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TRENDS IN PUBLIC EXPENDITURE ON EDUCATION
A Contrast between Two Educationally Backward States: Andhra Pradesh and Rajasthan

Jandhyala B.G. Tilak

Andhra Pradesh and Rajasthan are educationally backward. They also belong to the group of 'low performing' states, along with Bihar, Uttar Pradesh and Madhya Pradesh. Rajasthan, which was much behind Andhra Pradesh for a long period in educational development, has in the recent years forged ahead of Andhra Pradesh not only in educational development, but also in poverty reduction, and human development. This may be due to the increased levels of public spending on education in Rajasthan with a relative decline in Andhra Pradesh. But, relatively Andhra Pradesh is economically advanced; it has also adopted the new economic reform policies somewhat aggressively and is labelled as a 'progressive' state, while Rajasthan is described as a BiMaRU state. So a comparative study between the two states about public spending on education may provide interesting insights and may yield some useful lessons for other states. With this in mind, the paper discusses some of the important aspects relating to public expenditure on education, comparing and contrasting the situation in Andhra Pradesh and Rajasthan. It reviews the trends in public expenditure on education in general and elementary education in particular, during the last two decades, including the relative priority given to education in the fiscal framework. It also analyses inter-functional allocation of resources, sources of funds for elementary education, changing centre-state responsibilities in financing education, the contribution of external aid to education and the magnitude of household expenditure. It is found that Rajasthan is performing much better than Andhra Pradesh, and if the trends continue, Andhra Pradesh may replace Rajasthan in the category of BiMaRU states as far as education is concerned. The comparisons made here further explode the general presumption that finances do not matter much for the development of education. In fact, the evidence shows very clearly that sustained levels of expenditure on education are important for educational development. Second, it shows that even economically less advanced societies can accord high priority for education and increase the level of public spending on the same. Third, the trends reveal that rigorous pursuance of economic reform policies may adversely impact public expenditure on education.

'... it is precisely in the area of finance that so many of the nobler aims of education are defeated'.
Mark Blaug [1972].

I. INTRODUCTION

According to the human investment revolution in economic thought [Schultz, 1961, Pp. 1-17], and in India the Education Commission [1966], and more particularly the *National Policy on Education 1968* [Government of India, 1968], expenditure on education is an investment in human beings, an important investment for development, deserving high priority and an activity on which we had better spent more and more. It follows that expenditure on education is to be treated not as a burden on the public exchequer, and as an activity on which resources have to be saved, but as an investment of priority nature. Education is widely perceived as a crucial

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vehicle for social and economic development. It is also seen as a public good producing a huge set of externalities. Therefore, public policy towards education is one of the most critical areas of development strategies, and public expenditure on education is the most significant aspect of such a policy. Public expenditure on education assumes much significance, especially in developing societies like India, in the provision of education, in ensuring equity and quality in education and in promoting education as a public good and as a human right.

It appears that this view has not gone deep into the minds of our governments - union or states, the economic planners and the educational policy makers and planners. As a result, education system in India suffers from severe inadequacy of resources, and is in a deep financial crisis. This can be easily noted as the problem of resource scarcity assuming serious proportions, while at the same time the need for more resources is increasing rapidly. The financial crisis includes (a) inadequacy in the allocation of resources to education, (b) relatively low fiscal priority for education, and (c) improper allocation of resources within education sector among different levels and items of expenditures. The education systems in Andhra Pradesh and Rajasthan testify to all these important dimensions of the financial crisis. Andhra Pradesh has also adopted the new economic reform policies somewhat aggressively and was labelled as a 'progressive' state by the neo-liberals and as a 'pioneering state to earnestly initiate economic and fiscal reforms at the state level in India' by many others,[1] while Rajasthan is considered for a long period as a *bimaru* (BiMaRU) state. Hence, the comparison between the two states may reveal interesting aspects of educational development and is hoped to yield some useful lessons for other states.

Andhra Pradesh and Rajasthan are regarded as educationally backward states with literacy and enrolment ratio being the national averages. In terms of public spending on education also, both states belong to the group of 'low performing' states, along with Bihar, Uttar Pradesh and Madhya Pradesh.[2] That the education situation in Andhra Pradesh has been below the national average is well known. But what is surprising is that Andhra Pradesh is now performing worse than some of the more backward states. Rajasthan was behind Andhra Pradesh for a long period in terms of most indicators of educational development. But in recent years, the performance of Rajasthan has been remarkable, and as a result, its relative ranking position improved over Andhra Pradesh, as some of the indicators presented in Table 1 show.

Rajasthan could improve by 22 percentage points in its effective rate of literacy between 1991 and 2001, equalling the rate of literacy in Andhra Pradesh, and in case of male literacy Rajasthan could stand above national average. The gross enrolment ratio in primary education is now higher in Rajasthan than in Andhra Pradesh, though it was less by more than 20 per cent points a decade ago. In terms of transition rate from primary to upper primary level of education, in the provision of infrastructure in schools, and with respect to quite a few other important indicators of educational development, the situation in Rajasthan is much better today than what it was a decade ago, and is better than that in Andhra Pradesh. The development of the state of Rajasthan is not confined to education; Rajasthan excelled Andhra Pradesh in terms of reduction in poverty and human development as well, though it is still much behind Andhra Pradesh in the level of economic development, measured in terms of gross state domestic product (GSDP) per capita.[3]

Table 1. Indicators of Educational development in Andhra Pradesh and Rajasthan

(1)	Andhra Pradesh (2)	Rajasthan (3)
Literacy		
1991	44	39
2001	61	61
Gross Enrolment Ratio in Primary Education (%)		
1990-91	109.16	79.16
2003-04	87.72	109.41
% increase in enrolments in Primary education between 1993 and 2002	21.74	55.09
Transition Rate from Primary to Upper Primary Education (2003)	62.91	67.87
School Infrastructure (2004)		
% of Schools having		
Drinking water facility	58.45	73.85
Toilet facility	37.56	43.52
Facility for medical check-up of the students	67.39	74.29
Poverty (% of people below the poverty line)		
1993-94	22.19	27.14
1999-2000	15.77	15.28
Human Development Index (with rank)		
1991	0.377 (9)	0.347 (12)
2001	0.416 (10)	0.424 (9)
GSDP per capita 2000-01 (Rs)	18,104	13,685

Source: Economic and Political Weekly (EPWRF, 2004; Planning Commission, 2002; National Institute of Educational Planning NIEPA (2005), MHRD (a), and NCERT (2005).

It can be hypothesised that much of the improvement in education in Rajasthan is directly related to the increase in public spending on education, and the relative deterioration in Andhra Pradesh to the reduced levels of public expenditure on education. With this in background, the paper presents a comparative analysis of trends in public expenditure on education in the two states.

The paper discusses some of the important aspects relating to public expenditure on education, comparing and contrasting the situation in Andhra Pradesh and Rajasthan. The paper concentrates on public expenditure on education. A review of the trends in public expenditure on education during the last two decades and a half is attempted in Section 2, focusing on total and per capita expenditure in current and constant prices made by the Departments of Education and 'other' departments - central and state. It also analyses plan and non-plan expenditures. The relative priority given to education in the fiscal framework - in state income, state budget and five year plans is the focus of discussion in Section 3. After reviewing the pattern of intra-sectoral allocation of resources, i.e., allocation of resources to different levels of education briefly, Section 4 concentrates on elementary education, focusing on total expenditure, per student, and relative share of elementary education in state income, state budget and total education budgets. A brief account of inter-functional allocation of resources in elementary education is also presented. Section 5 analyses the sources of funds for elementary education, and describes the changing centre-state responsibilities in financing education and the contribution of external aid to education. Section 6 presents a brief idea on the magnitude of household expenditure on education. The quantum of resources required for universal elementary education seems to be huge,

as shown in Section 7. The paper ends with a short summary and a few concluding observations. Thus the scope of the paper is somewhat exhaustive. But, in fact, neither the selection of issues is exhaustive, nor the discussion on each issue comprehensive and thorough. The purpose of the paper is to present a fairly good understanding of the issues relating to financing of education in the two states.

Public expenditure on education has increased remarkably since independence in both Andhra Pradesh and Rajasthan, like in many other states in India. We concentrate here on the trends during the last 25 years, i.e., since 1980-81 to 2004-05. The period covers about five years before the *National Policy on Education 1986* (Government of India, 1986) was adopted by the Government of India and the post-Policy period including pre-*adjustment* and *adjustment* periods. Economic reform policies were introduced in India in the early half of the 1990s; and foreign aid for education was accepted for the first time in a big way since 1993-94. So the 25-year period we study is likely to capture some interesting developments in these two states under diverse conditions.

II. TRENDS IN PUBLIC EXPENDITURE ON EDUCATION

Economically Andhra Pradesh belongs to a middle income state with a per capita GSDP of Rs 18,104, ranking 14th among 27 major states and union territories; and Rajasthan a low income state with Rs 13,685 per capita GSDP, ranking 22nd in 2000-01 [EPWRF, 2004]. However, the relative economic position of the states may not necessarily explain the levels of spending on education. Let us examine the levels of public spending on education in the two states.

Government expenditure on education has increased by more than 20 times between 1980-81 and 2004-05 in both Andhra Pradesh and Rajasthan. It increased from Rs 290 crore to Rs 6236 crore during this period in Andhra Pradesh, and from Rs 157 crore to Rs 4230 crore by 2004-05 in Rajasthan. These figures include expenditure on education incurred by the Department of Education and also other Departments of the government. It increased at an annual rate of growth[4] of 13.6 per cent in Andhra Pradesh and at a rate of 15.5 per cent in Rajasthan. But in constant (1993-94) prices, and in per capita terms, these figures are not so impressive, as shown in Table 2.

Table 2. Growth in Government Expenditure on Education

	Total (Rs Crore)				Per Capita (Rs)			
	in current prices		in 1993-94 Prices		In current prices		In 1993-94 Prices	
(1)	AP (2)	Rajasthan (3)	AP (4)	Rajasthan (5)	AP (6)	Rajasthan (7)	AP (8)	Rajasthan (9)
1980-81	291.3	153.7	914.0	463.2	55.11	45.16	172.90	136.74
1985-86	687.2	360.6	1481.3	726.2	116.64	92.33	251.43	185.94
1990-91	1231.4	890.2	1742.5	1226.8	187.54	202.57	265.36	279.17
1995-96	2206.2	1830.6	1788.3	1556.4	307.84	371.79	249.53	316.09
2000-01	4012.9	3337.6	2472.3	2211.9	527.97	623.03	325.29	404.83
2003-04+	5965.9	4017.5	3193.8	2150.7	699.45	611.19	389.75	340.66
2004-05*	6236.4	4230.4						
Growth	13.6	15.5	4.6	7.3	11.9	13.6	2.7	5.0

Note: + revised estimate; * Budget estimate;
per capita figures shown against 2003-04 refer to 2002-03 (actual).
Growth: Annual rate of growth (%)
Source: based on MHRD (a and b), MOF [2005] and CSO [2005].

In constant (1993-94) prices[5] the total government expenditure on education increased by only 3.5 times in Andhra Pradesh (at a rate of growth of 4.6 per cent per annum) and 4.6 times or at a rate of growth of 7.3 per cent in Rajasthan between 1980-81 and 2003-04. The government expenditure on education per capita (per head of population) increased in current prices from Rs 55 to Rs 700 in Andhra Pradesh, and from Rs 45 to Rs 611 in Rajasthan between 1980-81 and 2002-03. In other words, in both states it increased by more than 13 times during this period. But in 1993-94 prices, it has increased only by 2.3-2.5 times. While in per capita terms the real growth has been around 5 per cent on average in Rajasthan, it is only 2.7 per cent in Andhra Pradesh.

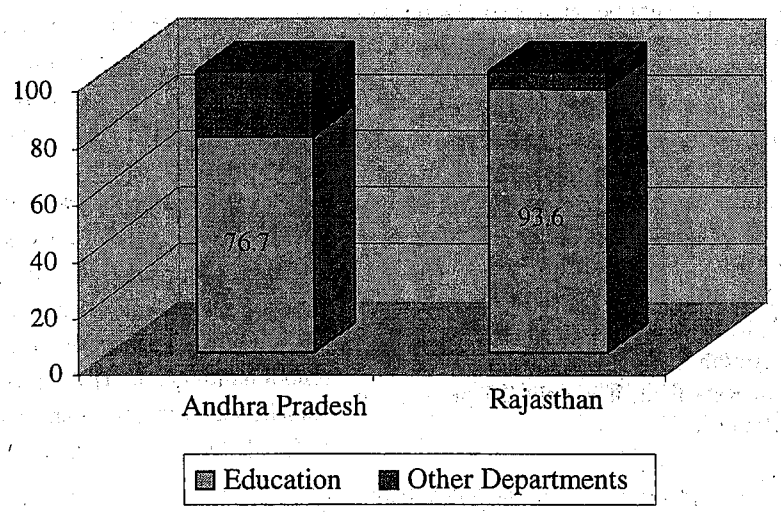
The relative position of both the states is not satisfactory in relation to other states on public spending on education per head of population. Andhra Pradesh and Rajasthan respectively rank 22nd and 23rd among the 28 states on which such data are available for 2002-03. They are ahead of only Bihar, Uttar Pradesh, Orissa, Madhya Pradesh, and Chhattisgarh. Thus both Andhra Pradesh and Rajasthan are characterized by backwardness in public spending on education or in fact by chronic underinvestment in education. But between the two states, the increase has been at a higher rate of growth in Rajasthan than in Andhra Pradesh. In fact, in per capita terms Rajasthan which was behind Andhra Pradesh in 1980-81, seemed to be spending more than Andhra Pradesh in 2000-01, thus not only just reducing the gap between the two states, but also even surpassing Andhra Pradesh.

Expenditure on Education by Department of Education and Other Departments

Budgetary resources flow into education from the Departments of Education, and also form other Departments/Ministries, both at the central and state level. While the share of the Department of Education is substantial, other departments also contribute significant amounts to the education budget. In Andhra Pradesh and Rajasthan also expenditure on education is incurred by the government not only by the Department of Education, but also by other Departments. Among the several departments, important ones at the state level, include Department of Tribal Welfare (on school education), Department of Health and Medicine (on medical education, including nursing and dentistry), Department of Agriculture (on agricultural education), etc. Expenditure on school buildings under the programme of Operation Blackboard was incurred by the Department of Rural Development under the National Rural Employment Programme (NREP). Other departments generally spend on three kinds of education: formal education, training and informal education. But most of the expenditure is on formal education. Training activities receive a small amount of resources, and informal education negligible amounts. While the Department of Education meets a major share of expenditure on education, other Departments in Andhra Pradesh are found to finance about one-fourth of the total expenditure on education. But in Rajasthan it is very small, 6 per cent in 2004-05, as shown in Figure 1. In a few other states, other departments meet 20-30 per cent of the total expenditure on education.

In Andhra Pradesh the Department of Social Welfare is found to be contributing to about 10-15 per cent of the total expenditure on school education, and the Department of Tribal Welfare about three per cent. Specifically in case of elementary education, nearly 95 per cent of the total expenditure comes from the Department of Education alone. The Departments of Tribal

Figure 1.
How Much do Other Departments Spend on Education? (2004-05)



Source: Based on *Analysis of Budget Expenditure on Education 2002-03 - 2004-05.*

Welfare and Social Welfare share the remaining five per cent, the former accounting for about four per cent. The Department of Social Welfare has been gradually increasing its expenditures on education of Scheduled Castes, Scheduled Tribes and other backward castes, under both plan and non-plan categories. Departments of Tribal/Social Welfare actually run a number of schools, and maintain hostels. So states that have large populations belonging to Scheduled Castes and Scheduled Tribes (e.g., Madhya Pradesh and Orissa) are generally found to have 'other' departments spending considerable amounts on education.

Since expansion of education benefits all departments and all sectors of the economy, it may be good if every department allocates a small fraction of their budget to education - directly to spend on education by themselves or to reallocate in favour of the education sector. In this sense, it is not only a few departments, such as the Departments of Tribal Welfare and Social Welfare, but all other departments may be required to allocate a fixed proportion of their budgets to education sector. Though one can argue that when resources are allocated to education from the common pool of budgetary resources, this does happen implicitly, some argue that explicit allocation may highlight the recognition by other sectors of their dependence on the education sector; and thereby the recognition of the importance of education by the society as a whole, besides increasing the quantum of resources that would be available to education.

Plan and Non-Plan Expenditure

The total revenue expenditure[6] on education (and also on other sectors) incurred by the

Department of Education and/or by other Departments, is composed of 'plan' and 'non-plan' expenditure. Plan expenditure is generally meant for plan or development activities (new programmes, projects, schemes, new schools, new buildings, new teachers, etc.), while non-plan expenditure is meant for maintenance of the system. That is, the latter is the committed expenditure on the existing system, like salaries of the existing staff, expenditure on the maintenance of the schools, etc. So all plan expenditures are transferred into non-plan account by the end of each Five Year Plan. Thus, as the system expands, non-plan expenditure bulges rapidly. Presently a large bulk of the expenditure on education in India is of non-plan category. In Andhra Pradesh and Rajasthan also, the non-plan expenditure on education forms above 80 per cent of the total expenditure on education. In Andhra Pradesh, the share of plan expenditure used to be much less, below 10 per cent during the 1990s, and it is only in the last few years, it has increased. In Rajasthan it has been above 10 per cent, as shown in Table 3.

Table 3. Plan and Non-Plan Expenditure on Education (% Distribution)

	Andhra Pradesh			Rajasthan		
	Plan	Non-Plan	Total	Plan	Non-Plan	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1990-91	6	94	100	13	87	100
1995-96	8	92	100	22	78	100
2000-01	5	95	100	13	87	100
2005-06*	12	88	100	14	86	100

Note: * Revised Estimate.
Source: Based on MHRD (b).

While both plan and non-plan expenditures are important, it is to be noted that plan expenditures can set new directions for development. At the same time, the resource planners enjoy more freedom or exercise more leverage with plan resources, as they can be increased or cut, without affecting the existing system, than with non-plan resources, as the latter are committed expenditures. For the same reason, one does not find a steady growth in plan expenditures on education, as one finds in case of non-plan expenditure.

It is natural that as the system of education expands, the relative share of plan expenditure declines and the share of non-plan expenditure increases. But as along as the unfinished tasks are huge in terms of, say for example, additional school buildings and classrooms to be constructed, additional teachers to be recruited, additional programmes to be launched for the improvement in quality, equity, etc., in addition to programmes for expansion, the financial needs of the plan category are also important. Therefore, it would be necessary to see that plan expenditures are not subject to serious fluctuations every year and, in stead, they increase steadily in real terms. In case of both Andhra Pradesh and Rajasthan, one would find the need for increases in plan expenditure as the needs of the system in terms of new schools, buildings, teachers, etc., are still large. For example, according to the *Seventh All-India Education Survey* [NCERT, 2005], 22 per cent of the rural habitations in Andhra Pradesh did not have any 'primary stage schooling facility' within the habitation in 2002; and in Rajasthan 20 per cent of the habitations did not have this facility even within a distance of one km. Seven per cent of the primary schools in Andhra Pradesh did not have any kind of buildings. About 21 thousand teachers, i.e., 12 per cent of all teachers in primary schools in Andhra Pradesh are *para-teachers* or part time teachers [see also NIEPA, 2005]. Such figures speak about the quality of physical infrastructure facilities and of teachers and at the same time stress the need for increase in plan investments in education.

III. RELATIVE FISCAL PRIORITIES: INTER-SECTORAL ALLOCATION OF RESOURCES

The priority given to education in the framework of the total state economy can be analysed in terms of a variety of indicators. Important ones are: share of education in state income, measured in terms of net state domestic product (NSDP), or gross state domestic product (GSDP) or simply state domestic product (SDP),[7] share of education in total government expenditure; and share of education in five year plan outlays/expenditures. Some of them are briefly examined here.

Share of Education in State Income

One of the most standard indicators of government efforts towards education is the percentage of state income spent on education. This also shows the priority given by the society to education *vis-à-vis* other sectors. On the recommendation of the Education Commission [1966], the Government of India [1968] quantitatively fixed a target of allocating six per cent of national income to education from the public exchequer by 1986; but the goal continues to remain elusive.[8] Recently, it is estimated that a substantial increase in allocation of resources would be required to reach this goal [MHRD (g), 2005].

Neither the Education Commission, nor the Government of India has made any such recommendation for states, though it is generally felt that the six per cent should also be considered as a goal at the state level. Both Andhra Pradesh and Rajasthan are much below the national target, though between the two, the performance of the state of Rajasthan is somewhat better in this regard. Government expenditure on education in Rajasthan formed 2.9 per cent of its NSDP in 1980-81, which increased to 4.5 per cent in 2004-05.

Table 4. Changing Relative Fiscal Priority for Education

	Government Expenditure on Education			
	% of NSDP		% of Total Budget Expenditure	
	Andhra Pradesh	Rajasthan	Andhra Pradesh	Rajasthan
(1)	(2)	(3)	(4)	(5)
1980-81	3.35	2.87	25.09	24.92
1985-86	4.24	3.55	24.71	23.92
1990-91	3.48	3.72	22.37	25.58
1995-96	2.76	3.87	20.79	21.97
2000-01	2.92	4.37	17.39	22.20
2004-05*	2.61	4.45	14.30	21.12

Note: * revised estimate Source: Based on MHRD (b).

In contrast, in 1980-81 Andhra Pradesh was spending a higher proportion than Rajasthan; but by 1990-91, Rajasthan overtook Andhra Pradesh; and it was allocating a higher proportion of its NSDP than Andhra Pradesh, and the trends continued in the later period. In 2004-05, Rajasthan allocated 4.5 per cent, while Andhra Pradesh allocated 2.6 per cent of NSDP for education, as the figures in Table 4 show.

Among the major states, Himachal Pradesh spends as high as 7.3 per cent of its NSDP on education.[9] Kerala used to spend above six per cent; it is only in the recent years, Kerala could afford to reduce the proportion, given the success in universal school education. Now the corresponding ratio for Kerala is 5 per cent. Both Andhra Pradesh and Rajasthan have to make special efforts to raise their respective allocations to education as a proportion of the NSDP to reach the national norm of six per cent. In fact, both Andhra Pradesh and Rajasthan may have to allocate much above 6 per cent of NSDP to provide education of reasonable quality. Hence, they have to set the target at a higher level than the national target of six per cent for achievement in near future. This was also felt necessary for the country as a whole [see MHRD (g), 2005].

Share of Education in the Government Budget

A more important gauge of governmental priority given to education is a measure in terms of expenditure on education as a percentage share of total government expenditure or the budget. This is more important because, the government has more direct control on government expenditure than on SDP. Andhra Pradesh and Rajasthan were spending about one-fourth of their respective revenue budgets on education in 1980-81. But Andhra Pradesh has progressively reduced the share of education in the budget in the subsequent years and it stood at 14 per cent in 2004-05. Rajasthan also reduced the relative priority given to education in the revenue budget, but the decline is marginally less, but it still spends a little above one-fifth of its revenue budget on education. Both states lag behind educationally advanced states like Kerala which presently spend nearly one-fourth of its budget on education. Kerala used to spend a much higher proportion earlier.

As already noted, the budget expenditure includes plan expenditure and non-plan expenditure. The percentage share of plan expenditure spent on education reveals the relative priority given to education in plan framework. Plan priorities have not been systematic in general, and also in case of Andhra Pradesh and Rajasthan. Between 1990-91 and 2004-05, it fluctuated much in Andhra Pradesh: it was 8.4 per cent in 1990-91, 11.9 per cent in 1995-96, declined to below 5 per cent in 2000-01 and then increased to 6 per cent in 2004-05! We note similar fluctuations in Rajasthan too: it was 25 per cent in 1995-96; and only 14 per cent in 2004-05. In case of non-plan expenditure, there is a somewhat steady decline in the share of education in both states, as revealed by the trends shown in Table 5.

Table 5. Share of Education Expenditure in Total Plan and Non-Plan Expenditure (%)

	Plan Expenditure		Non-Plan Expenditure	
	Andhra Pradesh	Rajasthan	Andhra Pradesh	Rajasthan
(1)	(2)	(3)	(4)	(5)
1990-91	8.35	18.45	25.26	27.18
1995-96	11.86	25.61	22.16	21.10
2000-01	4.67	23.17	20.25	22.06
2004-05*	6.25	14.28	17.23	22.30

Note: * revised estimate Source: Based on MHRD (b).

With respect to percentage of NSDP allocated to education, both Andhra Pradesh and Rajasthan rank poorly in comparison with other states. Rajasthan ranks 17th and Andhra Pradesh 23rd among the 28 states on which data are presented in Table 6.

Both states fare relatively better in case of the share of budget allocated to education: Andhra Pradesh 15th and Rajasthan 11th. The table also gives data on per capita expenditure on education. In general, it can be concluded that with respect to all the three indicators, but more particularly with respect to percentage share in NSDP and expenditure on education per capita, Andhra Pradesh and Rajasthan lag far behind many other states in India. This may partly explain the overall educational backwardness of these two states, compared to other states.

Expenditure on Education in Five Year Plans

The five year plan outlays provide important directions for development and set targets for achievement during the five year plan period. They also indicate sectoral distribution of the plan resources. The relative priority accorded to education in the five year plans in Andhra Pradesh has been quite erratic. In the second and the third five year plans, the state had allocated more than six per cent of the total plan outlay/expenditure to education. The corresponding proportion

Table 6. Expenditure on Education in India: Inter-State Comparisons

(1)	2003-04/2004-05 % of NSDP (2)	% of Total Budget (3)	2002-03 Per capita Rs. (4)
Andhra Pradesh	3.64	19.45	708.10
Arunachal Pradesh	9.47	16.04	1423.68
Assam	7.23	22.38	965.84
Bihar	7.05	26.14	397.82
Chhattisgarh	5.95	26.99	606.82
Goa	4.09	14.93	2301.58
Gujarat	2.96	17.89	798.82
Haryana	2.77	17.20	799.40
Himachal Pradesh	7.25	20.03	1563.04
Jammu & Kashmir	6.60	14.77	979.99
Jharkhand	3.94	13.94	749.87
Karnataka	3.94	21.05	713.72
Kerala	5.00	24.31	893.11
Madhya Pradesh	3.89	17.37	521.89
Maharashtra	3.79	23.45	1067.67
Manipur	9.51	18.08	1525.71
Meghalaya	6.09	19.44	1147.54
Mizoram	10.62	16.73	2256.78
Nagaland	5.07	13.50	1024.74
Orissa	4.72	16.80	538.78
Punjab	3.58	14.53	947.93
Rajasthan	4.46	20.50	636.50
Sikkim	11.71	13.50	2587.05
Tamil Nadu	3.59	20.23	851.41
Tripura	8.09	25.24	1590.12
Uttar Pradesh	3.85	20.56	417.11
Uttaranchal	6.31	25.30	1209.25
West Bengal	3.04	20.18	745.90

Source: Based on MHRD (a and b).

declined to 3.4 per cent in the fourth five year plan. There has been a continuous decline in the proportion allocated to education in the subsequent five year plans. There was a special effort to increase the priority in the seventh Five Year Plan and the share of education went up to 4.8 per cent. This could be due to special programmes launched after the *National Policy on Education 1986* was formulated.

The tempo could not be maintained in the following period. In the eighth and the ninth Five Year Plans as small as 2.1 per cent of the total plan expenditure was spent on education. In the tenth plan it is proposed to be raised marginally, as shown in Figure 2. Even in absolute terms, the growth in expenditure on education in the Five Year Plans has not been smooth in the state of Andhra Pradesh [Tilak, 1998].

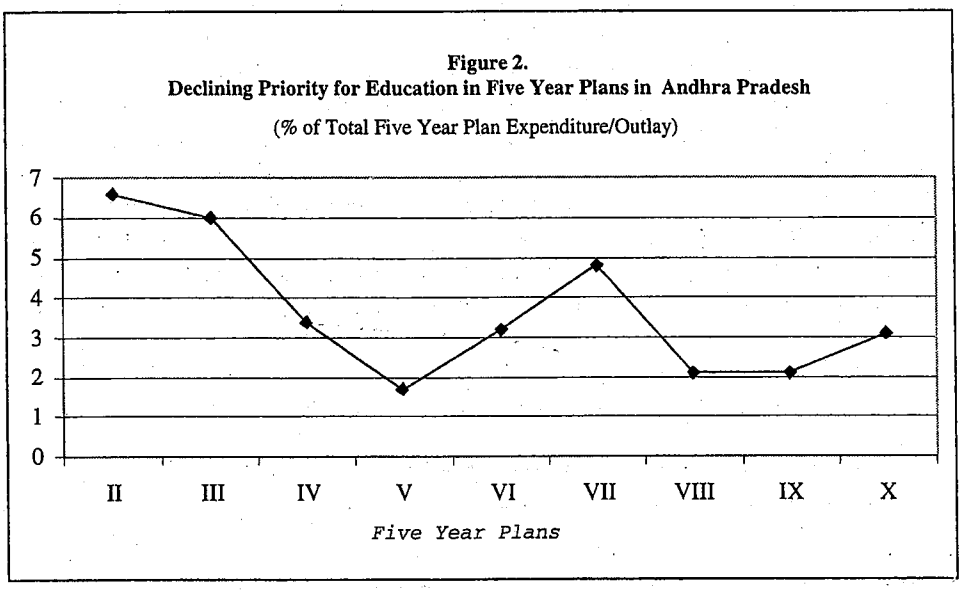
Even in case of Rajasthan, the trends were not smooth in the allocations in the last three five year plans (eighth to tenth plans), though Rajasthan allocates a higher proportion of the total plan outlay/expenditure to education. In the ninth plan, education sector received 10 per cent of the total; but according to the estimates available, the corresponding proportion is expected to decline to 5.4 per cent in the tenth plan. Even in absolute amounts there is a big fall, as the figures in Table 7 show.

Table 7. Expenditure on Education in Five Year Plans (Rs in crore)

Five Year Plan	Andhra Pradesh				Rajasthan			
(1)	VIII (2)	IX* (3)	IX (4)	X* (5)	VIII (6)	IX* (7)	IX (8)	X* (9)
General Education	175.48	491.23	364.33	1417.54	1099.27	2195.38	1691.82	1427.26
Technical Education	60.67	38.14	199.64	37.55	88.08	97.66	72.46	40.56
Total	236.15	529.37	563.97	1455.09	1187.35	2293.04	1764.28	1467.82
% of the Total of All Sectors	..	2.10	..	3.12	..	10.18	..	5.37

* approved outlay; .. not available

Source: Education Division, Planning Commission (unpublished).



Source: Tilak [1998] and Education Division, Planning Commission.

Such zigzag trends in plan priorities do not ensure healthy growth of the education system in any state. It is important to note that five year plan outlays are important as they set new directions for development. But it has to be concluded that sufficient attention has not been given to education to provide a steady flow of funds to education in the Five Year Plans in the states.

On the whole, the trends in total government spending on education in the two states reveal a few interesting trends. Andhra Pradesh today spends less than Rajasthan on education, in terms of totals - total expenditure, per capita, and in relative priorities - percentage of state income and total revenue expenditure of the state. It was not the same situation in the 1980s. The economic reform policies were found to have a significant effect on budgetary allocations to education in Andhra Pradesh, and the reform period has no adverse effect in Rajasthan. Rajasthan seemed to have become serious with education. As a result, expenditure on education and also relative priority given to education increased in Rajasthan during this period.[10]

Statistically also we find in Table 8 a significant negative impact of the reform period on expenditure on education as a proportion of SDP in Andhra Pradesh. The value of the coefficient of the dummy variable for the reform period used in the regression equation is negative and statistically significant.[11] It is well known that Andhra Pradesh has pursued the economic reform policies quite vigorously from the beginning, and Rajasthan has not, though it also started rather much later implementing the reforms.[12] Further, general level of economic development, measured in terms of SDP per capita has no relation

to the level of relative priority given to education in either of the states, confirming the general finding that level of public spending on education is not necessarily influenced by levels of economic development [Tilak, 1987, Pp. 132-99]. It may be felt that the influence of the per capita GSDP is not seen in the equation possibly because of the high correlation of it with the dummy variable (D). But as the results in Eqn.3 indicate, this is not the case. The level of economic development has no significant effect on the relative priority given to education. In both states, the level of economic development has no relation to the level of spending on education, as a proportion of SDP spent on education, as an increase (in principle also a fall) in SDP per capita is not followed by a proportionate increase (or a decrease) in the proportion of NSDP spent on education. Further, it is also well noted some of the economically better-off states (e.g., Punjab and Haryana) do not necessarily spend more on education than some of the economically poorer states (like Kerala and Himachal Pradesh) in terms of relative proportions and also in terms of absolute amounts - per capita or per student expenditure [see also Tilak, 1987].

Table 8. Regression Results of Expenditure on Education (*ln*EDEX/SDP) in Andhra Pradesh and Rajasthan

	Andhra Pradesh (1980-81-2000-01)			Rajasthan (1980-81-2001-02)		
	Eqn.1	Eqn.2	Eqn.3	Eqn.1	Eqn.2	Eqn.3
(1)	(2)	(3)	(4)	(5)	(6)	(7)
GSDP/pc	0.000012		-0.000018	0.000008		0.0000275
	(0.653)		(0.983)	(0.651)		(2.345)
D(YEAR)	-0.092	-0.082		0.0543	0.6239	
	(3.171)	(3.377)		(2.559)	(3.681)	
Intercept	0.4952	0.5619	0.637	0.4873	0.5315	0.404
	(4.791)	(35.342)	(5.627)	(7.236)	(46.405)	(6.061)
Adjusted R^2	0.3217	0.3422	-0.0016	0.3553	0.3739	0.1764
F-Value	5.742	11.403	0.967	6.787	13.539	5.497
N	21	21	21	22	22	22

Notation:
EDEX/SDP: Expenditure on education as % of SDP
GSDP/pc: Gross State Domestic Product per capita
D(YEAR): Dummy for Economic reform period; year = 1, if adjustment period, 0 otherwise t-values in parentheses.

Not only expenditure on education, but also expenditure on social services as a whole suffered severely in Andhra Pradesh. Total revenue expenditure of the state on social services accounted for 7 per cent during 1980-81 to 1990-91, and it came down to 6.1 per cent during the period 1991-92 to 2000-01 [Sudhakar Rao, 2006, p. 624] and the opposite is seen in Rajasthan [see also Dev and Mooij, 2002, Pp. 853-66]. The level of economic development, as represented by GSDP per capita, shows no relation to the proportion of SDP spent on education in Andhra Pradesh, but influences it favourably in Rajasthan. On the whole, if these overall trends in public expenditure on education continue, one may have to ponder the possibility of Andhra Pradesh taking the place of Rajasthan in the group of BiMaRU states.

IV. INTRA-SECTORAL ALLOCATION OF RESOURCES AND EXPENDITURE ON ELEMENTARY EDUCATION

The next important question is the pattern of intra-sectoral allocation of resources. Of the total resources available to education, what have been the priorities given to different levels of education? The distribution of resources between different levels of education shows the relative priority that the government attaches to various

levels of education.

Given the inadequate progress with respect to universal elementary education, and following the emphasis laid on elementary education in the *National Policy on Education 1986,* the union government had desired that at least fifty per cent of the total expenditure on education be allocated to elementary education, and the remaining 50 per cent be distributed among other levels of education.[13] Accordingly, many state governments have made necessary changes in the pattern of allocation of resources within education. While many states allocated nearly or about 50 per cent of the total to elementary education, there are some states which are far off the mark.

According to the latest statistics, presented in Table 9, elementary education in Andhra Pradesh received only 46 per cent of the total education expenditure, while in Rajasthan the corresponding proportion is 59 per cent in 2005-06.

Table 9. Distribution of Expenditure on Education, by Levels (%)

	1990-91		1995-96		2000-01		2002-03		2005-06*	
(1)	AP (2)	Rajasthan (3)	AP (4)	Rajasthan (5)	AP (6)	Rajasthan (7)	AP (8)	Rajasthan (9)	AP (10)	Rajasthan (11)
Elementary	46.0	54.4	43.1	56.0	40.0	57.8	42.1	57.3	45.9	58.9
Secondary	28.2	32.1	31.8	32.6	31.6	32.6	32.3	33.3	30.1	32.7
Adult	0.7	1.0	0.2	0.8	0.3	0.1	0.3	0.1	0.2	0.3
Higher	21.3	9.2	20.8	7.6	24.6	7.2	20.9	6.9	19.2	6.0
Technical	2.8	1.7	2.9	1.4	2.5	1.0	3.3	1.1	3.3	1.0
Physical	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
Other General	0.6	0.7	0.7	0.6	0.7	0.3	0.8	0.2	0.8	0.2
Language Development	0.4	0.9	0.4	1.0	0.4	1.0	0.3	1.0	0.3	0.9
Total	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Budget estimate.
Source: Based on MHRD (b).

Over the years there were changes: it was 46 per cent in Andhra Pradesh in 1990-91, declined to 40 per cent in 2000-01, and then it seemed to be increasing in the following years. In Rajasthan, on the other hand, it has been above 50 per cent. Secondary education is accorded a similar priority in both states: about one-third is allocated to secondary education. But there are significant differences in spending on higher education. While Andhra Pradesh spends about one-fifth of the total education budget on higher education, Rajasthan spends less than one-tenth. Other levels and types of education receive negligible proportions in both states.

Comparisons between the two states over the last 15 years present some interesting patterns:

* Andhra Pradesh has been spending less than 50 per cent of its education budget on elementary education; it varied between 40 and 50 per cent. While Rajasthan has been spending above 50 per cent (54-58 per cent).
* Rajasthan is consistent in allocating about 30 per cent to secondary education. Variations between several years are very small. Andhra Pradesh is not so consistent: its allocation to secondary education varied between 28 and 33 per cent.

* Higher education receives a better share in Andhra Pradesh - consistently above one-fifth of the total; Rajasthan is also consistent in its spending on higher education - but less than one-tenth; moreover, it also gradually declined from 9.2 per cent to 6 per cent of the total between 1990-91 and 2005-06.
* Both states spend very small amounts on technical education - Andhra Pradesh about 3 per cent, and Rajasthan much less, just around one per cent in 2005-06.
* Both states are consistent in spending insignificant proportions of their education budgets on other levels and types of education programmes.

Public Expenditure on Elementary Education

Universalisation of elementary education has been an important objective of educational planning in India. It is also felt that this is one area which is very much underinvested in terms of pubic funds, resulting in under achievement in the realisation of the goals relating to all important dimensions of universal elementary education, that include universal enrolment of all children of the age group 6-14 in formal schools, universal retention of the children in the school system until they complete at least eight years of schooling, and universal attainment of a minimum level of learning. Table 10 gives the trends in public expenditure on elementary education in the two states in current and constant prices.

While in current prices there has been a significant increase in both the states, the increase in real terms is very small in Andhra Pradesh, the rate of growth being 3.8 per cent per annum, while in Rajasthan the rate of growth has been reasonably satisfactory, eight per cent. What is interesting to note is: Andhra Pradesh was spending higher amounts in the 1980s, throughout the period from the beginning of the 1980s until 1990-91. But the relative position changed from 1993-94 onwards. In 2000-01, Rajasthan was spending about 40 per cent higher than Andhra Pradesh.[14] Along with this, as Andhra Pradesh has a larger number of enrolments than Rajasthan, the differences in per pupil expenditures are higher, as shown later.

Table 10. Expenditure on Elementary Education (Rs crore)

	in current Prices		in 1993-94 Prices	
(1)	Andhra Pradesh (2)	Rajasthan (3)	Andhra Pradesh (4)	Rajasthan (5)
1980-81	101.4	77.6	318.1	233.8
1985-86	243.1	172.9	524.0	348.2
1990-91	454.5	433.4	643.1	597.3
1995-96	724.7	939.6	587.4	798.9
2000-01	1392.7	1818.3	858.1	1205.0
2004-05*	2225.5	2284.5	..	..
Growth	14.6	20.3	3.8	8.0

Note: Growth: Annual rate of growth of the expenditure in 1993-94 prices refer to the period from 1980-81 to 2002-03 only.
* Budget estimates.
Source: Based on MHRD (b).

The relative share of plan expenditure on elementary education has increased from 10 per cent in 1990-91 to 21 per cent in 1995-96 in Andhra Pradesh. In contrast, in Rajasthan more than 90 per cent of the expenditure remained under non-plan category, as shown in Table 11. Probably, as the assistance from the union government to plan expenditure on elementary education in the 1990s was higher in Andhra Pradesh than in Rajasthan, it led to such a situation. Even in 2005-06 one-fifth of the total expenditure in Andhra Pradesh is of plan category. In Rajasthan, the relative proportion of plan expenditure is expected to suddenly increase to 16 per cent in 2005-06 from 2 per cent in 2000-01. These sudden increases and cuts cannot be easily explained, though one may find that in the last year or two of every five year plan in general, there could be a steep increase in plan allocations to exhaust the total allocations made in the five year plan [Tilak, 1987].

Table 11. Plan and Non-Plan Expenditure on Elementary Education

(per cent)

	Andhra Pradesh		Rajasthan	
(1)	Plan (2)	Non-Plan (3)	Plan (4)	Non-Plan (5)
1980-81	6	94	3	97
1985-86	9	91	7	93
1990-91	10	90	7	93
1995-96	21	79	5	95
2000-01	14	86	2	98
2005-06*	16	84	16	84

Note: * Budget estimate Source: Based on MHRD (b).

IV.2 Share of Elementary Education in State Income and Government Budget

The relative priority accorded to elementary education can be analysed in terms of the share of expenditure on elementary education as a proportion of (a) SDP, (b) total government budget, and (c) total budget expenditure on education. The trends with respect to these three are shown in Table 12.

Table 12. Indicators of Relative Priority for Elementary Education

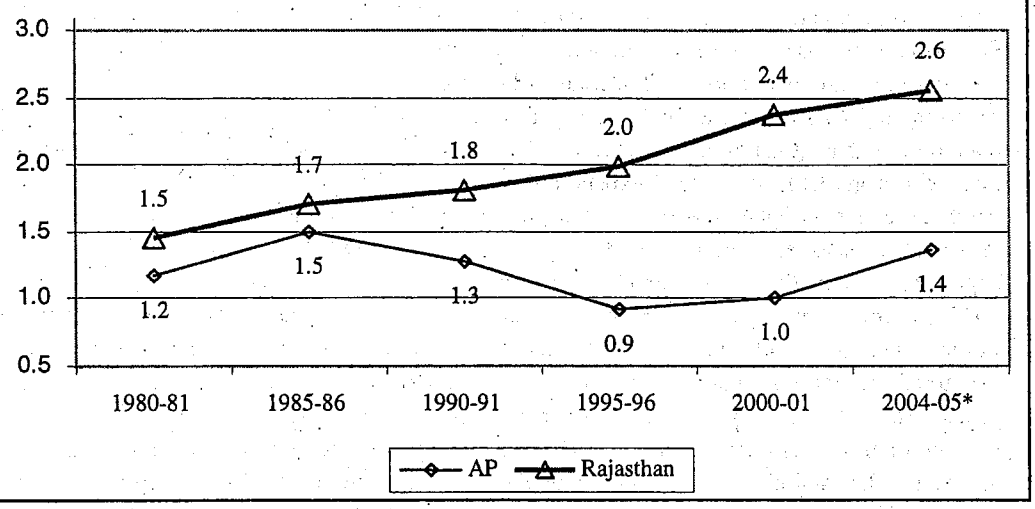
	% of SDP		% of Total Government Budget		% of Total Education Expenditure	
(1)	Andhra Pradesh (2)	Rajasthan (3)	Andhra Pradesh (4)	Rajasthan (5)	Andhra Pradesh (6)	Rajasthan (7)
1980-81	1.17	1.45	8.73	12.58	35	50
1985-86	1.50	1.70	8.74	11.47	35	48
1990-91	1.28	1.81	8.26	12.45	37	49
1995-96	0.91	1.99	6.83	11.28	33	51
2000-01	1.01	2.38	6.04	12.09	35	54
2004-05*	1.37	2.56	6.52	11.67	46	58

Note: * Budget estimate Source: Based on MHRD (a and b).

All the three indicators clearly reveal that Rajasthan has accorded a higher priority to elementary education than Andhra Pradesh throughout the period examined here. As the trends in expenditure on elementary education reveal, the share of elementary education in SDP declined in Andhra Pradesh from 1.5 per cent in 1985-86 to 0.9 per cent in 1995-96. Though it increased marginally later, it remained much below the 1985-86 level of 1.5 per cent. As the Figure 3 shows clearly the gap between the two states increased during the last 20 years, i.e., between 1985-86 and 2004-05. Rajasthan spends in 2004-05 nearly double the ratio that Andhra Pradesh allocates to elementary education.

Similarly while in Rajasthan, above ten per cent of the revenue budget was consistently

Figure 3. Share of Expenditure on Elementary Education in SDP (%)



Source: Based on *Analysis of Budget Expenditure on Education and Domestic Product of States of India.*

allocated to elementary education, it remained much below ten per cent in Andhra Pradesh. In Andhra Pradesh, it also declined from 8.7 per cent in 1980-81 to 6.5 per cent in 2004-05. Further, Rajasthan spends nearly or above half of the total education expenditure on elementary education; but in Andhra Pradesh it remained around one-third. According to the latest budget estimates, it may be above 40 per cent in 2004-05.

Thus, elementary education received better treatment in Rajasthan than in Andhra Pradesh during the last 25 years in the overall fiscal framework and also within education budget.

It is not only in terms of total expenditure and relative priorities, but also in terms of expenditure per student, Rajasthan made significant improvement over the years, as shown in Table 13. Rajasthan was spending consistently higher amounts per student than Andhra Pradesh.

In constant prices, per student expenditure on elementary education increased at an annual rate of growth of 2.9 per cent in Rajasthan between 1980-81 and 2000-01, while in Andhra Pradesh, it increased only at the rate of 1.5 per cent per annum. But the annual rate of growth has not been consistent in either of the states. While the highest rate of increase was noticed in Andhra Pradesh during 1980-81 to 1984-85, it was during 1985-86 to 1989-90 that Rajasthan could experience such a high rate of growth.

As in case of total expenditure on education, expenditure on elementary education also suffered during the reform period in Andhra Pradesh. Similar equations are estimated and the results are shown in Table 14.

Table 13. Public Expenditure on Elementary Education Per Student (Rs Per Annum)

	Andhra Pradesh		Rajasthan	
	in current Prices	in 1993-94 prices	in current prices	in 1993-94 Prices
(1)	(2)	(3)	(4)	(5)
1980-81	189.72	595.21	244.33	736.54
1985-86	347.36	748.78	373.23	751.60
1990-91	581.68	823.08	835.94	1152.07
1995-96	968.40	784.98	1309.79	1113.57
2000-01	1602.66	987.40	1816.53	1203.84
2002-03*	1901.38	1059.51	2222.33	1238.68
Annual Growth Rates				
1980-81 to 1984-85	17.02	8.06	9.16	1.15
1985-86 to 1989-90	13.44	5.28	15.50	8.36
1990-91 to 1994-95	15.00	2.62	8.98	-0.76
1995-96 to 1999-2000	10.54	4.05	8.46	2.49
1980-81 to 2000-01	10.82	1.46	11.57	2.93

* revised estimate.
Source: Based on MHRD (a and b).

Table 14. Regression Results of Expenditure on Elementary Education (*ln*ELEYEDEX/SDP) in Andhra Pradesh and Rajasthan

	Andhra Pradesh (1980-81-2000-01)			Rajasthan (1980-81-2001-02)		
(1)	Eqn.1 (2)	Eqn.2 (3)	Eqn.3 (4)	Eqn.1 (5)	Eqn.2 (6)	Eqn.3 (7)
GSDP/pc	-0.0000087		-0.000047	-0.0000014		-0.1026
	(0.546)		(2.416)	(0.097)		(7.834)
D(YEAR)	-0.1153	-0.1226		0.8818	-0.0805	
	(4.503)	(5.741)		(3.534)	(4.399)	
Intercept	0.1847	1.136	0.3626	0.2268	0.2198	0.3567
	(2.026)	(9.70)	(3.106)	(3.086)	(17.813)	(24.959)
Adjusted R^2	0.6403	0.6151	0.1947	0.4386	0.4664	0.7419
F-Value	16.018	32.955	5.836	9.202	19.352	61.379
n	21	21	21	22	22	22

Notation
EDEX/SDP: Expenditure on education as % of SDP
ELEYEDEX/SDP: Expenditure on Elementary Education as % of SDP
GSDP/pc: Gross State Domestic Product per capita
D(YEAR): Dummy for Economic reform period; year=1, if adjustment period, 0 otherwise Figures in parentheses are t-values.

The results show that the reform period has had a severe adverse effect on the revenue expenditure on elementary education in Andhra Pradesh. But the expenditures on elementary education in Rajasthan were not adversely affected.[15] This is despite the fact that the District Primary Education Project (DPEP), a major externally aided project was adopted in Andhra Pradesh in the early 1990s, i.e., at the very beginning of the project, and aid had flown in

through the union government, and this project was not adopted in Rajasthan until 1999.[16] Further, in both states, the level of economic development, as represented by the GSDP per capita, shows a negative effect on the proportion of SDP spent on elementary education.

IV.3 Inter-Functional Allocation of Resources

A substantial part of the expenditure on school education is of recurring nature and most of the recurring expenditure is on salaries of teachers and other staff. More than 95 per cent of the total[17] recurring expenditure on primary and upper primary schools in Andhra Pradesh and Rajasthan is incurred on salaries and allowances of the teaching and other staff in 1996-97, the latest year for which such data are available, which are given in Table 15. All other items including scholarships, incentives, materials receive petty little. In fact, available data do not provide any details on other expenditure.

Table 15. Functional Distribution of Expenditure on Primary and Upper Primary Education, 1996-97

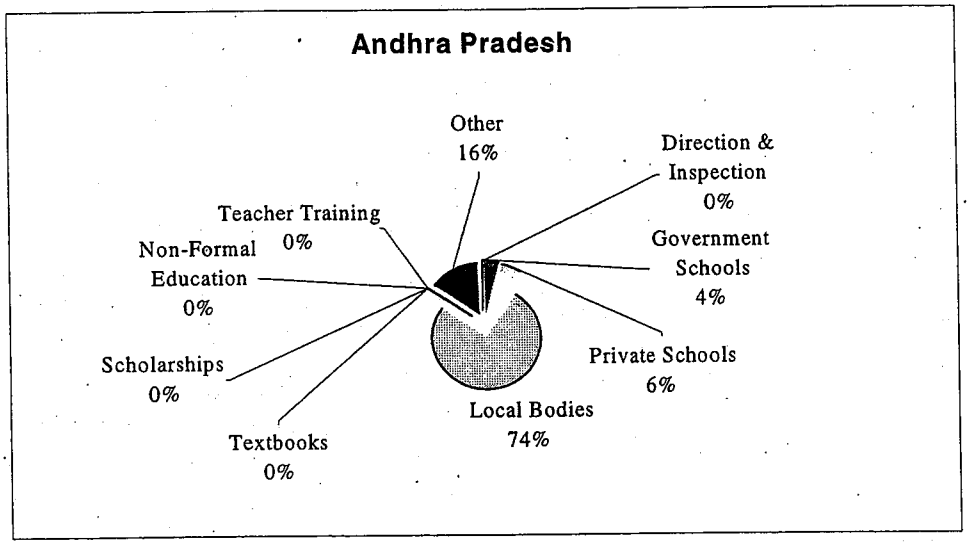
Per cent

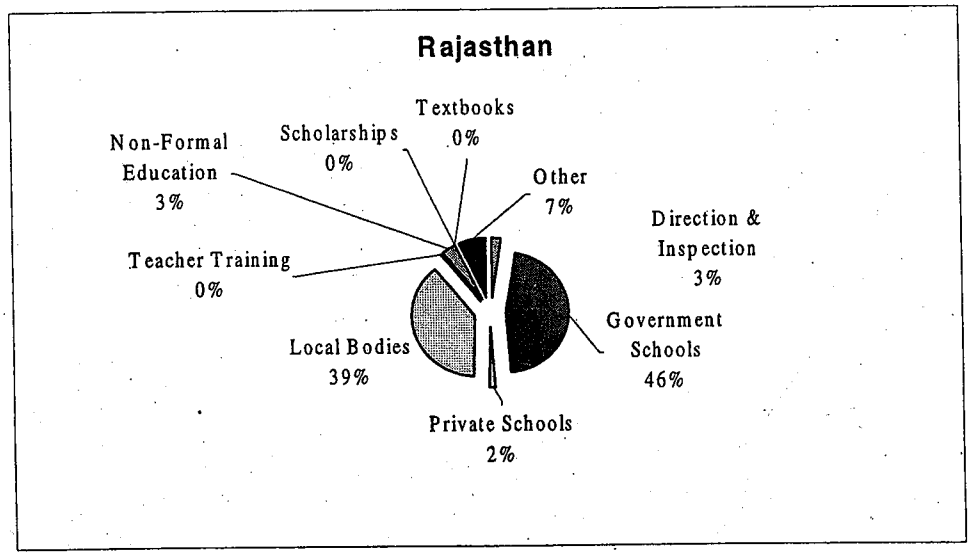
	Primary		Upper Primary	
	Andhra Pradesh (1)	Rajasthan (2)	Andhra Pradesh (3)	Rajasthan (4)
Recurring Expenditure				
Salaries & Allowances	97.0	98.6	96.8	95.4
Others*	3.0	1.4	3.2	4.6
Total	100.0	100.0	100.0	100.0
Total Recurring Expenditure	98.9	98.2	99.3	97.8
Non-Recurring Expenditure	1.1	1.8	0.7	2.2
Grand Total	100.0	100.0	100.0	100.0
Grand Total (Rs crore)	608.16	536.28	302.74	167.93

* includes maintenance expenditure on libraries, buildings, etc.
Source: MHRD (c) 1996-97.

We have somewhat different but elaborate details for more recent period [2003-04] on government expenditure.[18] They also confirm that expenditures on non-salary items are very small. According to these figures shown in Figure 4, negligible amounts are allocated to teacher training, scholarships, textbooks, etc. About 90 per cent is spent mostly on salaries, etc., in government, local body schools and private aided schools. Further, six per cent of the government expenditure on elementary education in Andhra Pradesh is given as grants-in-aid to private aided schools, which should in fact be called 'government aided private schools'. The corresponding ratio is only 1.5 per cent in Rajasthan. There is a larger number of private schools in Andhra Pradesh than in Rajasthan. 3.3 per cent of primary schools in Andhra Pradesh were private aided schools; in contrast, the corresponding ratio is only 0.7 per cent in Rajasthan in 2004 [NIEPA, 2005].

Figure 4. Distribution of Government Expenditure on Elementary Education, by Items, 2003-04





Source: Based on Analysis of Budget Expenditure on Education 2003-04-2005-06.

It is important to note the available evidence on developing countries that shows that investment in items such as textbooks, teaching learning material, teacher training, etc., that have close relation with quality of education yields higher returns than investment in other inputs. For example, Behrman and Birdsall [1983], Fuller et al. [1986] and Fuller [1990] have shown that investment in quality related inputs in education pays substantially and that unless schools have attained a threshold level of quality they cannot yield long-term economic benefits.

Secondly, to improve equity in education, it is also necessary that allocations to equity oriented items like scholarships at all levels, free text-books, noon meals, uniforms, etc., at school level are increased, besides providing 'free' education.

But both Andhra Pradesh and Rajasthan have been spending very little amounts on these various items in elementary education, though this is not very surprising, as this is more or less the same situation in many other states and the country as a whole [Tilak, 2003, Pp. 3-54]. The union and state governments seem to be concentrating all their expenditures on salaries only, salaries of teachers in case of elementary education.

V. SOURCES OF FUNDS FOR EDUCATION

The sources of funds for education in India include essentially the (a) Governmental sector (union government, state government, and local bodies such as *Zilla Parishads, Municipalities, Mandals,* and *Panchayats*), (b) Non-governmental sector (households: students/parents, on fees, maintenance costs, etc., and the rest of the community in terms of endowments and donations), and (c) foreign aid, consisting of bilateral aid and multi-lateral aid. Detailed data are available on (a) and (b) only. Among the contributions of the household sector, information from official sources is available only with respect to fee income accrued to educational institutions.[19] Focusing on the information available, one might note that like in most other developing and developed societies, government is the most important financier of education at all levels. Government - central and state, and local bodies, has been financing 95 per cent of the total expenditure on elementary education in many states in India.[20] Of course, local bodies also receive aid from the state governments.[21] This is same in Rajasthan and Andhra Pradesh also as shown in Table 16.

Government accounts for more than 95 per cent of the total income of elementary education of the education sector. But this is true with respect to recurring income only. Endowments and others which can be regarded as non-government or private funds for education constitute huge proportions in non-recurring income. But it has to be noted that non-recurring income is very small in quantum. For the same reason, in the totals (recurring plus non-recurring), government including local bodies account for 95 per cent and above.

The non-governmental contribution to financing of education is very limited - negligible in Rajasthan and 3-5 per cent in Andhra Pradesh in primary and upper primary education. In recent years, however efforts are being made to mobilise resources from communities both in cash and kind, and they are believed to be sizeable, though no quantitative information is available. They include both voluntary and non-voluntary contributions from the community.[22]

Earlier, funding from student fees was used to be mentioned as a separate source, though it accounted for a small proportion in primary and upper primary levels of education. But in recent years, in response to controversies on the relevance of fee in 'free' elementary education, fee income is clubbed along with endowment and others. So the above table does not necessarily mean that there is no fee in primary and upper primary levels of education in India or specifically in either of the two states. Several studies [e.g., Tilak, 1996a, pp. 355-66, 2002a, pp. 1-44, 2002b, pp. 231-67] have documented the prevalence of the phenomenon of fees in 'free' elementary education.[23] It was hoped that with the 86th Amendment of the *Constitution of India and the passage of the Free and Compulsory Education Bill* [MHRD (h), 2005] soon, all fees will be abolished in elementary level of education in all states. The Draft Bill provides for abolition of

Table 16. Sources of Income of Primary and Upper Primary Education, 1996-97

Per cent

	Primary		Upper Primary	
	Andhra Pradesh (1)	Rajasthan (2)	Andhra Pradesh (3)	Rajasthan (4)
Recurring				
Government	96.9	88.6	95.0	100.0
Local Bodies	0.0	11.2	0.0	0.0
Endowments & Others	3.1	0.2	5.0	0.0
Total	100.0	100.0	100.0	100.0
Non-Recurring				
Government	72.6	78.8	32.4	95.2
Local Bodies	0.0	0.0	0.0	0.0
Endowments & Others	27.4	21.2	67.6	4.8
Total	100.0	100.0	100.0	100.0
Total				
Government	96.6	88.5	94.6	99.9
Local Bodies	0.0	11.1	0.0	0.0
Endowments & Others	3.4	0.4	5.4	0.1
Total	100.0	100.0	100.0	100.0
Total (Rs crore)	607.65	502.10	302.31	188.66

Source: MHRD (c) 1996-97.

all kinds of fees and charges that students otherwise are required to pay, and also for provision of financial and other incentives in such a way that families do not experience any economic constraints in sending their children to schools. But unfortunately the Bill is now shelved by the union government and it is now left to the states to make an appropriate act at the sate level. It is widely feared that the resource-scare states may not take it up at all.

V.1 Centre-State Shares in Financing Education

Since 1950, education was largely a state subject, as per the provisions of the Constitution of India. However, it was made a 'concurrent' subject in 1976 with the 42nd amendment to the Constitution. Union government began taking serious interest in education, more specifically in elementary education since 1986, i.e., after the formulation of the National Policy on Education 1986. The 73rd and the 74th amendments to the Constitution of India in 1993 enlarged the powers of local bodies in school administration. But local bodies rely on grants from states, as they do not have much role in generating funds for education. In a federal system, the financial responsibilities of the union and state governments are important.[24] However, education continues to be largely funded out of state budgets, supplemented by assistance from union government - the states meeting about 90 per cent of the total - plan and non plan expenditure on education, and the union government meeting the rest. The union government meets a high proportion of plan expenditure, sometimes even about half in case of elementary education; but plan expenditure itself is very small in size in relating to non-plan expenditure. In short, a large part of the expenditure on education is met by the state government.

Union government finances education (and a few other sectors) in the states through (a) centrally sponsored schemes and (b) central schemes. The central schemes are totally financed by the union government, while the centrally sponsored schemes are only partially financed by the union government; the balance in case of the centrally

Table 17. Expenditure on Centrally Sponsored Schemes (Total Expenditure incurred during 1992-93 to 1998-99)

	Andhra Pradesh		Rajasthan	
	Rs Lakh (1)	% (2)	Rs Lakh (3)	% (4)
Operation Blackboard	12444.99	28.40	11160.17	22.62
Non-Formal Education	9794.07	22.35	7569.59	15.34
Teacher Education	4256.41	9.71	6890.42	13.97
Vocational Education	2554.36	5.83	2172.26	4.40
Science Education	593.12	1.35	412.17	0.84
Education Technology	1073.81	2.45	457.03	0.93
Environment Education	15.13	0.03	37.56	0.08
Integrated Education for Disabled Children (IEDC)	213.68	0.49	321.65	0.65
Computer Literacy and Studies in Schools (CASS)	373.81	0.85	418.17	0.85
Promotion of Yoga	26.00	0.06	0.00	0.00
Rural Functional Literacy Project (RFLP)	0.00	0.00	150.00	0.30
Jana Shikshan Nilayam/Post-Literacy & Continuing Education (JSN/PL&CE)	1641.49	3.75	570.59	1.16
Special Assistance Scheme (SAS)*	330.32	0.75	549.99	1.11
Appointment of Hindi Teachers	2.00	0.00	0.00	0.00
Development of Sanskrit	11.91	0.03	70.49	0.14
National Scholarships	0.00	0.00	0.90	0.00
Scholarships for Talented Children	105.98	0.24	1.68	0.00
Upgrdation of facilities for Scheduled Castes/Scheduled Tribes	0.97	0.00	4.11	0.01
Total Literacy Campaign/ Post-Literacy Campaign	4453.25	10.16	5433.45	11.01
Madarasa Education	30.55	0.07	31.55	0.06
Minorities Education	42.90	0.10	55.60	0.11
External Aided Projects				
District Primary Education Project (DPEP)	5850.00	13.35	1968.21	3.99
Lok Jumbish			11062.00	22.42
Total	43814.75	100.0	49337.59	100.00

* Probably this is now renamed as Special Assistance Programme (SAP)
Source: Based on MHRD (d) 1997 and 1999.

sponsored schemes is met by the state government. For example, vocational education is a centrally sponsored scheme, which is jointly financed by the state and the union governments. Schemes such as development of Sanskrit, literacy campaigns, etc., are totally financed by the Union government. Other programmes that come under either of these categories include DPEP, promotion of classical languages, education for disabled children, mid-day meals and operation blackboard, science education, education technology, environmental education, etc. Nowadays all schemes are classified as centrally sponsored schemes. During the period 1992-93 to 1998-99, in all, an amount of Rs 438 crore was allocated by the union government to Andhra Pradesh for centrally sponsored schemes in education and Rs 493 crore to Rajasthan, as presented in Table 17. Of the several schemes which the union government financed, four schemes accounted for the bulk. The operation blackboard scheme that was launched after the National Policy on Education 1986, to provide basic infrastructure - physical and human, and material to all primary and later upper primary schools, was the single most important scheme. Non-formal education,

teacher education/training, and literacy programme (total literacy and post literacy campaign) are the three other important schemes. However, the importance given to schemes like operation blackboard, non formal education and teacher training has declined understandably by the end of the 1990s. The noon meal scheme started in 1995-96 now accounts for 40-50 per cent of the total central assistance.[25]

Table 18. Share of Andhra Pradesh and Rajasthan in Some Centrally Sponsored Schemes 1996-2000 (% of All States)

(1)	Andhra Pradesh (2)	Rajasthan (3)
Operation Blackboard	7.30	6.10
Non-Formal Education	12.10	10.40
Teacher Training	5.80	14.90
TLC/PLC	4.60	25.00
External Aided Projects		
DPEP	17.80	8.90
Lok Jumbish	0.00	83.0
Mahila Samakhya	18.60	..
Total	12.60	11.10

Source: Srivastava [2005], Pp. 127-72 at p. 164.
Abbreviations: See Table 17.

In all, Andhra Pradesh and Rajasthan are also two major states that each accounted for about one-tenth of the total expenditure of the union government on central schemes in education, as the figures in Table 18 indicate. It means that all other states together accounted for the remaining 76 per cent of the total expenditure incurred by the union government on these centrally sponsored schemes.

Union government's assistance to elementary education, in general, under the plan category has been on increase since the beginning of the 1990s; and relatively the share of the states is declining. The increase in central expenditure on elementary education in the 1990s was partly possible due to external borrowing, and hence the growth in central expenditure on education can be regarded as 'aid-led growth' [Tilak, 1999a, Pp. 614-20]. Now in the recent years, most of the union government's allocations to elementary education under Sarva Shiksha Abhiyan (SSA) are accounted by the revenues received from education cess, and hence they may be regarded as 'cess-driven allocations' [Tilak, 2006b]. Further, while there are some important centrally sponsored schemes such as education for disabled children and mid-day meals, which aim at promoting equity in the system, the central transfers for education have not been found to be contributing to reduction in inter-state disparities. Similarly, while a predominant part of the education is financed by the states out of their own resources, one cannot say that central transfers have clearly promoted resource mobilisation by the states [Tilak, 1989, Pp. 450-80; see also Dev and Mooij, 2002, 853-66].

V.2 External Assistance for Education

Since the early 1990s, foreign aid began to flow almost for the first time into primary education in India in sizeable quantities. Most of the external assistance received for elementary education has been routed through the union government. Hence external aided projects, viz., the District Primary Education Project (DPEP), *Lok Jumbish* and *Mahila Samakhya* figure as centrally sponsored schemes in the above tables. Started slowly in early 1990s, they grew in importance by the end of the decade. Among these *Lok Jumbish*, a project originally financed by the Swedish International Development Agency (SIDA) is particularly an important project in Rajasthan that was started in 1992. It is 'merged' into *Sarva Shiksha Abhiyan* in 2004. 83 per cent of the total expenditure on Lok Jumbish was incurred in Rajasthan only, while DPEP, largely funded by the World Bank (as a credit from the

International Development Association) was taken up by most states.[26] *Mahila Samakhya,* a project aimed at empowerment of women, was financed the Dutch government and it was started in 1989. *Shiksha Karmi* is another externally aided project started in Rajasthan in 1987 with the support from SIDA, and is presently funded by British government. Some external assistance was also routed through the central budget in the form of state programmes and takes the form of additional central assistance to the states. This includes programmes, for example, the Andhra Pradesh Primary Education Project (APPEP) funded by the Overseas Development Assistance (ODA) of the British government,[27] in addition to the Bihar Education Project and the Uttar Pradesh Basic Education Project, funded respectively by the UNICEF and the World Bank.

However, though the foreign aid for elementary education continues, it is now on decline. Further, though foreign aid was very small in quantum, it exerted considerable influence on the functioning of the school system, in terms of strengthening planning and monitoring mechanisms, district level planning, decentralised administration including setting up of village level education management committees, etc. However, foreign aid also created different kinds of problems - in stead of being additional, to some extent it substituted government efforts of mobilising domestic resources; it led to donor dependency, viewing foreign aid as critical for the development of the system; and since the aid was not geographically spread all over, different kinds of regional inequalities arose [see Tilak, 1999a, 1999b, Pp. 307-17]. On the whole, the external aid for primary education had been very uneven. Bashir [2000] finds that educationally developed states have received higher level of resources per capita compared to educationally poor states from external aid, though of the total central assistance (or external aid for elementary education), educationally backward states accounted for a larger proportion than the others, as shown earlier.

V.3 Sarva Shiksha Abhiyan

Since 2000-01, the union government has started an umbrella scheme called *Sarva Shiksha Abhiyan.* Aimed at fast universalisation of elementary education in the country, the SSA proposed a new pattern of sharing financial responsibilities of elementary education between the union and the state governments. During the ninth five year plan period, the union government met 85 per cent of the plan expenditure on elementary education and state government 15 per cent; the proportions changed to 75:25 during the tenth five year plan and it is proposed that they will further change to 50:50 after the tenth plan period. The SSA also provides, drawing from the experience of the District Primary Education Project, for a new pattern of devolution of resources from the centre - to the autonomous bodies/societies at state and district levels, in stead of channelling the resources through the government departments. While claims are being made on the efficiency and 'grand success' of the SSA, it is yet to be seen how far the marginalisation of the government departments would be efficient and desirable. Besides, the SSA is designed to be an umbrella programme covering all the central schemes, including externally aided projects, in such a way that the states will have flexibility in utilising the assistance provided for various schemes. It was also intended to provide under SSA for non-relapse of unutilised funds. The unutilised funds are saved in the *Prathamik Shiksha Kosh* (elementary education fund) set up recently by the union government as a non-relapsable fund for elementary education, along with other allocations under SSA.

VI. HOUSEHOLD EXPENDITURE ON EDUCATION

Total expenditure on education consists of public expenditure and expenditure incurred by the households. For a long period it was believed that families do not spend much on education in India and that government meets nearly the total expenditure on education. But increasing evidence shows that households do spend significant levels of money on acquiring education for their children, in addition to incurring opportunity costs. It is felt that family expenditure on education complements government expenditure, raising the total expenditure; or alternatively sometimes family expenditure substitutes government expenditure on education, as we find families tending to increase their spending on education, as the government spending decreases. For instance as the government spending on textbooks and stationery is not adequate, households spend on purchase of books and stationery on their own; as the government spending on teacher salaries declines, and as a result, good quality trained teachers are not available, families spend on private tuition. If good quality teachers are available, many children may not feel compelled to go for private tuition and to spend huge amounts on it; if good quality public schools are available at a walking distance, families may not feel the need to spend on transport; and so on [Tilak, 2000].

According to the latest available statistics [2002-03], households seem to spend amounts equivalent to 40 per cent of what the government spends in Andhra Pradesh and 30 per cent in Rajasthan. Households in Andhra Pradesh spent Rs 1,938 crore in 2001-02 on education, while the government expenditure was Rs 4,866 crore. The corresponding amounts for Rajasthan were Rs 1,110 core and Rs 3,572 crore.[28] If total expenditure on education is composed of government expenditure and household expenditure, we note that family expenditure constitutes 29 per cent of the total in Andhra Pradesh, and 24 per cent in Rajasthan, the balance - over 70 per cent being government expenditure, as shown in Figure 5.[29] These figures relating to family expenditure on education seem to be quite high, compared to other countries.

In both Rajasthan and Andhra Pradesh household expenditure on education is substantial. Families spend about Rs 800 per student on education. The expenditure per student increases with increasing levels of education. For example, families in Andhra Pradesh spend on average Rs 430 per student on primary education per annum, Rs 1,540 on secondary education and Rs 2,080 on higher education, as shown in Table 19.[30] Between the two states, family expenditure per student in Rajasthan is higher on elementary education - primary and upper primary education than in Andhra Pradesh, though the difference is large in upper primary education. But in case of secondary and higher education, families in Andhra Pradesh incur higher levels of expenditure than those in Rajasthan. In case of higher education, families in Andhra Pradesh spend 50 per cent higher than families in Rajasthan.

Table 19. Average Household Expenditure in General Education, 1995-96

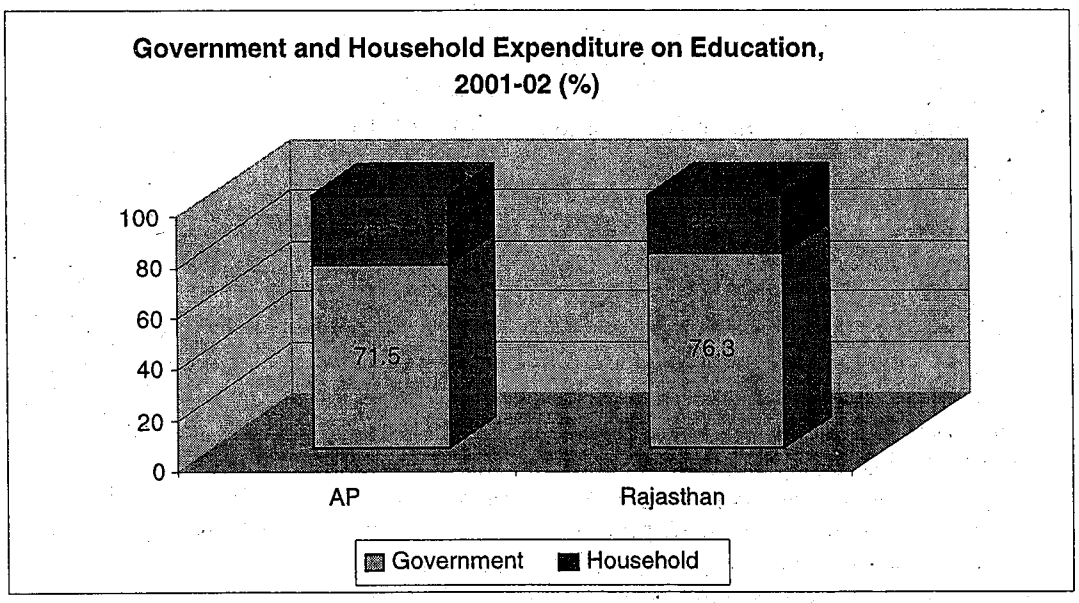
(Rs Per Student)

Primary (1)	Middle (2)	Secondary (3)	Higher (4)	All (5)
Andhra Pradesh	430,820	1,541	3,081	825
Rajasthan	518,831	1,400	2,016	778

Source: Tilak [2000].

While the increasing levels of household expenditure on education is viewed by some as 'willingness to pay' for education, probably families feel compelled to spend on education as public expenditure is not adequate. Further, it was found that poor households spend, naturally like on other necessities, higher proportions of their income than rich households. The 'wealth

Figure 5.



Source: Selected Educational Statistics 2002-03.

effect', i.e., the difference in expenditure on education between the richest and poorest groups of population in public (government) schools is found to be the highest in Rajasthan and Andhra Pradesh, after Gujarat among major states in India [Tilak, 2002c]. All this shows that having to rely on higher levels of household expenditure for education would restrict the access of the weaker sections to education. Further, the high level of household expenditure on education in Andhra Pradesh is not found to have caused any high level of overall achievement in terms of access or in terms of completion and transition rates.

VII. REQUIREMENT OF RESOURCES FOR ELEMENTARY EDUCATION

The requirements of the education sector in the two states are indeed mammoth. Earlier, Tilak [1994] has estimated the requirement of resources for education in different states, based on the cost functions - costs regressed on enrolments and unit costs of education during 1980s . There are several other attempts of estimating the resources required for education later.[31] Based on detailed estimation of costs of every item/programmes, the financial requirement for universalising elementary education was estimated by an expert group constituted by the Ministry of Human Resource Development [1999]. It was estimated that an additional amount of Rs 4,201 crore would be required for primary education and Rs 4,496 crore for upper primary level in Andhra Pradesh for a ten-year period. Similarly, Rajasthan requires Rs. 6508 cores for provision of universal elementary education - Rs 4,273 crore for primary education and Rs 2,235 crore for upper primary education.[32] The estimates include requirement of resources for improvement in access to education, improvement in quality of education, improvement in equity and improvement in processes - planning, management and the functioning of the school. However, important items of costs were still construction of school buildings, buildings

for district institutes of training (DIETs), block resource centres (BRCs), and teacher salaries. The next most important group of items include equity and quality related items such as school uniforms, scholarships, noon meals and teaching learning equipment.

These estimates are already dated, and the additional needs might indeed have increased.[33] Given the present levels of spending, and the growth rates, it is clear that it needs special efforts by both Andhra Pradesh and Rajasthan to generate the required amount of resources for elementary education. Though some efforts are being initiated to generate resources through mobilisation from community, etc., bulk of the resources have to come from the state exchequer, and/or from the union government, at least as far as elementary education is concerned. Resources need to be generated for secondary and higher education as well. Strong rationale does exist for public financing of secondary and higher education as well, as they too constitute public goods and merit goods, besides being a part of human rights [Tilak, 2004, Pp. 343-59].

VIII. CONCLUDING OBSERVATIONS

Despite some significant achievements, particularly in terms of quantitative expansion, education situation in India and in particular in Andhra Pradesh and Rajasthan is marked by a few major problems and even some conspicuous failures. Both these states rank poorly among the major states of the country with respect to any indicator of educational development. Many of the problems in education can be traced to inadequate investments in education, though adequate investments in education would not necessarily solve all the problems automatically and satisfactorily. In this sense, finances form a *necessary*, but not a *sufficient* condition for improvement of the education situation. The paper presents an analytical account of some of the issues relating to public expenditure on education in Andhra Pradesh and Rajasthan in a comparative framework.

To sum up the situation, both Andhra Pradesh and Rajasthan are educationally backward states. Also, with respect to public spending on education as well, the relative position of both the states is not satisfactory in relation to the other states. Andhra Pradesh and Rajasthan respectively rank 22nd and 23rd according to public spending on education per head of population among the 28 states on which such data are available. They are ahead of only a few states such as Bihar, Uttar Pradesh, Orissa, Madhya Pradesh, and Chhattisgarh in case of public spending per capita. Thus, both Andhra Pradesh and Rajasthan are characterised by backwardness in public spending on education or by chronic underinvestment in education.

Relatively speaking, Andhra Pradesh is economically an advanced state with a higher per capita income than that of Rajasthan. But Rajasthan could increase its spending on education at a higher rate of growth than that of Andhra Pradesh, pushing Andhra Pradesh behind Rajasthan over the years. In terms of all the indicators - absolute levels of expenditure, per capita expenditure, percentage shares in SDP and in the budgets, Rajasthan now ranks ahead of Andhra Pradesh. Not only with respect to the total education sector, but also with respect to relative priority given to elementary education, Andhra Pradesh lost its comparatively advantageous position to Rajasthan during the last 10-15 years. Andhra Pradesh was spending higher amounts in the 1980s, from the beginning of the 1980s until 1990-91. But the relative position changed from 1993-94 onwards. By 2000-01 Rajasthan is spending about 40 per cent higher than what Andhra Pradesh spends. The economic reform policies are found to have a significant adverse

effect on budgetary allocations to education in both the states, which affected Andhra Pradesh more severely than in Rajasthan. The relative position of Andhra Pradesh compared to Rajasthan in public spending on education and with respect to other indicators of educational development deteriorated. The vigorous pursuit of economic reform policies has caused a serious damage to the expenditure on education in Andhra Pradesh. In summary, Andhra Pradesh is characterised by poor performance in fiscal priority accorded to education, in general and elementary education in particular, while Rajasthan has been a much better performer. As a result, Rajasthan could improve its relative position in literacy and educational development and march ahead of Andhra Pradesh even with respect to human development index and reduction in poverty. If the trends continue in both the states, Rajasthan can be hope to come out of the infamous *BiMaRU* fraternity and Andhra Pradesh may take its place. Andhra Pradesh has to make significant efforts to avoid this.

The review attempted here also confirms that (a) economically less advanced states can also spend higher levels of amounts on education and progress educationally as levels of economic development are not found to be related to the levels of public spending on education; (b) public expenditure on education matters significantly for the development of education; and (c) economic reform policies in general may have harmed public spending on education and overall educational development.

VIII.1 Towards Improvement

There is a national goal of spending six per cent of national income on education from public exchequer. Both Rajasthan and Andhra Pradesh are much below the national target, ranking 17th and 23rd respectively among the 28 states. Though between the two, the performance of the state of Rajasthan is somewhat better in this regard. In 2004-05, Rajasthan allocated 4.5 per cent, while Andhra Pradesh allocated 3.6 per cent of NSDP for education. It has been noted that the overall allocations to education are not adequate. To reach the target of allocating six per cent of SDP in a meaningful way, both the states, like many others in the country have to step up the allocations to education very substantially. In fact, given the magnitude of the unaccomplished task, it is felt that both states should aim at allocating much above six per cent of their respective SDP to education.

Allocations to education in the five year plans in the two states do not show any systematic pattern. The severely fluctuating trends in plan priorities do not ensure healthy growth of the education system in the state. It is important to note that five year plan outlays are important as they set new directions for development. But it has to be concluded that sufficient attention has not been given to education to provide a steady flow of funds to education in the Five Year Plans in the states.

With respect to intra-sectoral allocations, Andhra Pradesh has been spending less than 50 per cent of its education budget on elementary education; it varied between 40 and 50 per cent; and Rajasthan has been spending above 50 per cent on elementary education. Higher education receives a better share in Andhra Pradesh - consistently above one-fifth of the total; Rajasthan is also consistent in its spending on higher education - less than ten per cent. With respect to the share of expenditure on elementary education in state income, the gap between the two states increased during the last 20 years, i.e., between 1985-86 and 2004-05. Rajasthan spends nearly double the ratio that Andhra Pradesh allocates to elementary education. On the whole, there is also much scope

for improvement in inter- and intra-sectoral allocation of resources to and within education in both the states. Given the inter-sectoral links between elementary (primary and middle), secondary and higher levels of education, it is also important to see that there is smooth and steady progress in secondary and higher education as well. Sudden and significant reductions in allocations to secondary and higher education may inflict severe damage to balanced educational development.

Further, there seems to be much scope for improvement in the functional distribution of resources in elementary education. Very meagre resources are allocated to non-salary items in school education. Since items like textbooks and other teaching learning material and teacher training are found to be having significant impact on the quality of education, allocations to these items have to be increased. Tentatively, it may be suggested that at least five per cent of the elementary education budget should be allocated to these items and another five per cent to equity related items.

Trends in public spending on education have not been smooth either in Andhra Pradesh or in Rajasthan, like in many other states. Since frequent and violent fluctuations in allocations to education and to various levels of education therein would cause serious damage to the planned progress of education, it is necessary that such fluctuations are avoided. As a thumb rule, it has to be seen that the allocations to any sector of education -- total and per student -- do not decline over time in constant prices. After all, decrease in expenditure per student in real terms, ceteris pari bus, might suggest decline in the quality of education.

Education systems in both Andhra Pradesh and Rajasthan require huge amount of additional resources. In 1999, it was estimated that additionally the state of Andhra Pradesh requires Rs 8,697 crore and Rajasthan Rs 6,508 crore for universalisation of elementary education alone. Since elementary education is a 'fundamental right', the government has to finance elementary education one hundred per cent without relying on any non-governmental resources. Voluntary community contributions, if any, would only supplement supplementary activities or programmes of additional quality improvement. In short, the state has to come forward to liberally finance education, as after all, 'no nation goes bankrupt by investing in education'.

Appendix Table 1. Additional Requirement of Resources for Universal Elementary Education in Andhra Pradesh and Rajasthan

(Rs Crore)

		Andhra Pradesh			Rajasthan		
(1)		Primary (2)	Middle (3)	Elementary (4)	Primary (5)	Middle (6)	Elementary (7)
Access and retention: Non recurring costs							
A1	Construction of Schools with Community Supervision	1346.8	1391.3	2738.1	949.8	610.3	1560.1
A2	Provision of School Equipments by Decentralized Procurement	7.2	102.3	109.5	16.3	60.6	76.9
A3	Establishment of New DIETs and Up- gradation of DIETs	1080.0		1080.0	1770.0		1770.0
A4	Establishment of Cluster Centres	3.5	4.2	7.7	7.1	3.7	10.8
A5	Estt. of Block Resource Centres	23.1	1497.8	1520.9	18.6	874.6	893.2
Access and retention: Recurring costs							
A6	Teachers Salaries	1060.5	1056.3	2116.9	940.4	382.2	1322.6
A7	Teachers' Support Material	14.2	13.8	28.0	12.6	10.1	22.7
A8	Maintenance and Repair of School Infrastructure with Community Support	16.9	14.1	31.0	14.9	12.3	27.1
A9	Provision of Sustainable Replacement/ Repair Maintenance of School Equipment	16.9	14.1	31.0	14.9	12.4	27.2
A10	Salaries of DIET Staff	81.4		81.4	58.4		58.4
A11	Salaries of Block Level Institutions	5.7		5.7	4.1		4.1
Access and retention: Special Needs: Non Recurring Costs							
B1	Integrated Education for Disabled Children	99.6	70.9	170.5	84.9	52.1	1376.0
Access and retention: Special Needs-Recurring Costs							
B2	Teachers for Disables Children	33.8	16.9	50.7	29.7	14.9	44.6
Access and Retention: Incentives-Recurrent Costs							
C1	Free Uniforms	103.7	73.9	177.6	98.4	54.3	152.7
C2	Mid-day Meals	93.0	59.1	152.1	70.7	13.4	84.2
C3	Scholarships	103.7	73.9	177.6	83.4	54.3	137.7
C4	Teaching Learning Equipment	66.4	88.7	155.0	56.6	65.1	121.7
Curriculum and text books: Non Recurrent Cost							
D1	Curriculum & Textbook Improvement	0.15		0.2	0.2		0.2
Curriculum and Textbooks: Recurrent Cost							
D2-D3	Curriculum and Textbooks	25.5	13.8	39.3	22.6	10.1	32.7
D4	Community Based Monitoring, Supervision and Research	4.6		4.6	5.4		5.4
D5.	Advocacy and Environment Building	4.6		4.6	5.4		5.4
D6	Classroom Observation by Resource Persons	10.2	5.1	15.2	8.9	4.5	13.4
	Total	4201.3	4496.1	8697.4	4273.1	2234.9	6508.1

Source: MHRD (f) [1999].

NOTES

1. See Hanumantha Rao [2003] for a detailed discussion on economic reform policies in the state. See also Sarma [2003] and Narasimhulu [2006] for a brief account of fiscal reforms attempted in Andhra Pradesh.

2. 'Medium' performance states include Orissa, Assam, Haryana, Karnataka, and West Bengal, and 'high' performance states are Punjab, Gujarat, Tamil Nadu, Maharashtra, Himachal Pradesh and Kerala [Srivsastava, 2005, p. 136].

3. However, according to the latest estimates on poverty, the position of Andhra Pradesh relative to Rajasthan seems to have been reversed, the poverty ratio being higher in Rajasthan than Andhra Pradesh [Planning Commission, 2007].

4. All annual rates of growth are estimated in the paper by using the semi-log regression equation on continuous annual data.

5. State income deflators based on 1993-94 GDP/SDP series are used through out the paper to convert all the figures from current prices into constant prices, based on data drawn from *Economic Survey 2004-05, and 2005-06,* and *National Accounts Statistics 2005.*

6. Total expenditure on education consists of revenue expenditure and capital expenditure. The share of education in capital expenditure is negligible in most states and in the country as a whole; and hence it is not included in many analyses. The capital expenditure on education forms less than one per cent of the total expenditure on education and the revenue expenditure forms more than 99 per cent. It is increasingly noted that the classification of expenditure into revenue and capital accounts in education in India does not serve any meaningful purpose, as non-recurring expenditure needs are met out of revenue account, and even recurring expenditure out of capital accounts.

7. Generally GSDP is used here, but depending upon the availability of data and the indicator, NSDP and simply SDP are also used.

8. The Education Commission recommended six per cent of GNP for education by the government - central, states together, based on detailed calculations on the financial needs of the system that needs to be developed in the next twenty years. The Government of India in its *National Policy on Education 1968* referred to this as six per cent of national income. MHRD (g) [2005] has used GDP in stead of GNP. The difference in the expenditure on education as a proportion of GNP or GDP seems to be not very significant. See Tilak [2006a] for a detailed discussion on the basis of the recommendation made by the Education Commission, the performance of the country with respect to this, the prospects, and the needed allocations to reach this goal.

9. Some state-wise details are given in Table 6.

10. For example, Srivastava [2005, p. 149] also estimated that between 1975 and 2000, the decade of the 1990s marks the lowest rate of growth in expenditure on education in Andhra Pradesh (3.2 per cent between 1990 and 2000, compared to 7.8 per cent between 1975 and 1990). In contrast, the trends are reverse in Rajasthan: expenditure on education increased at a rate of growth of above 7 per cent between 1990 and 2000, compared to 6.7 per cent in the 15 years preceding this period See also Ray [2005, p. 175]. For an elaborate discussion on the impact of economic reform policies on education in India, see among many, Tilak [1996b, Pp. 266-93] and Jha [2005] for analyses of impact of adjustment policies on education in India.

11. The total period considered here covers 1980-81 to 2000-01/2001-02. The reform period is defined to include the period beginning from 1992-93 and the period before 1992-93 is considered as pre-reform period.

12. See, for example, World Bank [1996, 2006] that describe the implementation of the reforms in Andhra Pradesh and Rajasthan respectively.

13. The Central Advisory Board of Education Committee on Financing Higher and Technical Education [MHRD (i), 2005] has suggested equal distribution of the remaining 50 per cent between secondary and higher (general and technical) education.

14. Srivastava [2005] also estimated that the overall growth in real expenditure on elementary education during 1975-2000 in Andhra Pradesh had been the lowest, and that in Rajasthan had been the highest among the major states in India.

15. Srivastava [2005, p. 149] has estimated that the rate of growth in expenditure on elementary education in Andhra Pradesh was only 4.3 per cent per annum between 1990 and 2000, compared to 8.6 per cent between 1975 and 1990 and in the 1990s. Rajasthan experienced a rate of growth of 7.6 per cent compared to 5.6 per cent in the earlier period. In fact, Srivastava (2005) found that expenditure on elementary education in all other states was adversely impacted.

16. Some details on the DPEP and other externally aided projects are given later in Section 6.

17. The *total* includes government expenditure, expenditure incurred by local bodies, contributions from fees, endowments, etc.

18. Two different sources are used in this context and some problems of comparison arise. *Education in India* (MHRD, c) an annual statistical publication of the Ministry of Human Resource Development forms the basis for Table 15. The other source used is *Analysis of Budgeted Expenditure on Education* (MHRD, b) that forms the basis for a somewhat detailed break-up given below (Figure 4). The later adopts a different classification of objects of expenditure. The latest volume of *Education in India* (on expenditure related aspects) refers to 1996-97, that too for school education; for higher education the latest one is as old as 1983-84.

19. Other sources based on household surveys provide details on other aspects of household expenditure. They are discussed in Section 7.

20. The income received from the local bodies or the

expenditure incurred by local bodies includes the grants received by the local bodies from the state governments and the resources generated by the local bodies themselves may be very small, if not nil.

21. See Tilak [2003] for more details.

22. See, e.g., the proposals made by Government of Andhra Pradesh [1995].

23. Among others, Majumdar [2001] also shows that children pay fees in government schools in Rajasthan and Tamil Nadu.

24. See Tilak [1989] for an elaborate discussion on centre-state relations in financing education in India.

25. Mid-day meal scheme is not listed in Tables 17 and 18, as detailed information by states is not available.

26. DPEP was not introduced in Rajasthan until 1999. However, *Shiskha Karmi* and *Lok Jumbish* were taken up with external funds since 1987 and 1992 respectively. More recently, another project *Janashala,* known as GOI-UN *Janashala* project, was launched by Government of India in collaboration with United Nations' agencies.

27. This was merged with DPEP after 1995.

28. It may be noted that even when we consider government and household expenditure on education, the differences between the two states in the levels of aggregate spending on education remain high.

29. Based on 57th round of the NSSO [2001-02], the MHRD (a) presented these figures in their volume relating to 2003-04.

30. In fact, more recent studies [e.g., Panchamukhi, 2005] show that households spend much higher levels of expenditures on primary and upper primary education both in rural and urban areas. This is based on a UNICEF survey in eight states conducted in 1999. See also Krishnaji [2001] and Majumdar [2001] for details on household expenditure on education based on surveys at grassroots level. Tilak [2000, 2002a, c] provides details based on NSS data and Tilak [2000b] based on NCAER (National Council of Applied Economic Research) survey.

31. See, e.g., MHRD [1997] and Srivastava [2005].

32. Appendix Table 1 gives details.

33. See Ray [2005] for estimates based on household survey in Rajasthan, which is also dated.

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AGRARIAN CRISIS IN ANDHRA PRADESH

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The reform package for agriculture emphasises on making terms of trade favourable, and assumes that these can take care of capital formation, technical change, and output in the agriculture sector. The results of this study show that the terms of trade have become favourable to the sector in the reform period. However, the favourable impact of the terms of trade has been eroded by the absolute decline in total factor productivity. This decline in total factor productivity is the crux of agrarian distress. The favourable terms of trade have not led to higher capital formation, or statistically significant supply response, and/or higher agricultural output growth. As the present level of infrastructure is working as a hindrance to having the desired impact from the favourable prices, the strategy of agricultural development must mainly focus on improving rural infrastructure through increased role of state.

Key words: Terms of Trade for Agriculture; Productivity; Supply Response; Capital Formation

I. INTRODUCTION

The new economic policies concentrated on making the terms of trade favourable to agriculture by reducing the level of protection to manufacturing sector, and removing restriction on agricultural trade within and outside the country [Ahluwalia, 1996; Desai, 2002, Pp. 1-18; Sen, 2001, Pp. 8-10; Singh, 1995, Pp. 1-6]. The favourable terms of trade were expected to increase capital formation in agriculture, result in technical change and, as a consequence, increase in the growth rate of output. Reducing protection to industry was expected to decrease the prices payable by agriculture for the industrial inputs. This was likely to enable reduction in subsidies to farm inputs. The resultant savings would be used for improving infrastructure by raising public capital formation. The accelerated growth in agriculture was expected to lead to greater non-farm employment, and trade liberalisation was supposed to encourage diversification of agriculture to high value crops, livestock, etc. This was the reform strategy in agriculture in the country, and the expectations from it.

The new policy has been successful in improving the terms of trade for agriculture, and increasing private capital formation and gross fixed capital formation, in real terms, at the all-India level. The terms of trade have become favourable to agriculture during the nineties, mainly due to the increases in minimum support prices, and reduction in the prices of industrial inputs [Thamarajakshi, 2000, Pp. 3237-40]. The minimum support prices announced by the government have been higher than the ones recommended by the Commission for Agricultural Costs and Prices [CACP] during the nineties [Rao, 2001, Pp. 22]. On the other hand, the expectation of a higher public capital formation through reduction of input subsidies in agriculture has not materialised. The measures taken to contain fiscal deficit reduced the additional public capital formation in agriculture by reducing expenditure on irrigation, power, other rural infrastructure, as well as on agricultural research and extension. But, the gross capital formation at the all-India level did show increasing trend in the nineties, despite decline in the public capital formation. This happened because of a robust growth in the private capital formation during the nineties [Rao, 2002, Pp. 225-52]. However, the situation regarding the complementarity between

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public and private capital formation in agriculture, and their actual movements may vary at the state level.[1]

Since the new economic policies place greater emphasis on price related interventions, the targeted growth rate of about 4-5 per cent in agriculture can materialise, only if agricultural production is highly responsive to increased prices. However, the favourable terms of trade and increased private capital formation in agriculture have not lead to a jump in the growth rate of agricultural production. In fact, there has been a deceleration in the growth of agricultural production. Some scholars refer to the nineties as a lost decade for agriculture. As a consequence of the loss of the growth momentum in agriculture, the aggregate demand in the country has decelerated, and this has been in part responsible for the slump in industrial production in the late nineties [Desai, 2002, Pp. 1-18; Dev, 2002, Pp. 1088-91].

There has been an intense debate on the efficacy of the reform strategy for agriculture in the country as a whole [Chadha, 2003, Pp. 1-31; Desai, 2002, Pp. 1-18; Vaidyanathan, 2000, Pp. 1735-41]. In a vast country like India with marked regional differences and inequalities, variations across states in regard to the impact of this strategy are sure to be noticed. Further, as the reforms progress, the policies of state governments have a more critical bearing on growth and poverty alleviation than that before the 1990s [Reddy, 2002]. Therefore, the movement of terms of trade, capital formation, and aggregate agricultural supply response at the state level assume greater importance. Unfortunately, there is dearth of studies in this regard. Andhra Pradesh is one of the states to implement economic reforms vigorously, in addition to the reforms of the central government, particularly after 1995. Moreover, the state is a representative case as far as financial position and infrastructure are concerned. The fiscal position of states came under severe strain in the nineties due to several factors, including the reduction of transfers from the centre to the states, and Andhra Pradesh is no exception to this [Sarma, 2003, Pp. 1158-70]. The levels of rural infrastructure, and social and economic infrastructure in the state as a whole are close to the all-India levels [Bhatia, 1999, A-43-A-48; Dev and Ravi, 2003, Pp. 1143-57]. Against this background, it will be useful to study in detail the movements of terms of trade in Andhra Pradesh agriculture, the aggregate agricultural supply response, and different components of capital formation, to arrive at some broad conclusions on the reasons for the agrarian crisis. The terms of trade for agriculture in the state are calculated and presented in this paper in detail.[2]

2. METHODOLOGY AND DATA SOURCES

The study is conducted by taking 1980-81 to 1990-91 as the pre-reform period and 1991-92 to 1999-2000 as the reform period in Andhra Pradesh. Data from different sources, published and unpublished, are used for the purpose. The methodology followed for measurement of terms of trade, and data sources are briefly outlined below.[3]

The study utilises and improves upon the methodologies of terms of trade for agriculture, developed by Thamarajakshi [1969], Kahlon and Tyagi [1980], Rath [1985] Mungekar [1993], Palanivel [1999], and the Task Force on Terms of Trade of the Government of India [1995]. Among the several measures of terms of trade, net barter terms of trade [NBTT] and single factorial terms of trade [SFTT] are calculated for the state. The concept of NBTT is the ratio of the composite index of prices received by the agriculture sector to the composite index of prices paid by the agriculture sector. A rise in the net barter terms of trade over time means that a given volume of

agricultural goods would exchange for a larger volume of non-agricultural goods and services than that in the earlier period. In other words, a rise in the NBTT would mean a movement favourable to the agricultural sector. However, it does not take into account either the physical volume of commodities traded or the productivities of the sectors in question. Therefore, the concept of single factorial terms of trade [SFTT] is used to correct the NBTT for agricultural productivity in this study. SFTT is nothing but the NBTT multiplied by the productivity of the agriculture sector. The rise in SFTT is a favourable change in the sense that a greater quantity of non-agricultural goods and services can be obtained per unit of factor input used in the production of agricultural goods, compared to the base period. In other words, it reflects the purchasing power of agriculture per unit of productive effort [Palanivel, 1999, Pp. 471-507]. The total factor productivity measured by Törnquist-Theil index is employed to indicate the productivity, instead of the partial indicators of productivity. The index of total factor productivity is the ratio of aggregate output to an index of aggregate input, and Törnquist-Theil Index[4] is superior to other indices for its measurement [Desai 1994, Pp. 457-75].

The period 1988-91 is taken as the base, that is, the year in which all price indices are equal to 100 the accuracy and correctness of inter-sectoral terms of trade necessitate that as many products as possible from those actually exchanged between the sectors are included in the study [Mungekar, 1993, Pp. A-111-A120]. We have identified 102 products to have been exchanged between agriculture and non-agriculture, and included them in the study as shown in Table 1.

Table 1. List of Products Exchanged Between Agriculture & Non-Agriculture in A.P.

Items sold by agriculture to non-agriculture	Items purchased by agriculture from non-agriculture		
	For family consumption	For intermediate consumption	For capital formation
(1)	(2)	(3)	(4)
a) Foodgrains Paddy, sorghum, pearl millet, maize, finger millet, Italian millet, pigeon pea, black gram, green gram, horse gram, Bengal gram b) Non-foodgrains Castor, groundnut, cotton kapas, sugarcane, tobacco, onions, chillies, turmeric, Deccan hemp, sesamum, c) Livestock products Milk, eggs, chicken, male and female cattle, he and she buffalo, goat, sheep, cattle hides, buffalo hides, sheepskin and goat skin.	Pigeon pea dal, gram dal, groundnut oil, salt crystals, refined sugar, tea powder, coffee powder, bidi, cigarette, country liquor, kerosene, match box, electricity, shirting [cotton], shirting [synthetic], saree [handloom], saree [synthetic], dhoti [handloom], lungi, trousers cloth [cotton], trousers [synthetic], towel, leather chappals, rubber chappals, leather shoes, ampicillin, saridon, crocin, pathological tests, doctor's fee, school fee, fulscape paper, cinema ticket, busfare per km, toilet soap, hair oil, barber charges, washing soap, washer man charges, tailoring charges, radio, television, aluminum for utensils, cycle and watch	Seeds, chemical fertilizers, pesticides, hired labour, interest rates, electricity, diesel, land revenue, water charges and livestock feed	Hand operated sprayers, power sprayers, iron plough, diesel pump-sets, electric motors, tractors, cement, lime, bricks, iron and steel, logs and timber, paint and rough stone
34 items	45 items	10 items	13 items

The study needed two types of data. The first one is the prices of the items sold and purchased, and the second is the quantities of items purchased and sold by the agriculture sector, for the purpose of developing weights for construction of price indices for the entire study period of 1980-81 to 1999-2000. The weighting diagrams for items sold by agriculture to non-agriculture and the items purchased for final consumption, intermediate consumption, and capital formation are worked out separately for all the years of the study period, *viz.,* 1980-81 to 1999-2000 [Appendices 7, 9, 11, and 13]. The total value of the marketed surplus of all the items sold by the agricultural sector to the non-agricultural sector is worked out and aggregated. The contribution of each individual item in the total value of the marketed production, in terms of percentage to total, is taken as its weight. The ratios of marketed surplus are taken from the *Report of the Sub-group on Estimation of Marketed Surplus Ratios,* headed by H.L. Chawla [Bansil, 1992, Pp. 607-08]. The sub-group has worked out marketed surplus ratios only for paddy, sorghum, pearl millet, and maize for Andhra Pradesh. For finger millet, marketed surplus ratio of sorghum is adopted. For Korra [Italian millet], marketed surplus ratio of pearl millet is adopted. For the remaining crops, and for milk and eggs, the marketed surplus ratios for the all-India level are adopted, as there is no other alternative to serve the purpose of arriving at the volume of transactions.

The weights for the 45 items purchased for final consumption are worked out by multiplying the per capita expenditure on each item with the total number of persons dependent on agriculture. The rural consumer expenditure survey data of the National Sample Survey Organisation (NSSO) are used to arrive at the per capita expenditure on each item. The agriculture sector's per capita expenditure for most commodities is assumed to be the same as that for the total rural sector. Separate weights are to be assigned to all the 45 items, whereas the consumer expenditure of the NSSO is given for groups of commodities. The disaggregation of items in each of the sub-groups of expenditure is made as far as possible with the NSSO data. For some of the sub-groups, for which break-up is not available under the NSSO's consumer expenditure surveys, items of expenditure are disaggregated on the basis of the weighting diagram of indices for rural labour, constructed by the Labour Bureau of the state. The NSSO's consumer survey data are available for every five years, and for the period in-between the thin sample data of the NSSO are used. The number of persons in agriculture is worked out by taking the percentage of self-employed in agriculture from the NSSO employment data and multiplying with the rural population, calculated from annual population estimates of the Registrar and Controller General of India. On multiplying the per capita expenditure on each item with the total number of persons, the total expenditure is arrived at. These are aggregated and the percentage of contribution of each item is taken as the weight. The average rural retail prices for these items are collected from the published and unpublished data of Andhra Pradesh (A.P.) Directorate of Economics and Statistics. Several other sources are explored for the purpose. For example, the bus fares per kilometer are obtained from the A.P. Road Transport Corporation.

The weights for items purchased for intermediate consumption are arrived at by calculating the total expenditure under all these items put together, and then taking the percentage of the contribution of each individual item to the total as the weight. We have considered 10 items under the items purchased for intermediate consumption. However, there are a number of specific items under seeds, fertilisers, and pesticides. Therefore, combined indices are developed for these three items for all the years. For this purpose,

eleven crops, *viz.*, paddy, finger millet, sorghum, pearl millet, maize, red gram, green gram, black gram, groundnut, castor, and cotton are used to construct combined seed indices. The expenditure on seeds per hectare from Cost of Cultivation Scheme [of the Government of India [GoI, 2000] data is multiplied with the respective acreage under the crop in the state, and then multiplying it with the seed replacement ratio, we get the purchased expenditure on seeds of the particular crop. The seed replacement ratios are taken from the *Report of the Task Force on Terms of Trade* [1995]. The same procedure is followed for all the crops. All these are aggregated and the contribution of each individual item in the total value of purchased expenditure on seeds, in terms of percentage to total, is taken as its weight. The seed prices are collected from the Andhra Pradesh Seeds Development Corporation, Hyderabad, because that is a better source, compared to the Cost of Cultivation Scheme (CCS) data. The combined index of fertiliser prices is developed by multiplying the quantities of fertilisers used in the state with the prices, and taking the individual fertiliser's share, as percentage of the total, as its weight. Two nitrogenous fertilisers [urea and ammonium sulphate], one phosphatic [single super phosphate] and one potassic [muriate of potash], and one mixed fertiliser [di-ammonium phosphate] are considered for the purpose. The prices of fertilisers are obtained from different issues of the *Fertiliser Statistics in India,* and for the expenditure on fertilisers, the Cost of Cultivation Scheme data are used as in the case of seeds. Five important chemical insecticides [Endosulphan, Monocrotophos, Ekalux, Chlorpyriphos and Fenvelerate], and two fungicides [Bavistin and Dithane-M-45] are considered for calculating combined pesticide index. The data on the prices of pesticides are collected from the Department of Agriculture, and A.P. Agro-industries Development Corporation. The development of weights is done as in case of seeds and fertilisers through the CCS data.

Similar exercise is carried out for the items purchased for capital formation. Broadly, items purchased for capital formation are of two types. One is the machinery and equipment used in the agriculture sector, and the other is the construction materials used. The number of machinery and equipment is available from the Quinquennial Livestock Census of the Andhra Pradesh Directorate of Economics and Statistics, and the number in the intervening years is obtained by intrapolation. From this time series of equipments, annual net additions are calculated. Multiplying these numbers with the respective prices gives the expenditure on these items. However, there has been some difficulty in arriving at the total expenditure under the other group of items, *viz.*, construction materials: cement, lime, bricks, iron and steel, logs and timbers, stone and paint from the *All-India Debt and Investment Survey 1981-82 and 1991-92* [RBI, 1988; NSSO, 1999]. The per cultivator estimated expenditures on capital formation is arrived for each item, *viz.*, i) digging of wells, ii) bunding, reclamation of land and other land improvements, iii) other irrigation sources, iv) farm houses, barns and sheds, and residential buildings The time series for these is constructed through intrapolation and extrapolation. The per cultivator expenditure is multiplied by the total number of cultivators to get the total expenditure on these items. After arriving at these figures, the actual purchases from the non-agricultural sector are calculated with the ratios (of purchases to the total required material) given in the *Report of the Task Force on Terms of Trade* [1995]. Expressing the individual item's expenditure as a percentage of the aggregate expenditure on all these items gives the weight of the item.

To get a combined index of prices paid, the total expenditure on all the three items is taken and the percentage of each of the three items in the total gives its weight. Based on these weights, the three indices of prices paid are combined to get combined index of prices paid (Appendix 15).

Farm harvest prices better represent the prices received by farmers for the products sold by them than the wholesale prices. Therefore, farm harvest prices for items sold by farmers, and state-wide average rural retail prices for items purchased by them are used as price indicators in the calculation of terms of trade. The farm harvest prices are collected from different issues of the *Farm Harvest Prices in India* published by the Ministry of Agriculture, and the rural retail prices for the items purchased are collected from both, the publications of A.P. Directorate of Economics and Statistics like *Statistical Abstract and Season and Crop Report* and also its unpublished records.

The prices received of total agriculture produce -- crops, foodgrains and non-foodgrains -- are calculated separately. Ideally, the indices of prices paid also need to be calculated for all these groups separately. But the prices paid could not be calculated separately due to problems in disaggregation of data for some of the items. This is a limitation of the study. Further, as the prices and production details for fruit crops and vegetables could not be obtained, they are not included in the items sold by agriculture to non-agriculture. This is another limitation of the study.

3. TERMS OF TRADE FOR AGRICULTURE IN ANDHRA PRADESH

In this section, the indices of net barter terms of trade [NBTT], causes for variations in NBTT, and productivity corrected NBTT called single factorial terms of trade [SFTT], are presented in brief. The detailed empirical calculations of the terms of trade for agriculture, giving the year-wise data - the basic as well as the calculated, are presented in Appendix 1 to Appendix 19.

3.1.Net Barter Terms of Trade for Agriculture

Before we present the indices of NBTT in the state, it will be useful to explain in brief the distinction between the 'favorableness or unfavourableness of terms of trade', and 'improvement or deterioration of terms of trade'. When the index of 'prices received' of a sector is higher than the index of 'prices paid', the terms of trade are said to be favourable to that sector, and *vice versa.* On the other hand, the improvement or deterioration in the terms of trade is a concept referring to the 'change' in the terms of trade over a period, which themselves may be favourable or unfavourable at any point of time. Thus, even in the case of terms of trade of a sector, which are favourable to it, to start with, the prices received may fall faster than the prices paid, so that after this change in the prices received or paid, the terms of trade would have worsened or deteriorated, though they may continue to be favourable to that sector. Again, unfavourable terms of trade may improve because the prices received rise faster than the prices paid, and yet be unfavourable after this 'improvement'. Thus, it should be noted that an improving terms of trade need not necessarily become favourable too; nor need a worsening terms of trade become unfavourable.

There is an improvement in the terms of trade for agriculture in the pre-reform period, and the terms become favourable to agriculture by 1990-91 [Table 2]. The average terms of trade in Andhra Pradesh are 97.39 in the pre-reform period and 102.99 in the reform period, and the change is not statistically significant. The terms of trade are favourable to agriculture in most of the years in the reform period. However, there are three years in the reform period, in which agriculture sector suffers adverse terms of trade, *viz.*,

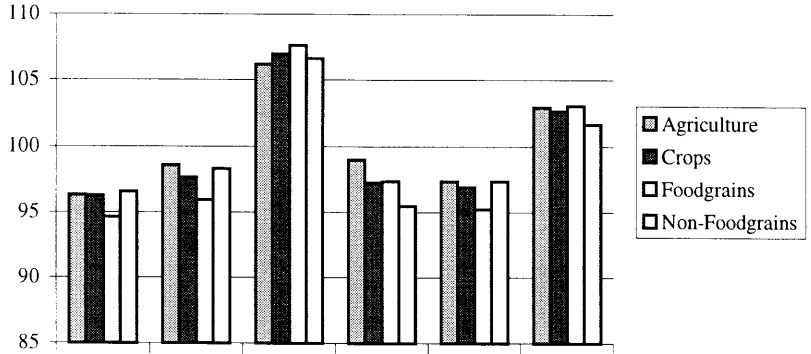
1992-93, 1996-97, and 1999-2000. In the same way, the terms of trade are unfavourable to agriculture in most of the years in the pre-reform period, except in 1984-85, 1987-88, 1988-89, and 1990-91.[5] The index of net barter terms of trade is the highest in 1994-95, and later it deteriorates . There are also wide fluctuations in the net barter terms of trade from year to year.

Table 2. Net Barter Terms of Trade between Agriculture & Non-Agriculture in A.P. Based on Current Year Weights

Year	Index of Prices Paid for			Combined Index of Prices Paid	Index of Prices Received	NBTT
	Final Consumption	Intermediate Consumption	Capital Formation			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1980-81	60.35	54.56	33.09	55.65	53.99	97.02
1981-82	63.27	62.20	40.50	61.48	55.15	89.70
1982-83	66.09	64.94	45.46	63.99	57.17	89.34
1983-84	69.80	70.86	52.60	69.03	68.76	99.61
1984-85	73.44	75.15	61.22	73.21	80.58	110.06
1985-86	77.48	78.77	68.12	77.21	71.30	92.35
1986-87	81.87	84.81	73.79	82.58	75.26	91.13
1987-88	89.24	87.51	82.26	87.65	88.27	100.71
1988-89	92.26	92.57	89.06	92.13	93.16	101.12
1989-90	96.98	99.05	97.68	98.15	93.81	95.58
1990-91	111.14	108.47	113.39	109.86	114.92	104.61
1991-92	128.58	126.94	121.65	126.99	141.34	111.30
1992-93	137.95	137.58	129.34	136.98	129.71	94.69
1993-94	147.87	144.06	137.97	145.08	150.18	103.52
1994-95	161.40	144.40	148.69	150.09	176.28	117.45
1995-96	180.73	193.96	156.22	187.05	194.45	103.95
1996-97	214.01	211.17	178.34	209.81	197.22	94.00
1997-98	209.16	217.56	194.80	213.11	222.65	104.48
1998-99	230.72	223.97	203.51	224.57	230.02	102.42
1999-2K	256.43	240.64	205.63	243.24	231.31	95.09

On the whole, the net barter terms of trade are unfavourable to (total) agriculture, (total) crops, (total) foodgrain and non-foodgrain crops in Andhra Pradesh in the pre-reform period (Table 3). In the reform period, these are favourable to all the groups of crops. However, the index of net barter terms of trade for non-foodgrains improves faster in the pre-reform period than that for foodgrains and for all crops in the same period. Though the terms of trade remain favourable to agriculture in the reform period on the whole, they have become unfavourble to both foodgrains and non-foodgrains by the end of the nineties, *viz.*, during 1996 to 1999 [Figure 1]. The terms of trade for agriculture at the all-India level, calculated by the Directorate of Economics and Statistics of the Government of India, are also favourable to agriculture in the reform period as against adverse terms of trade in all the pre-reform years [GoI, 2003], and the movements of terms of trade in the state and at the all-India level are similar on the whole. At the all-India level also, the Commission for Agricultural Costs and Prices [CACP] reports deterioration in the terms of trade for non-foodgrain crops towards the end of the nineties [GoI, 2001, p. 428].

Figure 1: Average Net Barter Terms of Trade for Agriculture in A.P for Sub-Periods



	1980-85	1986-90	1991-95	1996-99	Pre-Reform	Reform period
Agriculture	96.35	98.63	106.18	98.99	97.39	102.99
Crops	96.29	97.67	106.99	97.27	96.92	102.67
Foodgrains	94.64	95.96	107.62	97.37	95.24	103.06
Non-Foodgrains	96.6	98.34	106.62	95.51	97.39	101.68

Table 3. Indices of Net Barter Terms of Trade in A.P. & All-India

Year	Andhra Pradesh		All-India*		
	Agriculture	Crops	Foodgrains	Non-Foodgrains	
(1)	(2)	(3)	(4)	(5)	(6)
1980-81	97.02	99.46	95.89	101.71	N.A
1981-82	89.70	90.21	95.10	87.46	88.70
1982-83	89.34	87.84	96.06	82.45	91.40
1983-84	99.61	99.46	99.46	99.48	91.60
1984-85	110.06	113.80	90.47	123.86	93.90
1985-86	92.35	86.93	90.88	84.61	93.60
1986-87	91.13	86.40	88.51	85.23	95.70
1987-88	100.71	101.00	92.24	105.09	97.40
1988-89	101.12	100.10	100.87	99.63	98.30
1989-90	95.58	93.73	95.75	92.69	99.40
1990-91	104.61	107.10	102.45	109.06	101.90
1991-92	111.30	113.50	104.88	117.01	105.60
1992-93	94.69	92.13	97.12	89.72	103.90
1993-94	103.52	104.20	105.62	103.63	103.60
1994-95	117.45	120.50	124.07	118.83	106.60
1995-96	103.95	104.60	106.39	103.89	105.30
1996-97	94.00	91.46	95.68	89.41	103.10
1997-98	104.48	103.70	98.26	106.15	105.60
1998-99	102.42	101.40	101.42	101.37	105.20
1999-2000	95.09	92.50	94.10	85.11	102.70
1980-85	96.35	96.29	94.64	96.60	91.84
1986-90	98.63	97.67	95.96	98.34	98.54
1991-95	106.18	106.99	107.62	106.62	105.00
1996-99	98.99	97.27	97.37	95.51	104.15
1980-90	97.39	96.92	95.24	97.39	95.19
1991-99	102.99	102.67	103.06	101.68	104.62
1980-99	99.91	99.57	98.76	99.32	99.66

Notes: The indices of net barter terms of trade for All-India are taken from GOI., 2005c
N.A- Not Available

3.2. Causes for Variations in the Indices of NBTT

The year-to-year variations in the indices of net barter terms of trade can be explained by changes in the indices of prices paid for final consumption, intermediate consumption and capital formation, and those in the indices of prices received. The growth rate[6] in the indices of prices received in the reform period is higher than that in the pre-reform period [Table 4]. It increases from 7.09 per cent in the pre-reform period to 7.65 per cent in the reform period. However, the growth rate in the indices of prices received for non-foodgrains in the reform period is lower than that in the pre-reform period.

Table 4. Trend Growth Rates of Indices of Prices Paid & Received in A.P

Sl. No. (1)	Item (2)	Pre-Reform (3)	Reform Period (4)
Indices of prices paid			
1	Final consumption	5.78*	8.80*
2	Intermediate consumption	6.28*	8.71*
3	Capital formation	11.60*	7.22*
4	Combined Index of Prices paid	6.33*	8.65*
Indices of prices received			
5	Aggregate agriculture	7.09*	7.65*
6	Crops	6.94*	9.45*
7	Food Grains	6.63*	7.46*
8	Non-Food grains	7.13*	6.74*
9	Livestock products	7.52*	8.55*
Net barter terms of trade			
10	Aggregate agriculture	0.76	-0.99
11	Crops	0.61	-1.36
12	Foodgrains	0.30	-1.18
13	Non-foodgrains	0.80	-1.91

Note: * indicates statistical significance below 10 per cent level
Source: Calculated from Table 2 and 3 and Appendix 17.

On the other hand, the combined index of prices paid increases by 8.65 per cent in the reform period compared to 6.33 per cent in the pre-reform period. The increase in the combined index of prices paid in the reform period is higher than the growth rate in the index of prices received. This explains the deteriorating trend in the terms of trade in the reform period, though they continue to be favourable to agriculture most of the years. The contributing factor for the rapid rise in the combined index of prices paid is mainly the index of prices paid for final consumption and intermediate consumption in the reform period, and that of prices paid for capital formation in the pre-reform period.

As can be seen from Table 3, the terms of trade for agriculture in the general and the different crop sectors deteriorate in the reform period. Severe deterioration in terms of trade could be observed in case of non-foodgrains during that period. Another important finding is that there is no statistically significant trend in the movement of terms of trade for agriculture in the state in both the periods. Both, linear and non-linear, trend equations were fitted and neither type of trend was found in case of aggregate agriculture, crops, foodgrains and non-foodgrains.

3.3. Indices of Single Factorial Terms of Trade: TFP Corrected Net Barter Terms of Trade

The index of single factorial terms of trade [SFTT] is a better indicator of profitability in

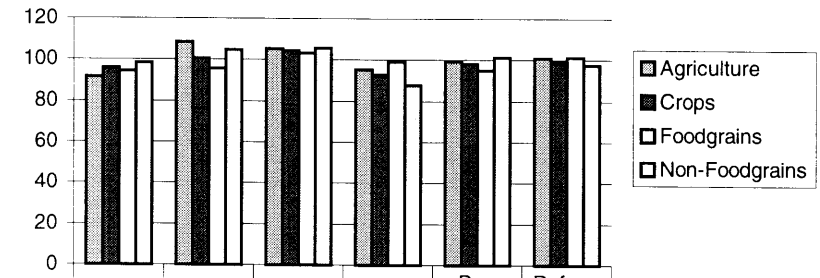
farming as it takes the productivity in the farming sector into consideration and corrects the net barter terms of trade with it. Therefore, the indices of SFTT were calculated by multiplying indices of net barter terms of trade with the respective indices of total factor productivity (TFP). The total input index outstripped total output index in many of the reform years, leading to lower total factor productivity in the reform period in agriculture. The average TFP index in the reform period was 97.90 as against 102.22 in the pre-reform period and the TFP index of non-foodgrains decreased drastically in the reform period. The contribution of TFP to output growth declined from 31 per cent in the pre-reform period to (-) 37 per cent in the reform period and this was much worse for the non-foodgrain crops.[7] This decline in the index of TFP seemed to have nullified the benefit of favourable net barter terms of trade as can be seen from the indices of single factorial terms of trade [Table 5]. The details are presented in Appendices 18 and 19.

Table 5. Indices of Single Factorial Terms of Trade in Andhra Pradesh

Year (1)	Agriculture (2)	Crops (3)	Foodgrains (4)	Non-Foodgrains (5)
1980-81	97.02	99.46	95.89	101.71
1981-82	95.36	98.95	97.96	102.33
1982-83	79.26	75.08	88.37	65.39
1983-84	120.94	122.72	113.71	132.48
1984-85	95.14	94.38	64.32	116.21
1985-86	62.52	86.16	106.19	73.33
1986-87	132.74	78.68	78.30	79.72
1987-88	109.11	116.66	95.25	132.61
1988-89	104.14	107.17	118.20	99.24
1989-90	99.43	96.41	96.02	97.41
1990-91	97.09	104.43	89.87	115.86
1991-92	110.81	111.14	100.20	116.47
1992-93	84.77	76.33	88.46	68.89
1993-94	122.94	126.23	118.48	132.72
1994-95	105.69	104.31	115.23	97.79
1995-96	102.83	103.98	93.65	112.48
1996-97	84.52	79.26	96.64	69.57
1997-98	96.89	89.84	81.07	95.31
1998-99	116.06	125.19	125.71	124.85
1999-2000	84.05	77.43	93.41	61.46
1980-85	91.71	96.12	94.40	98.57
1986-90	108.50	100.67	95.53	104.97
1991-95	105.41	104.39	103.2	105.67
1996-99	95.38	92.93	99.20	87.79
1980-90	99.34	98.19	94.91	101.48
1991-99	100.95	99.29	101.43	97.73
1980-99	100.07	98.69	97.85	99.79

The average value of index of single factorial terms of trade improved from 99.34 in the pre-reform period to 100.95 in reform period, showing an increase of only 1.62 per cent and was not statistically significant. The average value of the index of SFTT of crops and foodgrains improved by 1.12 per cent and 6.87 per cent respectively, while that of non-foodgrains deteriorated by 3.69 per cent in the reform period. This indicated that the small improvement in the index of net barter terms of trade was more than offset by the large decline in the index of total factor productivity for the non-foodgrain crops. The indices of SFTT deteriorated drastically and became unfavourable in the second half of the nineties for aggregate agriculture, crops, foodgrains and non-foodgrains, while these were favourable in the early nineties [Figure 2]. These indices of SFTT for AP agriculture, crops, foodgrains and non-foodgrains have been tested for trend and there was no statistically significant trend. The steep deterioration in the single factorial terms of trade for non-foodgrains relative to other crops and also relative to the pre-reform period is particularly noteworthy here.

Figure 2: Average Single Factorial Terms of Trade in A.P



	1980-85	1986-90	1991-95	1996-99	Pre-Reform	Reform period
Agriculture	91.71	108.5	105.41	95.38	99.34	100.95
Crops	96.12	100.67	104.39	92.93	98.19	99.29
Foodgrains	94.4	95.53	103.2	99.2	94.91	101.43
Non-Foodgrains	98.57	104.97	105.67	87.79	101.48	97.73

4. AGGREGATE AGRICULTURAL SUPPLY RESPONSE AND CAPITAL FORMATION IN AGRICULTURE

4.1. Aggregate Agricultural Supply Response

The movement of terms of trade in favour of agriculture does not seem to have propelled agricultural growth in the state. In fact, there has been a deceleration in the growth rate of agricultural production during the nineties. After two decades of good performance, the state witnessed deceleration in agricultural growth in the nineties by decreasing from 3.4 per cent per annum in the eighties to 2.3 per cent per annum in the nineties [Subrahmanyam and Satyasekhar, 2003, Pp. 1202-1211]. The per capita gross state domestic product from agriculture in constant prices did not increase after 1993 [GOAP, 2004, Pp. 4-5]. This situation of higher or favourable terms of trade and lower growth in the agricultural production needs enquiry into the nature of supply response in the particular context. Therefore, estimation of the price response of agricultural production in Andhra Pradesh becomes essential.

A regression model in the basic Nerlovian partial adjustment framework was employed to bring out the response of aggregate agricultural production to the changing relative prices or terms of trade. The aggregate supply response model is specified in log-linear form[8] with the index of net barter terms of trade in year t-1, state average annual rainfall, irrigation ratio/index of total factor productivity and output in year t-1 as the independent variables. The expected price is taken as the average of the last three years with weights of 3 [for the last year's index of net barer terms of trade], 2 [for before last year's index of net barter terms of trade] and 1 [for the index of net barer terms of trade before three years], as done by Bapna [1980, Pp. 55-58]. The price variable in the regression formulation is as below

$$P = 3\,P_{t-1} + 2\,P_{t-2} + 1P_{t-3}/6$$

The model is estimated by using ordinary least squares method. Besides the index of net barter

terms of trade [price a], the ratio of index of prices received to the index of prices paid for inputs used in farm production [price b] is also alternatively used as a price variable. The irrigation ratio, *viz.*, ratio of gross irrigated area to gross sown area, is generally used to represent technology in many studies on agricultural supply. In this study, index of total factor productivity in the agriculture sector, based on Törnquist-Theil Index, is also taken as technology variable as an alternative to irrigation ratio.

Table 6. Estimates of Aggregate Agricultural Output Function in Andhra Pradesh for the Period 1980-81 to 1999-2000 [OLS Estimates] [Long-Linear form]

Equation	Dependant Variable	Intercept	Coefficients						R^2	H Statistic'
			Price a	Price b	Irrigation Ratio	Index of TFP	Rainfall	Lagged Output		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.1	All crop output	-5.3973	0.26	-	-	0.841	0.222	0.873	0.628	-0.459
		(-1.772*)	(-0.589)			(3.381*)	(-1.402)	(4.285*)		
1.2	Do	-4.014	-0.100	-	-	0.839	0.197	0.922	0.619	-0.243
		(1.382)	(-0.252)			(3.332*)	(-1.27)	(4.487*)		
1.3	Do	-4.598	0.106	-	-	1.013	-	0.942	0.600	-0.252
		(-1.483)	(0.239)			(4.529*)		(4.600*)		
1.4	Do	-3.755	-0.122	-	-	1.000	-	0.971	0.601	-0.113
		(-1.266)	(-0.299)			(4.490*)		(4.705*)		
1.5	Do	-4.668	-	0.0899	-	0.849	0.198	0.892	0.618	-0.419
		(-1.564)		-0.187		(3.350*)	(1.277)	(4.166*)		
2.1	Food grain output	-1.660	-0.331	-	0.851	-	0.156	0.786	0.613	0.910
		(-0.607)	(-0.734)		(3.979*)		(1.090)	(3.811*)		
2.2	Do	-0.941	-0.319	-	0.782	-	0.157	0.732	0.613	0.913
		(-0.278)	(-0.732)		(3.773*)		(1.101)	(3.710*)		
2.3	Do	-0.795	-0.467	-	0.963	-	-	0.823	0.607	1.033
		(-0.302)	(-1.069)		(5.101)			(4.018*)		
2.4	Do	10.08	-1.347	-	-	1.097	-	0.0248	0.609	-0.724
		(4.553*)	(-3.271*)			(4.505*)		(0.145)		
2.5	Do	0.206	-0.446	-	0.868	-	-	0.747	0.606	0.941
		(0.604)	(-1.055)		(4.477*)			(3.766*)		
2.6	Do	-3.652	-	0.297	0.818	-	0.178	0.680	0.616	0.257
		(-1.466)		(0.814)	(4.004*)		(1.296)	(3.247*)		
3.1	Non-Food grain output	-4.869	-0.366	-	0.959	-	0.182	1.105	0.741	-0.690
		(-1.834*)	(-0.475)		(5.084*)		(1.228)	(4.420*)		
3.2	Do	-5.618	-0.0159	-	0.950	-	0.174	1.017	0.736	-0.708
		(-2.058*)	(-0.033)		(4.873*)		(1.173)	(5.713*)		
3.3	Do	-4.567	-0.265	-	1.052	-	-	1.111	0.731	-0.601
		(-1.695)	(-0.340)		(5.989*)			(4.362*)		
3.4	Do	-4.175	-	-0.654	0.965	-	0.188	1.169	0.750	-0.774
		(-1.531)		(-0.811)	(5.204*)		-1.29	(4.710*)		

Notes: 1. All variables are expressed as logarithms of the original values. Hence all coefficients are also elasticities.
2. The numbers in the square brackets are the calculated t values. The starred values of *t* imply the significance at 10 per cent or lower levels. A value of 'h' below 1.645 in absolute value indicates the absence of serial coorelation.
3. Basic data sets for this Table are given in the Appendix 20.
4. The difference between pairs of equations (1.1) and (1.2); (1.3) and (1.4); (2.1) and (2.2); (2.3) and (2.5); and (3.1) and (3.2) - is that the first equation uses the index of net barter terms of trade with base year weights as the price variable of the respective commodity group whereas the second equation uses the index of NBTT with current year weights as the price variable of the respective commodity group.
Source: Rao [2003].

All the regression coefficients have the expected signs according to economic logic [Table 6]. The regression coefficients of terms of trade in the equation for aggregate agricultural output (including all crops, foodgrains and non-foodgrains) for price a and price b, were statistically not significant, but positive. On the other hand, technology variables represented by irrigation ratio or total factor productivity were significant and positive in case of aggregate agricultural output, foodgrain output and non-food grain output. The coefficients for technological variables were higher than those for terms of trade. Therefore, it could be concluded that the elasticity of output with respect to technological change variable was substantially higher than that with respect to price variable. The elasticity for the technology variable indicated by the index of total factor productivity varied between 0.839 and 1.013, while it was between 0.08 and 0.260 for the price variable for all crop output. Similar results can be seen for foodgrains and non-foodgrains. The regression coefficient of terms of trade in the equation for the output of foodgrains, for price b, was statistically not significant, but positive. The coefficient for the price a variable was statistically significant but of the wrong negative sign in the equation for the output of non-foodgrains, with the Index of TFP in place of the irrigation ratio. In other equations, the coefficient for the price variable is negative and statistically not significant. Since we have used a separate expected price variable in these equations, and since the price variable is statistically not significant, the coefficient of the lagged dependent variable here reflects the slow adjustment of output over time to increase in irrigation or technological improvements.

Several studies on the aggregate agricultural supply response, using terms of trade for agriculture as the price variable, found positive but non-significant coefficients [Desai and Namboodiri, 1997; Thamarajakshi, 1994]. A higher level of irrigation and other infrastructures created by public investment raise the impact of prices on output and vice versa. Further, high variability in prices from year to year also cannot stimulate growth in agriculture [Schiff and Montenegro, 1997, Pp. 393-410]. The level of rural infrastructure in the state is very low. It was found that the index of rural infrastructure[9] in Andhra Pradesh was only 53.6 as against 85.3 in Punjab. It is nearer to that at the all-India level, which was 52.7, while the maximum possible value of the index was 100 [Bhatia, 1999, Pp. A-43-A-48]. The net area under canal irrigation has, in fact, came down in the state from 1.87 million hectares in 1990-91 to 1.63 million hectares in 1999-2000 and further to 1.14 million hectares in 2003-2004. The irrigated area under tanks went down from 1.02 million hectares to 0.65 million hectares in 1999-2000 and further to 0.49 million hectares in 2003-2004.[10] Though the area under wells increased from 1.3 million hectares in 1990-91 to 1.9 million hectares in 1999-00, it could only make up for the decline in canal and tank irrigation. Further, there were not any major breakthroughs in agricultural research in the past decade. The initiatives of government like introduction of hybrids in rice did not succeed in the country (including Andhra Pradesh) due to various reasons [Janaiah and Hossain, 2003, Pp. 2,492-2,501]. In view of this, the statistically insignificant response to the favourable terms of trade may be due to the low level of rural public infrastructure and wide fluctuations in the terms of trade for agriculture. Further, the lack of statistical significance of the price variable, in the present exercise, is to be expected since the dependent variable is an aggregate of output of all the crops within each category - foodgrains, non-foodgrains, or all crops - in the irrigated and rain-fed regions of the state. There is very little possibility of substitution in response to changes in relative prices among different individual crops

across regions with diverse soil-climatic conditions and aggregation further conceals whatever substitutability that might be there among different crops.

4.2. Capital Formation in Agriculture

The question of the movements of fixed capital formation in agriculture in general and private capital formation in particular during the period of favourable terms of trade during the nineties is a very pertinent question in view of the reform strategy. The public fixed capital formation in agriculture in Andhra Pradesh at constant prices showed increasing trend up to 1986-87 and it stagnated since then up to 1999-2000 [Figure 3]. The private fixed capital formation in agriculture showed increasing trend up to 1988-89 except for a dip in 1983-84 and stagnated since then. The gross fixed capital formation in agriculture in the state showed increasing trend, on the whole, up to 1988-89. It crossed the 1988-89 level only once in 1998-99. If forestry and logging and fishing components are removed, the private fixed capital formation in agriculture (which includes the crop sector and animal husbandry) has actually decreased. In this case, the peak level was reached in 1991-92 and thereafter it remained lower.

Figure 3: Gross Fixed Capital Formation in Agriculture and Animal Husbandry in AP at 1993-94 Prices

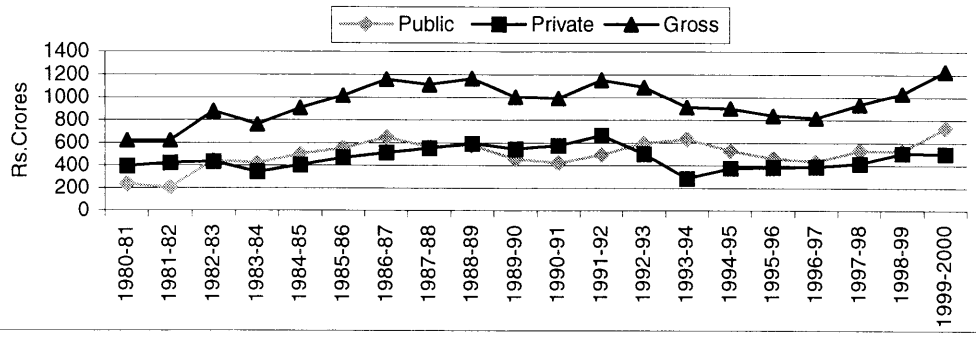


Table 7. Trend Growth Rates on Public, Private and Gross Fixed Capital Formation

Sl. No.	Period	Agric+AH+F&L+Fishing			Agriculture+A.H		
		Public FCFA	Private FCFA	GFCFA	Public FCFA	Private FCFA	GFCFA
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Pre-reform	7.08*	5.08*	5.82*	7.15*	4.67*	5.58*
2	Reform	1.7	2.78	2.12	1.05	-0.51	0.04

* Significant below 10 per cent level
Source: Rao [2003].

Gross fixed capital formation in agriculture as per cent of gross state domestic product in agriculture fell from 7.45 per cent in pre-reform period to 5.56 per cent in reform period in AP and that in All-India from 7.36 per cent to 6.38 per cent [Table 9]. In AP, it was still lower, *viz.*, 5.06 per cent in the last years of reform period, while that in All-India was maintained at 6.42 per cent. The foregoing analysis clearly points to the fact that both the public and private capital formation in agriculture declined in the state and that the level is also very low compared to all-India. This could have definitely shown its impact on output and yield.

Table 8. Terms of Trade, Public and Private Capital Formation in AP Agriculture

Period (1)	Index of NBTT (2)	Public FCFA (3)	Private FCFA (4)
1980-81 to 1985-86	96.35	393	410
1986-87 to 1990-91	98.63	534	555
1991-92 to 1995-96	106.18	542	442
1996-97 to 1999-00	98.99	554	453
1980-81 to 1990-91	97.39	457	476
1991-92 to 1999-00	102.99	547	447

Source: Rao [2003].

Table 9. Fixed Capital formation in Agriculture as Per cent of GDPA in A.P. and All-India

Year (1)	GFCFA to GSDPA %	
	A.P (2)	India (3)
1980-81- '85-86	6.78	7.83
1986-87- '90-91	8.24	6.80
1991-92- '95-96	5.82	6.48
1996-97- '99-00	5.23	6.30
Pre-reform	7.45	7.36
Reform	5.56	6.40
Overall Reriod	6.60	6.60

Source: Rao, 2003.

5. ANATOMY OF THE AGRARIAN CRISIS

The agrarian distress in the state has much to do with the reform strategy for agriculture. The terms of trade became favourable to the sector during the reform period in the state . The results presented above showed that the reform strategy for agriculture worked well as far as making terms of trade favourable to agriculture was concerned. The problem was with all other basic pillars of the agriculture sector, *viz.*, total factor productivity and public and private capital formation in agriculture. Though the relative prices favoured agriculture sector, the route through which they became favourable was not as per the reform strategy asserted by the policy makers. While they maintained that trade liberalisation and reduction of protection to the industry would be the route, in fact the terms of trade moved in favour of the sector mainly because of the higher procurement prices offered, aided of course by the reduction in protection to industrial goods. The prices of almost all the intermediate consumption goods, like power, fertilisers, etc., in fact, increased at a higher rate in the nineties along with the items purchased for final consumption. The cost and quality of power supplied to agriculture suffered in this period, contrary to expectations.[11] However, the reduction of protection to industrial sector helped in reducing the prices of capital goods. The increase in agricultural prices during this period in the state came at a time of decline in productivity and increase in the intensity of inputs.[12] The situation towards the end of nineties became very distressful to farmers because of unfavourable terms of trade and negative contribution of total factor productivity.

The contribution of total factor productivity to output growth declined from 31 per cent in the pre-reform period to [-] 37 per cent in the reform period in the crops sector as a whole; it was much sharper for non-foodgrain crops. There were several reasons for this. The farmers in the state began using large quantity of chemical fertilizers, pesticides and very expensive seeds besides large contingents of labour. The costs of production per unit of output in case of all crops were the highest in Andhra Pradesh compared to all other Indian states [GoAP, 2002]. The farmers in the state use nearly 35 per cent of the total chemical pesticides in the country. The decline of groundwater and soil degradation was very severe in the state; of late it has assumed serious proportions. While the area under irrigation stagnated around 4.3 million hectares in the state during the nineties, the irrigated area under canals and tanks has gone down by 2,00,000 and 3,00,000 hectares, respectively [GoAP, 2005]. The increase in area under well irrigation coupled with the decline in tank irrigation resulted in overexploitation of groundwater. The irrigated area per well declined marginally from 1.9 acres to 1.22 acres indicating reduced water yield. The groundwater department of the government

identified 339 Mandals[13] of the total 1100 Mandals of the state as problematic with regard to ground water availability. In 79 Mandals, the water table has steadily gone down by more than 20 meters[14] [Reddy, 2003, Pp. 1179-1191]. The cultivated area in the state was degraded to an extent of 19 per cent and the cost of degradation is about 1.2 per cent of gross state domestic product [Rao and Dev, 2003, Pp. 1130-1142]. The research and extension expenditures in the state are far less compared to many other states in the country. The state invested 0.26 per cent of gross state domestic product from the agricultural sector in agricultural research and education, compared to the average of 0.37 for 14 other states in the country during 1992-94. In case of agricultural extension, the state invested only 0.02 per cent of GSDP in agriculture as against an all-state average of 0.15 per cent [Pal and Singh, 1998, Pp. 488-503]. All the above might have contributed to the decline in the total factor productivity.

Several scholars had argued that private capital formation would increase and grow autonomously eventually substitute public capital formation as a result of favourable terms of trade for agriculture [For, e.g., Mishra and Chand, 1995, Pp. A-64-A-79]. The main issue in this debate is complementarity or substitutability between public and private capital formation in agriculture. The increase in private fixed capital formation in agriculture despite a continuous decline of public fixed capital formation at the all-India level during the nineties has been shown as a proof of lack of complementarity. However, even if private capital formation grows independently of public capital formation, it may not be possible for the private capital formation to substitute public capital formation because of differences in composition and implications of both of them [Purohit and Reddy, 1999]. The results of the present study show that things could be very different at the state level as both private and public capital formation declined during the nineties despite favourable terms of trade. This implies that the complementarity may be at work at the state level and this needs further analysis. The gross capital formation in agriculture as a percent of gross state domestic product in agriculture went down from 7.45 per cent per annum during the eighties to 5.56 per cent per annum during the nineties and this was lower than that at the all-India level.[15] The share of private sector in the gross capital formation in agriculture has been nearly fifty per cent and did not increase in the nineties in the state compared to considerable increase at the all-India level from 56 per cent in the pre-reform period to 72 per cent in the reform period. The slow pace of public investments in agriculture in the state affected the development of rural infrastructure like irrigation, market yards, agricultural research, extension, etc. The declining public and private capital formation and the associated neglect of rural infrastructure may also be one of the reasons for the decline in the contribution of total factor productivity.

The study on the aggregate agricultural supply response showed that there was no statistically significant response to the price variable represented by terms of trade for agriculture. The technology variables represented by total factor productivity index and irrigation ratio were found to have statistically significant impact. This lack of significant response to the terms of trade variable may be due to the low level of rural infrastructure and wide fluctuations in the terms of trade for agriculture.

In addition to the above problems in the working of the reform strategy for agriculture, there were also other problems that intensified the crisis. While the incidence of indebtedness was the highest in Andhra Pradesh with 82 per cent as against a national average of 50 per cent in 2003,[16] the credit supplied by institutional sources was

only 30 per cent of the total quantum of credit taken by the farmers [GoI, 2005b]. The difficulty with loans from moneylenders is that majority of these loans, *viz.*, 83 per cent of them were given at an average annual interest rate of 24 per cent or more [Reddy, 2004]. The rural employment growth in the state during the 1993-94 to 1999-2000 was only 0.29 per cent per annum compared to 2.40 during 1983 to 1993-94. The corresponding growth rates for all-India were 1.73 and 0.67 per cent per annum. [Dev and Mahajan, 2003, Pp. 1252-1261]. Therefore, the employment situation in the state was better in the eighties than in the nineties compared to all-India. The supply of spurious seeds, fertilisers and pesticides and lack of extension services were serious problems in the state. The extension machinery in the state has been reduced to a skeleton in the past decade with only one extension worker for nearly 4000 farmers [GoAP, 2004]. On the other hand, the situation was much better in the state in the eighties as shown in the same document. To make matters worse, the trader of seeds, fertilisers and pesticides has assumed the role of moneylender and also of the extension functionary in rural areas of the state. A higher proportion, *viz.*, 30 per cent of farmers, received information on modern technology in farming through input dealers in the state compared to only 13 per cent at the all-India level [GoI, 2005a, p. 12]. Further, there was a gradual decline of traditional caste based and other such institutions like the joint family system, which acted as a form of social security for the people including farmers in the villages. A sort of institutional vacuum arose in villages [Galab, 1999, Pp. 501-518]. The delivery system of public services at the village level have broken down to such an extent that the poor quality of education and health services in the public sector have forced the people to go to private sector even at the cost of paying higher prices [World Bank, 2003].

The slow pace in the long awaited reform of tenancy laws was the other major problem for tenants, as the banks are not willing to lend to them because of lack of official proof of tenancy [World Bank, 2003, Pp. 41-42]. On the other hand, the cooperative credit institutions declined in the state during the period. There has been a significant increase in leasing-in of the land by small farmers in the state. In a study, it was found that tenancy accounts for 60 per cent of the net sown area in South Coastal Andhra [Reddy, 2004]. There are mainly two reasons for this. In coastal districts of the state, many of the land-owners are settling in urban centres for joining their children in private schools and colleges to impart English medium education and if possible to send them abroad as computer professionals. In the Telangana region of the state, the spread of left wing communism called Naxalism resulted in most of the big land-owners fleeing villages either leaving their lands fallow or leasing them out. On the other hand, the small farmers, being unable to bear the expenses of education and health and devoid of non-farm employment opportunities like before in the eighties, had to lease in land to earn enough money for living. They also wanted to improve their economic condition by utilizing the opportunities of growing newer crops. As they cannot enter the institutional sources for credit, they approach moneylenders for loans at exorbitant interest rates of 36-60 per cent per annum [Reddy, 2004].

The inordinate delay in revising the import tariffs according to the needs of the country in case of cotton and palm oil, mainly as a result of lobbying of vested interests, caused huge losses to the growers of cotton and groundnut, respectively. The suicides of farmers in 1997-98 and 2000-2001 were mainly by the cultivators of cotton and groundnut crops, respectively. In the era of open trade, futures market, contract farming and comprehensive insurance cover are said to

reduce the risks of cultivation. There are no major initiatives for taking up contract farming in a big way in the country. After the first round of suicides, forward trading was allowed in 1999 and further liberalised in 2003; and forward markets are also liberalized. However, the volumes traded in these markets are very low due to so many bottlenecks including infrastructure and, therefore, provide insufficient hedges against price risk. Certain contract specifications at East India Cotton Association [EICA], Mumbai, to cotton segment with the lot size of ten tonnes [55 bales], are prohibitive for average farmer to participate [Naik and Jain, 2002, Pp. 3161-3173; Sahadevan, 2002, Pp. 3153-3160]. The central government had started the National Agricultural Insurance Scheme in 1999-2000 in a few districts in the country and later extended it to the entire country and formed Agricultural Insurance Corporation of India to implement it. But, the insurance against crop failure has not been very popular due to its recent origin [for the non-loanee farmers], lack of awareness among farmers, unaffordable premium rates for small farmers, etc. Though it is catching up now, it will take some time before this can be effective in reducing the adverse impact of crop failures. The government needs to subsidise the premium amount for the small and marginal farmers for some more time before the insurance companies can move on to actuarial regimes. To conclude, the main policy implication of the study is that the policy makers need to focus mainly on building the rural infrastructure like irrigation, roads, market yards, agricultural research, agricultural extension, etc, to increase the productivity and profitability and to raise the impact of favourable prices.

NOTES

1. Purohit and Reddy [1999] found that the complementarity persists at the state level, by taking data for the eighties for A.P, Kerala, Rajastan and Tamil Nadu. Similar finding was reported by Chand [2000].

2. There was only one study of terms of trade in Punjab agriculture (Singh, 1989) with the new methodology developed by Thamarajakshi (1969) and Kahlon and Tyagi (1980). Other studies at state level followed the old methodology (for e.g. Diwakar 1991).

3. Methodology is given in detail in Rao [2003].

4. Index of total factor productivity may be defined as the ratio of weighted combination of output to a weighted combination of inputs. Estimates of TFP indices are designed to provide an indication of the change in output per unit of total factor input. The Törnquist-Theil index provides consistent aggregation of inputs and outputs under the assumptions of competitive behaviour, constant returns to scale, Hicks neutral technical change and input-output separability [Rao, 2005, p. 2-3].

5. Though the indices of NBTT with the base year weights are not presented here, it was found that the direction of movement of terms of trade is same in both the indices. However, those with the current year weights are consistently higher than the ones with base year weights. To be more specific, they are higher by 1.95, 2.84 and 2.35 per cent in the pre-reform, reform and overall period of study. This shows that the index of NBTT with a fixed base year does not represent the true position of agriculture *vis-à-vis* non-agriculture because of its inability to capture changes in the pattern of trade.

6. All growth rates in the paper were calculated using semi-log trend equation.

7. Please see Rao [2005] for details.

8. The detailed derivation from Nerlove's model can be seen in Palanivel [1995].

9. Bhatia [1999, A-45-47] calculated an index of infrastructure for all-India and different states of the country. He has identified 14 sub-items of agricultural infrastructure and assigned weights based on the role and importance in influencing the level of agricultural production/productivity. The items and their weights are power [10], irrigation [15], transport [10], fertilizer [10], agricultural credit [10], rural health [10], agricultural marketing [15], agricultural extension [10] and agricultural research [10] and all these add to 100. Taking into consideration the available stock of infrastructural activities, the optimum/or desirable level as well as all India average, the statewise score were assigned to various activities. All the states with a level of infrastructural activity equal to or higher than the above specification were given full score for that item and other states were accordingly scored in proportion to their level and the desired level of infrastructure activity except in rural infant mortality rate where higher value was assigned low score.

10. This, of course, is not a sign of decline in infrastructure, but rather of declining use of available infrastructure. However, it is customary to consider the area under irrigation as the available infrastructure as far as farming is considered.

The area under canal irrigation declined despite rising relative prices because the public investment expenditure under operation and maintenance was reduced during the reform period.

11. The number of hours of power supply has gone down from around nine hours in the early nineties to less than seven hours by the end of the nineties. The investment needed for installation of power connection increased significantly in the nineties.

12. Similar situation at the all-India level was reported in Sen [2001].

13. *Mandal* is an intermediate administrative unit between the village Panchayat and the *Zilla Parishad* in Andhra Pradesh.

14. This explains the fact that there are large numbers of failed as well as dried up irrigation bore wells in the state. In fact, many suicides occurred on failure of bore well after investing huge amount on sinking bore wells by taking loans from money lenders, disproportionate to the repayment capacity.

15. Many scholars showed that there is a need to invest 12 per cent of agricultural income to achieve a growth rate of four per cent in agriculture assuming an incremental capital output ratio of three [Rao, 2002, Pp. 225-252].

16. For details, please see Deshpande and Prabhu [2005, p. 4664].

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Appendix 1. Calculation of Base Year Weights and Base Year Prices for Commodities Sold by Farmers in Andhra Pradesh

Sl. No	Commodity/ Product	BASE YEAR WEIGHTS					BASE YEAR PRICES			
		VMS IN 1988-89	VMS IN 1989-90	VMS IN 1990-91	Average of 3 years	Base Year Weight W0	Price in 1988-89	Price in 1989-90	Price in 1990-91	Average Price
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Paddy	1,183.22	1,107.79	1,323.00	1,204.67	19.19	197.77	197.47	243.24	212.83
2	Jowar	65.27	89.57	87.31	80.72	1.29	231.95	216.34	223.25	223.85
3	Bajra	13.36	12.41	12.40	12.72	0.20	184.15	186.11	200.36	190.21
4	Maize	17.56	23.49	23.44	21.50	0.34	201.15	197.18	204.35	200.89
5	Ragi	14.93	18.95	16.73	16.87	0.27	190.25	198.45	189.84	192.85
6	Korra	6.72	10.29	8.28	8.43	0.13	175.41	175.68	195.56	182.22
7	Red gram	20.47	25.11	31.53	25.70	0.41	574.77	632.71	837.41	681.63
8	Black gram	141.28	147.82	161.97	150.36	2.40	580.56	643.07	721.95	648.53
9	Green gram	48.08	49.36	48.53	48.66	0.78	515.34	581.23	596.63	564.40
10	Horse gram	6.04	6.18	10.45	7.56	0.12	273.86	239.90	334.33	282.70
11	Bengal gram	6.68	9.56	17.44	11.23	0.18	663.39	641.35	759.27	688.00
12	Castor	30.72	37.39	36.77	34.96	0.56	565.57	566.85	544.65	559.02
13	Ground nut	1,066.90	1,118.40	1,639.33	1,274.88	20.30	524.84	651.14	878.25	684.74
14	Cotton kapas	227.98	344.05	488.74	353.59	5.63	843.53	773.91	922.10	846.51
15	Sugar cane	368.39	433.40	511.39	437.73	6.98	356.28	405.02	438.26	399.85
16	Tobacco	327.51	268.06	425.09	340.22	5.42	2,071.49	1,553.48	2,674.35	2,099.77
17	onions	22.27	24.44	43.82	30.18	0.48	153.69	138.99	257.75	183.48
18	Chillies	498.26	344.54	524.02	455.61	7.26	1,736.81	976.36	1,716.09	1,476.42
19	Turmeric	37.87	93.59	121.96	84.47	1.35	642.06	553.89	877.55	691.17
20	Mesta	168.43	237.98	230.26	212.22	3.38	338.89	406.11	351.00	365.33
21	Sesamum	10.03	10.01	25.02	15.02	0.24	718.21	860.26	977.04	851.84
22	Milk	592.63	674.48	704.34	657.15	10.47	3.51	3.71	3.90	3.71
23	Eggs	202.45	196.33	212.76	203.85	3.25	0.67	0.60	0.63	0.63
24	Chicken	47.82	51.38	57.63	52.28	0.83	29.26	30.11	32.40	30.59
25	Cattle hides	9.12	9.24	9.28	9.21	0.15	77.60	83.00	88.25	82.95
26	Buffalo hides	8.34	9.15	9.97	9.15	0.15	71.40	76.60	81.79	76.60
27	Sheep hides	12.69	14.30	16.00	14.33	0.23	52.00	56.20	60.46	56.22
28	Goat hides	9.09	9.59	10.06	9.58	0.15	47.90	52.00	56.15	52.02
29	Cattle male	124.98	131.03	136.98	131.00	2.09	1,932.00	2,036.00	2,140.00	2,036.00
30	Cattle female	41.52	42.53	43.45	42.50	0.68	1,491.00	1,565.00	1,639.00	1,565.00
31	He buffalo	13.53	13.35	13.13	13.34	0.21	1,101.00	1,145.00	1,189.00	1,145.00
32	She buffalo	84.41	89.98	96.10	90.16	1.44	1,854.00	1,960.00	2,067.00	1,960.33
33	Goat female	93.88	98.86	103.57	98.80	1.57	436.00	468.00	500.00	468.00
34	Sheep	107.00	117.37	127.85	117.41	1.87	448.00	481.00	513.00	480.67
	Total	7,528.43	7,768.98	9,227.60	6,276.06	100.00				

* VMS= Value of marketed Surplus

Appendix 2. Calculation of Base Year Weights for Commodities Purchased for Final Consumption in Andhra Pradesh

Sl. No. (1)	Commodity/ Product (2)	Expenditure on 1988-89 (3)	Expenditure on 1989-90 (4)	Expenditure on 1990-91 (5)	Average Expend. in Rs. Crores (6)	Weights (7)
1	Arhar Dal	104.55	119.85	138.02	120.81	7.09
2	Gram Dal	13.89	15.88	18.32	16.03	0.94
3	Edible Oil	148.34	194.33	251.28	197.98	11.63
4	Salt	5.37	7.18	10.33	7.63	0.45
5	Sugar	48.89	62.38	65.30	58.86	3.46
6	Tea Powder	83.15	118.15	145.62	115.64	6.80
7	Coffee Powder	3.70	5.29	6.43	5.14	0.30
8	Beedi	71.86	76.18	104.88	84.31	4.95
9	Cigarette	13.70	14.56	19.88	16.05	0.94
10	Country Liquor	62.97	66.92	92.01	73.97	4.34
11	Kerosene	63.71	75.24	85.58	74.84	4.39
12	Match Box	44.45	52.55	59.85	52.28	3.07
13	Electricity	90.01	106.43	120.86	105.77	6.21
14	Shirting (Cotton)	33.71	53.69	53.22	46.87	2.75
15	Shirting (Syn)	23.71	38.00	37.43	33.05	1.94
16	Saree (Handloom)	37.41	59.55	58.87	51.94	3.05
17	Saree (Syn)	17.78	28.36	27.88	24.67	1.45
18	Dhoti (Hand)	17.78	28.36	27.88	24.67	1.45
19	Lungi	5.93	9.64	9.36	8.31	0.49
20	Trousers cloth (C)	5.56	9.07	8.97	7.87	0.46
21	Trousers cloth (S)	7.59	12.10	11.89	10.53	0.62
22	Towel	3.89	6.05	6.04	5.33	0.31
23	Leather chappals	7.59	4.91	4.09	5.53	0.31
24	Rubber chappals	4.63	3.02	2.53	3.39	0.20
25	Leather shoes	0.93	0.76	0.58	0.76	0.04
26	Ampicillin	65.37	63.89	102.15	77.14	4.53
27	Saridon	12.96	12.67	20.27	15.30	0.90
28	Crocin	38.89	38.19	60.82	45.97	2.70
29	Pathological Test	25.93	25.52	40.55	30.67	1.80
30	Doctors Fee	27.59	27.03	43.08	32.57	1.91
31	School Fee	65.37	64.08	102.15	77.20	4.53
32	Cinema Ticket	18.52	18.15	29.05	21.91	1.29
33	FS Paper	14.07	13.80	22.03	16.63	0.98
34	Bus Fare 1K.M	44.08	43.10	68.81	52.00	3.05
35	Toilet Soap	25.37	24.76	39.57	29.90	1.76
36	Hair Oil	30.00	29.30	46.79	35.36	2.08
37	Barber Charges	11.48	11.34	18.13	13.65	0.80
38	Washing Soap	30.00	29.30	46.79	35.36	2.08
39	Washermencharges	16.11	15.69	25.15	18.98	1.11
40	Tailoring Charges	7.04	6.99	11.11	8.38	0.49
41	Radio	6.11	9.83	7.41	7.78	0.46
42	T.V. (B/W)	4.07	6.62	5.07	5.25	0.31
43	Aluminum	12.04	19.28	14.62	15.31	0.90
44	Cycle	6.11	9.64	7.21	7.65	0.45
45	Watch	2.96	4.91	3.70	3.86	0.23
	Total	3,284.17	3,541.54	3,980.56	1,703.10	100.00

Appendix 3. Calculation of Base Year Prices for Commodities Purchased for Final Consumption in AP

Sl. No (1)	Commodity/ Product (2)	1988-89 Prices (3)	1989-90 Prices (4)	1990-91 Prices (5)	Average Prices (6)
1	Arhar dal	11.45	10.06	12.74	11.42
2	Gram dal	7.79	10.38	10.55	9.57
3	Edible Oil	22.27	22.56	26.09	23.64
4	Salt	0.65	0.79	1.20	0.88
5	Sugar	5.10	5.25	5.25	5.20
6	Tea Powder	27.00	29.50	33.25	29.92
7	Coffee Powder	30.00	30.50	31.00	30.50
8	Bidi	1.00	1.35	1.69	1.35
9	Cigarette	2.37	2.53	2.81	2.57
10	Country Liquor	5.00	5.00	6.00	5.33
11	Kerosene	2.45	2.45	2.45	2.45
12	Match Box	0.30	0.29	0.27	0.29
13	Electricity	50.00	60.00	60.00	56.67
14	Shirting (Cotton)	12.96	14.50	16.27	14.58
15	Shirting (Syn)	27.35	29.31	31.27	29.31
16	Saree (Handloom)	65.53	73.43	81.32	73.43
17	Saree (Syn)	158.89	172.00	186.35	172.41
18	Dhoti (Hand)	68.28	79.38	90.48	79.38
19	Lungi	17.86	18.43	19.00	18.43
20	Trousers cloth (C)	16.98	17.20	17.44	17.21
21	Trousers cloth (S)	50.48	57.02	63.56	57.02
22	Towel	16.25	17.00	17.00	16.75
23	Leather chappals	72.31	84.58	96.84	84.58
24	Rubber chappals	24.00	27.00	30.58	27.20
25	Leather shoes	144.25	180.00	212.15	178.80
26	Ampicillin	3.05	3.15	3.25	3.15
27	Saridon	3.66	3.90	4.12	3.89
28	Crocin	2.20	2.35	2.55	2.37
29	Pathological Test	7.00	7.00	12.00	8.67
30	Doctors Fee	10.00	10.00	15.00	11.67
31	School Fee	35.00	35.00	35.00	35.00
32	Cinema Ticket	1.50	1.50	3.00	2.00
33	FS Paper	3.50	3.75	4.00	3.75
34	Bus Fare 1K.M	10.00	10.00	12.50	10.83
35	Toilet Soap	4.40	4.85	5.55	4.93
36	Hair Oil	41.78	38.90	39.35	40.01
37	Barber Charges	200.00	200.00	350.00	250.00
38	Washing Soap	3.35	3.20	3.50	3.35
39	Washermencharges	65.26	65.17	160.51	96.98
40	Tailoring Charges	35.00	35.00	50.00	40.00
41	Radio	285.00	280.00	275.00	280.00
42	T.V. (B/W)	2,780.00	2,840.00	2,900.00	2,840.00
43	Aluminium	35.00	45.83	56.67	45.83
44	Cycle	800.00	875.00	925.00	866.67
45	Watch	362.00	382.00	400.00	381.33

Appendix 4. Calculation of Base Year Weights and Base Year Prices for Commodities Purchased by Farmers for Intermediate Consumption in Andhra Pradesh

Sl. No.	Item	Expenditure in			Average Expen-diture	Base Year Weights	Prices during			Base year Prices (P0)
		1988-89	1989-90	1990-91			1988-89	1989-90	1990-91	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Seed	31.52	34.04	37.18	34.25	1.32				**
2	Chemical Fertilizers	472.80	529.00	622.60	541.47	20.85				**
3	Pesticides	105.71	104.17	165.76	125.21	4.82				**
4	Hired Labour	1,308.49	1,241.54	1,746.94	1,432.32	55.14	10.70	11.98	13.11	11.93
5	Interest rate	116.26	124.80	131.77	124.28	4.79	10.60	10.61	10.50	10.57
6	Electricity	4.76	5.28	0.00	5.02*	0.19	50.00	50.00	0.00	50.00
7	Diesel	132.79	133.03	193.09	152.97	5.89	3.89	3.86	5.55	4.43
8	Livestock Feed	113.72	121.43	129.15	121.43	4.68	1.66	1.83	2.36	1.95
9	Land Revenue	17.43	20.40	28.16	22.00	0.85	6.71	6.71	6.71	6.71
10	Water Charges	39.97	30.02	44.16	38.05	1.47	143.00	143.00	143.00	143.00
						100.00				

Exp= Total expenditure; * Average of two years is taken since 1990-91 was a year when power was supplied free of cost to farmers; ** Combined index of prices were calculated for seeds of all crops and various chemical fertilizers.

Appendix 5. Calculation of Base Year Weight and Base Year Prices for Commodities Purchased by Farmers for Capital Formation in Andhra Pradesh

Sl. No.	Commodity	Expenditure in			Average Expen-diture	Base Year Weights W0	Prices during			Average Price (Rs)
		1988-89	1989-90	1990-91			1988-89	1989-90	1990-91	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Hand Operated Sprayers	107.5	142.975	142.975	393.45	0.30541	500	665	665	610
2	Power Sprayers	87.925	87.925	106.243	282.093	0.21897	25,000	2,500	3,020	2,673.33
3	Iron Plough	23.3835	23.3835	23.3835	70.1505	0.05445	255	255	255	255
4	Diesel engine Pumpsets	741.637	958.295	958.41	2,658.34	2.06352	8,900	11,500	11,500	10,633
5	Electric Motors 5hp	4,455	4,815	4,815	14,085	10.9334	9,900	10,700	10,700	10,433
6	Tractors 35hp	3,855.1	4,423.22	4,969.92	13,248.2	10.2839	95,000	109,000	122,442	108,814
7	Cement	4,911	5,313	5,714	15,938	12.3718	1,195	1,285	1,585	1,355
8	Lime	342	373	402	1,117	0.86707	212.85	229.25	245.5	229.2
9	Bricks	12,325	13,385	14,434	40,144	31.1616	378	412	467	419
10	Iron & Steel	4,173	4,538	4,901	13,612	10.5662	8,500	9,208	10,625	9,444.33
11	Logs & Timber	4,986	5,418	5,855	16,259	12.621	12,042	13,250	19,487	14,926.3
12	Stone	2,776	3,019	3,261	9,056	7.02968	3,022	3,264	3,505	3,263.67
13	Paint	601	655	706	1,962	1.52299	93.4	101	109.25	101.22
	Total	39,384.5	43,151.8	46,288.9	128,825	100				

APPENDIX 6. INDEX OF PRICES RECEIVED USING PRICE RELATIVES BASED ON FARM HARVEST PRICES BASED ON BASE YEAR WEIGHTS IN AP (1988-91=100)

SL. No.	Commodity/ Product	Base Year Weight W0	Price Relatives									
			1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Paddy	19.19	53.47	58.74	63.89	69.90	65.01	71.61	75.51	82.27	92.92	92.78
2	Jowar	1.29	52.71	60.38	55.82	65.07	62.22	64.28	65.82	72.42	99.19	92.51
3	Bajra	0.20	51.11	58.56	59.70	68.00	66.67	74.20	81.01	88.27	96.81	97.84
4	Maize	0.34	51.57	57.67	65.25	68.22	58.27	77.05	79.76	87.74	100.13	98.15
5	Ragi	0.27	57.27	62.20	64.71	73.13	74.78	77.94	77.27	87.09	98.65	102.90
6	Korra	0.13	68.53	69.41	74.48	86.65	84.05	84.05	82.49	93.54	96.26	96.41
7	Red gram	0.41	43.71	46.26	47.79	57.81	52.61	52.04	69.95	95.89	84.32	92.82
8	Black gram	2.40	40.84	41.38	52.15	66.34	70.32	66.85	62.14	68.85	89.52	99.16
9	Green gram	0.78	53.9	53.20	46.61	54.60	81.76	62.04	64.38	84.66	91.31	102.98
10	Horse gram	0.12	63.58	64.67	60.54	68.05	65.96	78.85	71.12	70.31	96.87	84.86
11	Bengal gram	0.18	56.65	45.55	38.07	51.46	59.98	67.98	55.88	70.52	96.42	93.22
12	Castor	0.56	49.64	48.73	52.06	87.34	69.35	56.88	75.57	116.05	101.17	101.40
13	Ground nut	20.30	49.33	50.00	54.23	59.74	61.86	63.41	78.36	91.51	76.65	95.09
14	Cotton kapas	5.63	62.71	60.63	57.74	71.05	64.64	54.34	72.5	101.25	99.65	91.42
15	Sugar cane	6.98	74.58	53.22	48.05	71.67	73.33	79.92	79.44	88.09	89.10	101.29
16	Tobacco	5.42	47.48	54.88	48.88	50.41	53.57	63.86	57.56	92.11	98.65	73.98
17	onions	0.48	28.2	39.21	64.22	44.39	40.45	44.75	62.71	100.03	83.76	75.75
18	Chillies	7.26	45.2	56.05	41.82	51.61	82.68	48.16	43.77	89.28	117.64	66.13
19	Turmeric	1.35	35.8	37.06	78.49	131.61	119.97	114.35	77.83	103.43	92.89	80.14
20	Mesta	3.38	48.18	57.65	59.06	89.89	184.43	56.03	57.49	72.47	92.76	111.16
21	Sesamum	0.24	45.44	52.17	57.34	65.36	76.50	68.32	87.06	105.49	84.31	100.99
22	Milk	10.47	45.82	49.33	55.53	70.08	72.78	84.10	84.1	87.33	94.61	100.00
23	Eggs	3.25	66.67	68.25	73.02	79.37	82.54	79.37	80.95	84.13	106.35	95.24
24	Chicken	0.83	45.77	49.85	52.30	58.84	76.01	81.73	92.09	93.82	95.65	98.43
25	Cattle Hides	0.15	42.19	48.52	55.15	61.48	67.81	74.44	80.77	87.10	93.55	100.06
26	Buffalo Hides	0.15	39.16	45.82	52.55	59.40	66.19	72.98	79.63	86.49	93.21	100.00
27	Sheep Hides	0.23	32.02	39.58	47.14	54.61	62.26	69.82	77.37	84.85	92.49	99.96
28	Goat Hides	0.15	28.84	36.76	44.69	52.48	60.55	68.24	76.12	84.20	92.08	99.96
29	Cattle Male	2.09	54.03	59.14	64.24	69.35	74.46	79.57	84.68	89.78	94.89	100.00
30	Cattle Female	0.68	57.51	62.24	66.77	71.69	76.42	81.15	85.81	90.54	95.27	100.00
31	He Buffalo	0.21	65.5	69.34	73.36	76.86	80.87	84.72	88.47	92.31	96.16	100.00
32	She Buffalo	1.44	51.01	56.42	61.88	67.34	72.74	78.25	83.66	89.07	94.58	99.98
33	Goat Female	1.57	38.46	45.30	52.14	58.97	65.81	72.65	79.49	86.32	93.16	100.00
34	Sheep	1.87	39.53	46.19	52.84	59.71	66.37	73.02	79.89	86.55	93.2	100.07
	Overall Index/Weight	100.00	51.78	54.01	56.24	66.54	72.42	68.99	73.53	87.78	92.56	93.03

(Contd.)

APPENDIX 6. *(Concld.)*

SL. No.	Commodity/ Product	Base Year Weight W0	Price Relatives									
			1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
(1)	(2)	(3)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
1	Paddy	19.19	114.29	134.51	136.73	156.93	178.55	189.82	196.87	209.25	227.27	253.09
2	Jowar	1.29	95.47	156.28	124.44	117.60	183.02	171.91	213.38	219.50	258.18	291.09
3	Bajra	0.20	105.34	150.51	149.31	142.47	174.02	211.87	202.93	207.85	221.60	255.91
4	Maize	0.34	101.72	150.17	134.90	136.89	174.22	182.69	195.63	206.69	215.28	219.57
5	Ragi	0.27	98.44	124.67	144.15	143.12	169.56	215.19	196.53	208.75	227.63	239.47
6	Korra	0.13	107.32	141.03	156.96	153.70	207.85	201.40	207.98	211.83	206.88	230.47
7	Red Gram	0.41	122.85	132.06	133.06	134.24	178.84	232.97	194.39	233.35	230.38	215.58
8	Black Gram	2.40	111.32	108.37	93.08	149.88	272.49	246.88	214.94	163.39	212.46	288.92
9	Green Gram	0.78	105.71	122.21	139.48	151.45	178.46	231.50	236.28	241.75	258.59	257.17
10	Horse Gram	0.12	118.26	115.67	100.86	122.22	148.47	157.98	207.82	206.49	190.24	230.62
11	Bengal Gram	0.18	110.36	102.48	110.17	156.25	145.93	143.60	174.85	239.48	169.72	198.28
12	Castor	0.56	97.43	116.94	114.13	149.37	150.8	163.14	182.82	191.68	236.13	215.71
13	Ground Nut	20.30	128.26	132.22	117.42	136.55	155.68	162.98	167.51	172.15	191.23	180.79
14	Cotton Kapas	5.63	108.93	170.97	117.42	172.71	255.17	229.53	206.97	233.13	234.68	224.7
15	Sugar Cane	6.98	109.61	110.14	146.05	168.31	152.06	170.31	212.58	262.99	244.59	221.08
16	Tobacco	5.42	127.36	116.76	113.92	112.01	121.11	158.06	182.97	242.17	210.93	168.00
17	Onions	0.48	140.48	127.17	112.94	257.43	126.25	211.68	247.08	285.52	376.40	154.19
18	Chillies	7.26	116.23	220.92	103.90	115.28	175.29	228.25	138.65	217.33	227.48	169.92
19	Turmeric	1.35	126.97	185.58	177.96	116.76	99.98	178.10	235.40	275.38	276.49	273.31
20	Mesta	3.38	96.08	94.16	113.87	188.87	155.48	249.36	221.72	200.01	197.36	225.03
21	Sesamum	0.24	114.70	133.26	123.15	132.89	154.49	173.51	170.45	156.15	215.33	203.25
22	Milk	10.47	105.12	143.67	134.77	143.67	161.19	196.23	213.75	222.64	240.16	245.28
23	Eggs	3.25	100.00	126.98	152.38	158.73	179.37	192.06	198.41	223.81	204.76	209.52
24	Chicken	0.83	105.92	119.19	136.25	141.65	156.91	174.89	190.32	205.95	203.04	216.18
25	Cattle Hides	0.15	106.39	126.91	166.90	201.17	228.17	261.58	286.92	242.31	302.57	301.49
26	Buffalo Hides	0.15	106.78	109.60	165.40	194.97	209.13	254.45	246.74	250.65	295.82	286.21
27	Sheep Hides	0.23	107.54	114.99	142.99	155.96	180.75	203.93	211.67	231.23	228.05	227.94
28	Goat Hides	0.15	107.94	122.55	134.37	150.25	172.11	190.54	203.77	221.07	228.57	222.15
29	Cattle Male	2.09	105.11	112.57	157.22	158.64	163.21	181.68	200.64	214.69	213.26	229.03
30	Cattle Female	0.68	104.73	120.45	127.41	133.61	153.29	173.80	206.90	233.42	256.10	263.26
31	He Buffalo	0.21	103.84	117.90	175.46	160.26	179.39	198.86	267.69	274.15	281.31	281.31
32	She Buffalo	1.44	105.44	129.57	119.83	122.33	144.92	165.99	189.30	214.61	226.29	241.03
33	Goat Female	1.57	106.84	108.12	134.19	144.44	156.41	182.05	222.01	256.84	275.00	296.58
34	Sheep	1.87	106.73	105.27	133.12	140.85	147.29	178.50	225.31	241.12	257.77	279.19
	Overall Weight/Index	100.00	114.27	137.29	127.53	146.49	169.16	189.63	193.12	213.19	223.13	221.48

APPENDIX 7. INDEX OF PRICES RECEIVED USING PRICE RELATIVES BASED ON FARM HARVEST PRICES BASED ON CURRENT YEAR WEIGHTS (1988-91=100)

Sl. No	Commidity/ Product	Current Year Weights									
		1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	Paddy	19.79	19.44	20.59	20.26	14.95	18.21	16.95	15.8	21.01	18.88
2	Jowar	2.69	3.03	3.21	2.16	2.25	2.24	2.00	2.01	1.16	1.53
3	Bajra	0.53	0.64	0.38	0.47	0.27	0.31	0.32	0.22	0.24	0.21
4	Maize	0.59	0.46	0.61	0.35	0.25	0.32	0.37	0.38	0.31	0.40
5	Ragi	0.55	0.55	0.65	0.47	0.40	0.40	0.35	0.29	0.27	0.32
6	Korra	0.34	0.61	0.26	0.38	0.20	0.21	0.19	0.21	0.12	0.18
7	Red Gram	0.29	0.34	0.26	0.41	0.28	0.43	0.55	0.34	0.36	0.43
8	Black Gram	0.76	0.52	0.92	0.96	1.47	1.59	2.14	1.87	2.51	2.52
9	Green Gram	1.47	1.32	1.58	1.24	1.33	1.41	0.92	1.47	0.85	0.84
10	Horse Gram	0.30	0.31	0.35	0.27	0.19	0.24	0.22	0.15	0.11	0.11
11	Bengal Gram	0.94	0.11	0.10	0.09	0.08	0.09	0.07	0.08	0.12	0.16
12	Castor	0.25	0.42	0.54	0.71	0.47	0.38	0.45	0.82	0.55	0.64
13	Ground Nut	10.52	14.21	12.09	15.88	12.18	13.06	16.42	22.21	18.94	19.05
14	Cotton Kapas	5.45	5.70	5.13	8.05	7.14	4.55	5.07	4.96	4.05	5.86
15	Sugar Cane	12.03	10.79	8.01	7.20	7.23	7.82	6.63	6.92	6.54	7.38
16	Tobacco	6.11	6.63	8.30	4.60	4.54	4.64	4.44	3.90	5.82	4.57
17	Onions	0.25	0.29	0.54	0.35	0.14	0.36	0.55	0.64	0.40	0.42
18	Chillies	3.85	4.21	3.67	3.30	7.55	5.64	4.51	6.58	8.85	5.87
19	Turmeric	0.78	0.66	1.36	2.00	1.82	2.32	1.38	1.63	0.67	1.59
20	Mesta	5.23	5.54	3.90	5.26	9.17	4.21	3.23	1.72	2.99	4.05
21	Sesamum	0.41	0.35	0.35	0.32	0.35	0.40	0.51	0.36	0.18	0.17
22	Milk	10.56	9.31	10.79	10.96	12.00	14.53	14.81	12.33	10.53	11.49
23	Eggs	4.41	3.75	4.17	3.61	3.91	3.86	4.02	3.42	3.60	3.34
24	Chicken	0.65	0.60	0.68	0.63	0.87	0.99	1.19	1.01	0.85	0.88
25	Cattle Hides	0.21	0.19	0.22	0.19	0.21	0.23	0.24	0.20	0.16	0.16
26	Buffalo Hides	0.13	0.13	0.15	0.14	0.16	0.18	0.20	0.17	0.15	0.16
27	Sheep Hides	0.19	0.19	0.23	0.21	0.24	0.27	0.29	0.25	0.23	0.24
28	Goat Hides	0.15	0.16	0.20	0.19	0.21	0.22	0.24	0.19	0.16	0.16
29	Cattle Male	3.08	2.67	2.90	2.43	2.66	2.88	3.13	2.69	2.22	2.23
30	Cattle Female	1.34	1.17	1.28	1.08	1.11	1.13	1.15	0.91	0.74	0.72
31	He Buffalo	0.55	0.45	0.47	0.37	0.38	0.38	0.39	0.31	0.24	0.23
32	She Buffalo	1.76	1.60	1.81	1.58	1.73	1.89	2.07	1.76	1.50	1.53
33	Goat Female	1.75	1.70	2.04	1.86	2.04	2.21	2.39	2.00	1.67	1.68
34	Sheep	2.09	1.95	2.26	2.02	2.22	2.40	2.61	2.2	1.90	2.00
	Price Index	53.99	55.15	57.17	68.76	80.58	71.30	75.26	88.27	93.16	93.81

(Contd.)

APPENDIX 7. *(Concld.)*

Sl. No	Commidity/ Product	Current Year Weights									
		1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	Paddy	18.06	16.99	18.03	17.47	17.39	14.61	17.45	16.08	17.81	19.77
2	Jowar	1.19	1.27	1.52	1.07	1.10	0.85	0.99	0.91	0.80	1.02
3	Bajra	0.17	0.16	0.17	0.11	0.11	0.13	0.12	0.07	0.10	0.11
4	Maize	0.32	0.39	0.38	0.37	0.47	0.41	0.58	0.60	0.59	0.71
5	Ragi	0.23	0.19	0.26	0.20	0.22	0.20	0.18	0.13	0.11	0.14
6	Korra	0.11	0.07	0.09	0.09	0.06	0.03	0.05	0.04	0.04	0.03
7	Red Gram	0.43	0.62	0.43	0.47	0.54	0.59	0.64	0.35	0.75	0.71
8	Black Gram	2.21	1.67	1.61	1.39	2.09	2.46	1.93	1.05	1.22	2.07
9	Green Gram	0.66	1.03	1.35	1.08	0.87	1.06	1.17	0.82	1.04	1.12
10	Horse Gram	0.14	0.12	0.11	0.08	0.10	0.09	0.12	0.12	0.07	0.09
11	Bengal Gram	0.24	0.15	0.11	0.27	0.48	0.20	0.30	0.29	0.34	0.32
12	Castor	0.50	0.53	0.42	0.47	0.53	0.36	0.36	0.26	0.25	0.34
13	Ground Nut	22.37	18.26	16.27	19.02	12.83	17.17	13.36	8.44	12.78	6.79
14	Cotton Kapas	6.67	10.22	6.82	9.14	12.88	10.64	10.87	9.36	7.94	8.78
15	Sugar Cane	6.98	6.69	8.00	8.15	7.76	6.66	7.14	9.38	8.46	8.99
16	Tobacco	5.80	6.07	6.03	3.65	3.14	3.42	4.16	6.57	5.10	3.54
17	Onions	0.60	0.44	0.38	1.84	0.62	1.00	1.12	1.25	1.75	0.48
18	Chillies	7.15	8.49	6.30	4.70	6.94	7.69	7.00	7.19	8.54	6.70
19	Turmeric	1.66	2.17	2.65	3.01	2.15	2.14	3.29	0.69	3.25	3.62
20	Mesta	3.14	2.60	2.56	3.29	3.13	4.09	0.71	3.09	2.15	3.13
21	Sesamum	0.34	0.40	0.39	0.34	0.29	0.44	0.30	0.16	0.30	0.31
22	Milk	9.61	10.71	11.66	11.69	13.26	13.26	14.71	16.69	14.29	16.54
23	Eggs	2.90	3.06	4.20	3.80	4.74	4.58	4.32	5.39	3.71	4.30
24	Chicken	0.79	0.77	1.00	0.84	0.88	0.84	0.93	1.14	0.86	1.06
25	Cattle Hides	0.13	0.12	0.16	0.14	0.14	0.13	0.14	0.13	0.12	0.13
26	Buffalo Hides	0.14	0.12	0.20	0.19	0.18	0.18	0.17	0.19	0.16	0.18
27	Sheep Hides	0.22	0.20	0.29	0.25	0.27	0.25	0.26	0.32	0.23	0.26
28	Goat Hides	0.14	0.13	0.15	0.12	0.13	0.13	0.14	0.17	0.13	0.15
29	Cattle Male	1.87	1.66	2.54	1.97	1.81	1.62	1.72	1.98	1.42	1.68
30	Cattle Female	0.59	0.55	0.63	0.49	0.51	0.46	0.53	0.65	0.52	0.59
31	She Buffalo	0.18	0.16	0.25	0.16	0.16	0.15	0.19	0.21	0.16	0.18
32	She Buffalo	1.31	1.36	1.40	1.12	1.22	1.15	1.29	1.61	1.25	1.50
33	Goat Female	1.41	1.17	1.56	1.28	1.29	1.26	1.54	1.99	1.60	1.97
34	Sheep	1.74	1.46	2.08	1.74	1.71	1.75	2.22	2.68	2.16	2.69
	Price Index	114.92	141.34	129.71	150.18	176.28	194.45	197.22	222.65	230.02	231.32

Note: Price relatives are taken from appendix 6 above.

Appendix 8. Index of Prices Paid for Final Consumption Using Statewide Average Retail Prices Based on Base Year Weights in Andhra Pradesh

Sl. No.	Commodity/ Product	Base Year Weight Wo	Price Relatives									
			1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Arhar Dal	7.09	44.22	44.92	49.04	58.49	60.95	52.98	59.28	86.87	100.26	88.09
2	Gram Dal	0.94	54.34	57.16	45.45	41.07	61.13	75.55	67.61	61.44	81.40	108.46
3	Edible Oil	11.63	59.22	60.83	59.90	65.65	68.82	64.34	77.92	100.47	94.20	95.43
4	Salt	0.45	40.91	40.91	45.45	51.14	61.36	63.64	65.91	67.05	73.86	89.77
5	Sugar	3.46	65.38	67.69	70.38	71.92	76.15	83.27	92.31	93.27	98.08	100.96
6	Tea Powder	6.80	43.45	43.45	46.79	50.47	66.84	71.52	88.57	88.57	90.24	98.60
7	Coffee Powder	0.30	47.54	49.18	57.38	65.57	72.13	78.69	85.25	91.80	98.36	100.00
8	Bidi	4.95	38.52	42.22	45.93	47.41	50.37	57.78	62.96	68.15	74.07	100.00
9	Cigarette	0.94	37.74	38.52	35.41	45.14	47.47	56.42	71.98	85.21	92.22	98.44
10	Country Liquor	4.34	56.29	56.29	56.29	75.05	75.05	93.81	93.81	93.81	93.81	93.81
11	Kerosene	4.39	67.76	71.43	76.73	80.00	83.27	91.02	97.14	100.00	100.00	100.00
12	Match Box	3.07	62.07	65.52	68.97	72.41	79.31	82.76	86.21	89.66	103.45	100.00
13	Electricity	6.21	70.58	75.88	75.88	75.88	79.41	79.41	79.41	88.23	88.23	105.88
14	Shirting (Cotton)	2.75	58.30	65.91	78.60	81.76	80.59	81.34	83.26	81.55	88.89	99.45
15	Shirting (Syn)	1.94	97.24	98.94	99.62	100.65	92.12	92.12	90.55	90.55	93.31	100.00
16	Saree (Handloom)	3.05	54.47	57.42	70.82	73.54	73.92	78.62	83.32	86.67	89.24	100.00
17	Saree (Syn)	1.45	58.00	63.80	69.60	75.40	81.20	87.00	92.80	98.60	92.16	99.76
18	Dhoti (Hand)	1.45	62.99	67.17	58.11	62.80	72.93	80.21	81.88	82.53	86.02	100.00
19	Lungi	0.49	54.26	62.40	73.25	81.39	84.48	87.57	90.67	93.81	96.91	100.00
20	Trousers Cloth (C)	0.46	52.30	61.13	74.08	74.38	73.56	75.83	78.15	87.68	98.66	99.94
21	Trousers Cloth (S)	0.62	96.46	96.46	98.21	99.09	98.21	98.21	98.21	98.21	88.53	100.00
22	Towel	0.31	53.73	56.72	65.25	74.63	79.10	85.07	91.04	97.01	97.01	101.49
23	Leather Chappals	0.31	31.24	35.97	43.20	49.69	55.23	59.33	64.14	71.00	85.49	100.00
24	Rubber Chappals	0.20	55.15	58.82	64.34	66.18	68.01	69.85	71.69	78.49	88.24	99.26
25	Leather Shoes	0.04	29.08	36.17	45.86	47.43	52.99	56.23	63.52	72.99	80.68	100.67
26	Ampicillin	4.53	71.43	74.60	77.78	80.95	84.13	87.30	90.48	93.65	96.83	100.00
27	Saridon	0.90	53.98	59.90	82.52	90.49	90.49	91.26	91.26	82.78	94.09	100.26
28	Crocin	2.70	75.95	75.95	80.17	84.39	84.39	88.61	92.83	92.83	92.83	99.16
29	Pathological Test	1.80	71.51	71.51	71.51	71.51	71.51	80.74	80.74	80.74	80.74	80.74
30	Doctors Fee	1.91	42.84	42.84	42.84	42.84	42.84	85.69	85.69	85.69	85.69	85.69
31	School Fee	4.53	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
32	Cinema Ticket	1.29	50.00	50.00	50.00	50.00	75.00	75.00	75.00	75.00	75.00	75.00
33	FS Paper	0.98	68.00	68.53	69.07	71.20	76.00	83.47	86.93	89.07	93.33	100.00
34	Bus Fare/k.m.	3.05	55.40	73.87	73.87	73.87	73.87	83.10	83.10	92.34	92.34	92.34
35	Toilet Soap	1.76	35.50	39.55	40.57	45.64	48.68	59.84	60.85	70.99	89.25	98.38
36	Hair Oil	2.08	47.49	48.54	47.49	54.99	88.18	79.38	86.23	96.08	104.42	97.23
37	Barber Charges	0.80	40.00	40.00	40.00	40.00	40.00	80.00	80.00	80.00	80.00	80.00
38	Washing Soap	2.08	64.18	71.64	73.13	76.12	76.12	80.60	83.58	92.54	100.00	95.52
39	Washer Men Charges	1.11	28.16	30.93	33.66	36.72	34.24	51.86	54.68	59.58	67.29	67.20
40	Tailoring Charges	0.49	25.00	25.00	25.00	25.00	25.00	87.50	87.50	87.50	87.50	88.00
41	Radio	0.46	125.00	121.43	117.86	114.29	110.71	107.14	105.36	103.57	101.79	100.00
42	T.V. (B/W)	0.31	80.99	83.10	85.21	87.32	89.44	91.55	93.66	95.77	97.89	100.00
43	Aluminum	0.90	58.91	58.91	56.73	58.91	61.10	68.73	71.44	73.10	76.37	100.00
44	Cycle	0.45	59.42	62.31	66.00	69.00	77.31	77.88	79.62	86.54	92.31	100.96
45	Watch	0.23	59.00	60.97	63.46	68.71	73.95	79.20	84.44	89.69	94.93	100.18
	Overall Weight /Index	100.00	59.31	62.09	64.45	68.50	72.67	77.05	82.21	89.26	92.24	96.71

(Contd.)

Appendix 8. *(Concld.)*

SL. No.	Commodity/ Product	Base Year Weight Wo	Price Relatives									
			1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2K
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Arhar Dal	7.09	111.56	144.92	141.94	146.15	151.14	224.34	249.65	195.88	262.43	251.66
2	Gram Dal	0.94	110.24	107.31	108.88	155.38	189.76	145.66	154.75	199.27	213.69	197.81
3	Edible Oil	11.63	110.36	158.97	147.21	134.81	149.07	156.01	150.38	156.98	184.77	187.86
4	Salt	0.45	136.36	136.36	140.91	146.59	175.00	253.41	256.82	256.82	261.36	272.73
5	Sugar	3.46	100.96	108.08	131.73	156.35	172.88	174.04	173.08	202.88	220.00	230.77
6	Tea Powder	6.80	111.13	133.69	147.06	170.45	177.14	180.48	205.55	240.64	254.01	300.80
7	Coffee Powder	0.30	101.64	134.43	140.98	157.38	160.66	163.93	163.93	196.72	196.72	196.72
8	Bidi	4.95	125.19	130.37	138.52	147.41	156.30	168.15	188.89	213.33	226.67	242.96
9	Cigarette	0.94	109.34	124.12	154.09	173.93	186.38	201.95	222.18	238.52	261.48	279.38
10	Country Liquor	4.34	112.57	131.33	150.09	168.86	187.62	281.43	281.43	281.43	375.23	469.04
11	Kerosene	4.39	100.00	108.16	108.16	108.16	117.55	118.78	122.45	122.45	122.45	132.65
12	Match Box	3.07	93.10	103.45	110.34	117.24	124.14	134.48	162.07	182.76	189.66	206.90
13	Electricity	6.21	105.88	105.88	123.52	123.52	123.52	151.76	151.76	151.76	151.76	238.22
14	Shirting (Cotton)	2.75	111.59	126.89	147.46	168.04	190.12	239.37	246.91	258.50	279.49	305.21
15	Shirting (Syn.)	1.94	106.69	119.38	132.11	144.80	157.49	174.34	930.13	907.30	928.52	955.31
16	Saree (Handloom)	3.05	110.74	133.38	156.01	178.63	201.27	223.33	250.73	287.97	346.67	394.93
17	Saree (Syn.)	1.45	108.09	118.76	129.45	140.13	150.80	153.37	30.84	29.58	30.29	31.32
18	Dhoti (Hand)	1.45	113.98	136.77	159.55	182.34	205.11	223.31	263.29	288.21	319.70	346.43
19	Lungi	0.49	103.09	156.00	208.90	261.80	314.70	327.73	340.75	353.77	366.79	379.82
20	Trousers Cloth (C)	0.46	101.34	127.43	153.52	179.55	205.64	244.33	298.37	316.85	352.70	389.31
21	Trousers Cloth (S)	0.62	111.47	121.31	131.16	141.00	150.84	180.27	189.04	195.25	196.23	201.68
22	Towel	0.31	101.49	113.43	125.37	137.31	149.25	191.04	208.96	226.87	244.78	250.75
23	Leather Chappals	0.31	114.50	128.99	143.49	157.99	172.49	182.08	201.53	202.54	206.40	212.82
24	Rubber chappals	0.20	112.43	119.78	127.13	134.49	142.02	154.41	165.07	169.04	170.96	183.82
25	Leather Shoes	0.04	118.65	138.70	161.07	177.85	195.72	210.78	223.69	223.69	232.90	246.09
26	Ampicillin	4.53	103.17	111.11	119.05	126.98	134.92	142.86	150.79	158.73	166.67	174.60
27	Saridon											
28	Crocin	2.70	107.59	116.03	124.47	130.80	136.71	148.95	174.68	213.08	228.27	242.62
29	Pathological Test	1.80	138.41	138.41	138.41	138.41	138.41	161.48	161.48	184.54	184.54	230.68
30	Doctors Fee	1.91	128.53	128.53	128.53	128.53	128.53	171.38	171.38	171.38	171.38	257.07
31	School Fee	4.53	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
32	Cinema Ticket	1.29	150.00	150.00	150.00	225.00	225.00	225.00	225.00	225.00	225.00	300.00
33	FS Paper	0.98	106.67	126.67	146.67	166.67	208.53	247.47	264.00	258.93	262.13	273.33
34	Bus Fare 1K.M.	3.05	115.42	115.42	156.97	156.97	156.97	193.91	203.14	221.61	221.61	277.01
35	Toilet Soap	1.76	112.58	121.70	133.87	141.99	172.41	182.56	162.27	169.37	182.56	212.98
36	Hair Oil	2.08	98.35	130.87	160.91	150.99	134.54	133.32	152.81	196.10	186.23	188.30
37	Barber Charges	0.80	140.00	140.00	140.00	140.00	140.00	200.00	200.00	200.00	200.00	200.00
38	Washing Soap	2.08	104.48	110.45	131.34	141.79	156.72	164.18	191.04	208.96	208.96	231.34
39	Washer Men Charges	1.11	165.51	194.82	315.06	361.62	411.43	437.41	453.65	482.17	523.69	586.76
40	Tailoring Charges	0.49	125.00	125.00	125.00	125.00	125.00	187.50	187.50	187.50	187.50	225.00
41	Radio	0.46	98.21	94.64	91.07	87.50	83.93	80.36	78.57	76.79	75.00	71.43
42	T.V. (B/W)	0.31	102.11	99.37	96.62	93.87	91.16	88.42	85.67	82.96	80.21	77.46
43	Aluminium	0.90	123.65	147.28	170.91	194.57	218.20	240.02	257.47	274.93	288.02	301.11
44	Cycle	0.45	106.73	115.38	121.85	128.19	134.65	141.00	147.35	153.81	160.15	167.31
45	Watch	0.23	104.90	115.09	125.29	135.49	145.69	155.89	166.08	176.28	186.48	196.68
	Overall Weight/Index	100.00	110.91	127.45	137.97	146.65	157.02	178.76	201.55	210.30	230.14	256.16

Appendix 9. Index of Prices Paid for Final Consumption Using Statewide Average Retail Prices Based on Current Year Weights in A.P.

Sl. No	Commidity/ Product	Current Year Weights									
		1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	Arhar dal	5.87	5.79	5.73	5.57	6.08	6.50	7.42	6.11	7.54	7.28
2	Gram dal	0.79	0.77	0.76	0.75	0.81	0.87	0.99	0.82	1.00	0.97
3	Edible Oil	5.96	6.18	6.38	7.76	9.26	10.67	12.97	10.84	10.71	11.83
4	Salt	0.35	0.31	0.31	0.30	0.35	0.42	0.50	0.42	0.39	0.44
5	Sugar	3.03	2.98	2.92	2.85	3.29	3.89	4.72	3.44	3.53	3.80
6	Tea Powder	6.19	6.36	6.51	6.52	5.88	5.15	4.74	6.30	6.00	7.17
7	Coffee Powder	0.28	0.28	0.29	0.30	0.27	0.23	0.22	0.29	0.27	0.32
8	Bidi	4.60	4.52	4.48	4.35	4.60	4.61	5.31	4.52	5.19	4.64
9	Cigarette	0.87	0.87	0.85	0.84	0.88	0.89	1.01	0.86	0.99	0.89
10	Country Liquor	4.04	3.97	3.91	3.82	4.03	4.04	4.67	3.96	4.55	4.08
11	Kerosene	3.75	3.71	3.70	3.62	4.22	4.24	5.78	4.66	4.60	4.58
12	Match Box	2.62	2.61	2.58	2.54	2.96	2.97	4.03	3.26	3.21	3.20
13	Electricity	5.30	5.25	5.23	5.13	5.98	6.01	8.18	6.59	6.50	6.48
14	Shirting (Cotton)	4.65	4.58	4.54	4.44	3.89	3.91	2.90	2.25	2.43	3.27
15	Shirting (Syn)	3.27	3.24	3.21	3.13	2.74	2.76	2.03	1.58	1.71	2.31
16	Saree (Handloom)	5.15	5.07	5.03	4.90	4.30	4.33	3.30	2.56	2.70	3.63
17	Saree (Syn)	2.44	2.41	2.38	2.33	2.04	2.06	1.53	1.18	1.28	1.73
18	Dhoti (Hand)	2.44	2.41	2.38	2.33	2.04	2.06	1.53	1.18	1.28	1.73
19	Lungi	0.83	0.81	0.81	0.79	0.70	0.70	0.52	0.40	0.43	0.59
20	Trousers Cloth (C)	0.79	0.77	0.76	0.74	0.65	0.65	0.49	0.38	0.40	0.55
21	Trousers Cloth (S)	1.05	1.03	1.00	0.98	0.86	0.87	0.65	0.51	0.55	0.74
22	Towel	0.52	0.53	0.52	0.51	0.45	0.45	0.32	0.26	0.28	0.37
23	Leather Chappals	0.72	0.73	0.72	0.72	0.73	0.74	0.77	0.44	0.55	0.30
24	Rubber Chappals	0.44	0.43	0.45	0.44	0.45	0.45	0.47	0.27	0.33	0.18
25	Leather Shoes	0.09	0.10	0.09	0.10	0.10	0.10	0.11	0.07	0.07	0.05
26	Ampicillin	4.25	4.33	4.36	4.36	4.02	3.66	3.51	4.79	4.72	3.89
27	Soridon	0.85	0.85	0.87	0.87	0.80	0.72	0.70	0.95	0.94	0.77
28	Crocin	2.53	2.57	2.60	2.59	2.39	2.17	2.09	2.86	2.81	2.33
29	Pathological Test	1.68	1.72	1.73	1.74	1.60	1.45	1.39	1.91	1.87	1.55
30	Doctors Fee	1.79	1.82	1.84	1.83	1.69	1.54	1.48	2.02	1.99	1.65
31	School Fee	4.25	4.33	4.36	4.36	4.02	3.66	3.51	4.80	4.72	3.90
32	Cinema Ticket	1.22	1.22	1.24	1.24	1.15	1.04	1.01	1.36	1.34	1.11
33	FS Paper	0.92	0.93	0.94	0.93	0.86	0.79	0.76	1.04	1.02	0.84
34	Bus Fare 1K.M.	2.86	2.90	2.94	2.93	2.71	2.46	2.36	3.23	3.18	2.62
35	Toilet Soap	1.66	1.68	1.69	1.69	1.56	1.42	1.37	1.86	1.83	1.51
36	Hair Oil	1.94	1.97	2.00	2.00	1.84	1.67	1.60	2.19	2.17	1.78
37	Barber Charges	0.74	0.77	0.77	0.77	0.71	0.65	0.61	0.84	0.83	0.69
38	Washing Soap	1.94	1.97	2.00	2.00	1.84	1.67	1.60	2.19	2.17	1.78
39	Washer Men Charges	1.05	1.07	1.08	1.06	1.00	0.90	0.86	1.18	1.16	0.96
40	Tailoring Charges	0.46	0.47	0.47	0.48	0.43	0.40	0.38	0.52	0.51	0.43
41	Radio	1.13	1.11	1.08	1.06	1.15	1.22	0.31	1.00	0.44	0.60
42	T.V. (B/W)	0.76	0.75	0.74	0.70	0.76	0.82	0.22	0.67	0.29	0.40
43	Aluminum	2.25	2.19	2.15	2.08	2.24	2.39	0.61	1.96	0.87	1.17
44	Cycle	1.11	1.09	1.06	1.03	1.11	1.20	0.31	0.99	0.44	0.59
45	Watch	0.57	0.55	0.54	0.52	0.56	0.60	0.16	0.49	0.21	0.30
	Index	60.35	63.27	66.09	69.80	73.44	77.48	81.87	89.24	92.26	96.98

(Contd.)

APPENDIX 9. *(Concld.)*

Sl. No	Commidity/ Product	Current Year Weights									
		1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
(1)	(2)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1	Arhar dal	6.62	8.14	7.16	6.08	7.50	8.22	6.56	7.43	7.97	8.46
2	Gram dal	0.88	1.08	0.95	0.81	1.00	1.09	0.88	0.99	1.06	1.12
3	Edible Oil	12.07	14.15	12.32	8.85	12.08	11.67	8.73	9.61	8.92	8.64
4	Salt	0.50	0.54	0.49	0.32	0.39	0.57	0.44	0.45	0.50	0.53
5	Sugar	3.14	3.25	3.43	3.35	3.92	3.31	3.21	3.38	4.52	5.32
6	Tea Powder	6.99	7.60	7.25	7.48	7.13	8.64	8.20	7.45	8.36	9.22
7	Coffee Powder	0.31	0.33	0.32	0.33	0.31	0.38	0.36	0.33	0.37	0.41
8	Bidi	5.03	4.53	4.47	4.09	3.74	4.12	3.64	4.45	3.62	2.97
9	Cigarette	0.95	0.87	0.85	0.78	0.72	0.79	0.70	0.85	0.69	0.57
10	Country Liquor	4.42	3.98	3.93	3.59	3.28	3.61	3.21	3.91	3.18	2.61
11	Kerosene	4.11	4.31	4.23	3.43	3.85	4.47	4.31	4.82	4.87	4.92
12	Match Box	2.87	3.01	2.96	2.40	2.70	3.12	3.01	3.37	3.41	3.44
13	Electricity	5.81	6.10	5.98	4.85	5.46	6.32	6.10	6.81	6.90	6.96
14	Shirting (Cotton)	2.56	2.22	2.49	2.97	5.27	3.84	4.60	2.75	3.02	3.15
15	Shirting (Syn)	1.80	1.56	1.76	2.10	3.72	2.71	3.25	1.94	2.13	2.22
16	Saree (Handloom)	2.83	2.46	2.76	3.30	5.84	4.27	5.11	3.05	3.44	3.49
17	Saree (Syn)	1.34	1.17	1.31	1.56	2.77	2.02	2.42	1.45	1.59	1.66
18	Dhoti (Hand)	1.34	1.17	1.31	1.56	2.77	2.02	2.42	1.45	1.59	1.66
19	Lungi	0.45	0.39	0.44	0.53	0.94	0.68	0.82	0.49	0.54	0.56
20	Trousers Cloth (C)	0.43	0.37	0.42	0.50	0.89	0.65	0.77	0.46	0.51	0.53
21	Trousers Cloth (S)	0.57	0.49	0.56	0.67	1.18	0.86	1.03	0.62	0.67	0.70
22	Towel	0.29	0.25	0.28	0.34	0.60	0.44	0.53	0.32	0.35	0.36
23	Leather Chappals	0.20	0.43	0.46	0.62	1.09	0.79	0.70	0.81	1.01	1.23
24	Rubber Chappals	0.12	0.26	0.28	0.38	0.67	0.48	0.43	0.50	0.62	0.76
25	Leather Shoes	0.03	0.06	0.06	0.08	0.15	0.10	0.09	0.11	0.13	0.16
26	Ampicillin	4.91	4.01	4.56	5.20	2.85	2.98	3.55	3.20	3.40	3.51
27	Saridon	0.97	0.80	0.91	1.03	0.57	0.59	0.71	0.63	0.67	0.70
28	Crocin	2.92	2.39	2.72	3.10	1.70	1.78	2.12	1.91	2.03	2.09
29	Pathological Test	1.95	1.59	1.81	2.07	1.13	1.18	1.41	1.27	1.35	1.40
30	Doctors Fee	2.07	1.69	1.93	2.20	1.20	1.26	1.50	1.35	1.44	1.48
31	School Fee	4.91	4.02	4.57	5.21	2.85	2.98	3.56	3.20	3.41	3.51
32	Cinema Ticket	1.40	1.14	1.30	1.48	0.81	0.85	1.01	0.91	0.97	1.00
33	FS Paper	1.06	0.87	0.99	1.13	0.61	0.65	0.77	0.69	0.73	0.76
34	Bus Fare 1K.M.	3.31	2.70	3.07	3.51	1.92	2.00	2.40	2.15	2.29	2.36
35	Toilet Soap	1.90	1.56	1.77	2.02	1.10	1.15	1.38	1.24	1.32	1.36
36	Hair Oil	2.25	1.83	2.09	2.39	1.30	1.36	1.63	1.46	1.56	1.61
37	Barber Charges	0.87	0.71	0.81	0.92	0.50	0.53	0.63	0.57	0.60	0.62
38	Washing Soap	2.25	1.83	2.09	2.39	1.30	1.37	1.63	1.46	1.56	1.61
39	Washer Men Charges	1.21	0.99	1.12	1.28	0.70	0.73	0.87	0.79	0.84	0.86
40	Tailoring Charges	0.53	0.43	0.49	0.56	0.31	0.32	0.38	0.34	0.37	0.38
41	Radio	0.36	0.93	0.65	0.89	0.62	1.00	0.96	2.16	1.46	1.00
42	T.V. (B/W)	0.24	0.62	0.43	0.60	0.42	0.67	0.65	1.45	0.99	0.67
43	Aluminum	0.70	1.81	1.27	1.74	1.22	1.96	1.90	4.24	2.88	1.96
44	Cycle	0.35	0.91	0.63	0.87	0.61	0.98	0.95	2.12	1.44	0.98
45	Watch	0.18	0.45	0.32	0.44	0.31	0.49	0.47	1.06	0.72	0.49
	Index	111.14	128.58	137.95	147.87	161.40	180.73	214.01	209.16	230.72	256.43

Note: Price relatives are taken from Appendix 8 above.

Appendix 10. Index of Prices Paid for Intermediate Consumption Using Statewide Average Retail Prices and Based on Base Year Weights in Andhra Pradesh

SL. No.	Commodity/ Product	Base Year Weight W0	Price Relatives									
			1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Seed	1.32	57.74	61.83	64.28	70.79	72.51	76.76	75.03	80.69	99.21	89.83
2	Chemical Fertilizers	20.85	82.42	95.29	94.18	92.34	93.11	93.07	100.00	100.00	100.00	100.00
3	Pesticides	4.82	55.98	56.66	60.53	64.51	69.63	76.31	82.22	88.12	94.02	100.00
4	Hired Labour	55.14	36.55	41.91	48.78	57.00	64.54	69.82	75.44	81.31	89.69	100.42
5	Interest Rate	4.79	108.42	110.50	105.96	106.24	110.97	111.07	110.97	110.97	100.28	100.38
6	Electricity	0.19	308.00	336.00	336.00	336.00	100.00	100.00	100.00	100.00	100.00	100.00
7	Diesel	5.89	59.82	71.78	71.78	80.36	80.36	82.84	86.68	86.46	87.81	87.13
8	Livestock feed	4.68	48.72	57.95	60.51	62.56	69.23	74.87	79.49	84.1	85.13	93.85
9	Land Revenue	0.85	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
10	Water Charges	1.47	49.65	49.65	49.65	49.65	49.65	49.65	100.00	100.00	100.00	100.00
	Overall weight/index	100.00	53.96	60.98	64.66	69.69	74.37	78.07	84.05	87.85	92.62	99.07

SL. No.	Commodity/ Product	Base Year Weight W0	Price Relatives									
			1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
(1)	(2)	(3)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
1	Seed	1.32	112.73	139.79	160.71	180.67	169.36	209.53	229.86	223.37	239.62	248.89
2	Chemical Fertilizers	20.85	100.00	129.14	121.14	119.79	166.71	193.19	186.29	182.90	192.15	197.12
3	Pesticides	4.82	105.98	111.95	117.92	118.90	119.87	120.84	121.81	121.59	112.43	102.89
4	Hired labour	55.14	109.89	128.08	145.43	154.82	176.95	198.91	225.90	236.71	253.14	269.66
5	Interest Rate	4.79	99.34	130.09	133.49	124.60	122.42	121.57	121.10	125.45	125.45	118.26
6	Electricity	0.19	0.00	0.00	224.00	224.00	224.00	174.00	648.00	648.00	548.00	548.00
7	Diesel	5.89	125.28	127.31	140.41	155.08	176.75	176.52	188.94	255.08	232.05	341.76
8	Livestock feed	4.68	121.03	130.26	143.08	141.03	161.54	179.49	200.00	225.64	225.64	241.03
9	Land Revenue	0.85	100.00	100.00	100.00	100.00	100.00	100.00	100.00	26.97	26.97	26.97
10	Water Charges	1.47	100.00	100.00	100.00	100.00	100.00	291.61	291.61	291.61	291.61	291.61
	Overall weight/index	100.00	108.16	126.94	137.36	142.91	166.92	188.64	204.97	214.81	224.02	240.66

Appendix 11. Index of Prices Paid for Intermediate Consumption Using Statewide Average Retail Prices and Based on Current Year Weights in A.P

Sl. No	Commidity/ Product	Current Year Weights									
		1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	Seed	1.25	1.21	1.09	1.16	1.17	1.22	1.18	1.32	1.35	1.45
2	Chemical Fertilizers	18.66	18.82	17.17	17.35	19.83	18.82	20.75	14.36	20.18	22.57
3	Pesticides	4.72	4.83	6.55	6.17	10.16	6.36	3.70	9.78	4.51	4.45
4	Hired Labour	54.50	53.59	54.68	52.84	46.86	51.40	51.66	53.18	55.83	52.97
5	Interest Rate	4.09	4.46	4.60	5.12	5.97	6.45	6.72	6.36	4.96	5.32
6	Electricity	0.64	0.66	0.64	0.66	0.19	0.21	0.24	0.22	0.20	0.23
7	Diesel	8.00	8.51	7.81	8.77	7.88	8.05	7.95	6.89	5.67	5.68
8	Livestock feed	5.24	5.05	5.03	5.40	5.37	5.84	6.00	5.64	4.85	5.18
9	Land Revenue	1.42	1.42	1.09	1.15	0.75	0.67	0.57	0.91	0.74	0.87
10	Water Charges	1.48	1.45	1.34	1.38	1.82	0.98	1.23	1.34	1.71	1.28
	Index	54.56	62.20	64.94	70.86	75.15	78.77	84.81	87.51	92.57	99.05

Sl. No	Commidity/ Product	Current Year Weights									
		1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
(1)	(2)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1	Seed	1.20	1.24	1.10	1.24	1.20	1.06	1.03	0.96	0.97	0.92
2	Chemical Fertilizers	20.09	20.20	17.63	16.89	20.07	19.97	17.87	19.79	18.59	18.75
3	Pesticides	5.35	6.61	8.14	5.81	4.98	6.89	6.14	5.39	6.08	5.49
4	Hired Labour	56.37	56.99	56.25	57.96	53.63	50.07	49.96	46.82	49.84	48.13
5	Interest Rate	4.25	3.99	5.16	6.40	5.52	5.83	6.18	7.20	7.20	7.41
6	Electricity	0.00	0.00	0.39	0.39	0.34	0.22	0.77	0.80	0.56	0.60
7	Diesel	6.23	5.32	5.76	5.95	5.73	4.90	4.69	6.70	5.18	7.63
8	Livestock feed	4.17	3.67	3.78	3.69	3.14	2.71	2.45	2.62	2.24	2.26
9	Land Revenue	0.91	0.77	0.8	0.66	0.08	0.05	1.50	1.41	1.32	1.25
10	Water Charges	1.43	1.21	0.99	1.01	5.31	8.30	9.41	8.31	8.02	7.56
	Index	108.47	126.94	137.58	144.06	144.40	193.96	211.56	217.56	223.97	240.64

Note: Price relatives are taken from Appendix 10 above.

Appendix 12. Index of Prices Paid for Items Purchased for Capital Formation Based on Base Year Weights in A.P. (1988-91=100)

SL. No.	Commodity/ Product	Base Year Weight W0	Price Relatives									
			1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	H.O. Sprayers	0.30541	65.57	67.21	69.67	73.61	76.23	80.00	81.97	81.97	81.97	109.02
2	Power Sprayers	0.21897	50.91	61.98	63.22	65.05	69.50	74.93	93.52	93.52	93.52	93.52
3	Iron Plough	0.05445	58.82	62.75	66.67	66.67	70.59	74.51	78.43	86.27	100.00	100.00
4	D.E. Pump Sets	2.06352	35.74	42.32	47.96	53.61	58.31	64.89	70.54	77.12	83.70	108.15
5	Electric Motors 5hp	10.9334	52.72	57.51	61.34	67.09	71.89	77.64	83.39	89.14	94.89	102.56
6	Tractors 35hp	10.2839	55.14	59.73	59.73	64.33	68.92	73.52	78.11	82.71	87.30	100.17
7	Cement	12.3718	35.42	41.99	48.63	55.20	61.85	68.41	75.06	81.62	88.19	94.83
8	Lime	0.86707	35.78	42.93	50.04	57.16	64.31	71.44	78.53	85.73	92.87	100.02
9	Bricks	31.1616	26.01	34.13	42.00	50.12	58.23	66.11	74.22	82.34	90.21	98.33
10	Iron & Steel	10.5662	30.38	37.83	45.30	52.75	60.21	67.67	75.12	82.59	90.00	97.50
11	Logs & Timber	12.6210	15.96	24.05	32.14	40.23	48.32	56.41	64.50	72.59	80.68	88.77
12	Stone	7.02968	33.40	40.81	48.20	55.61	63.00	70.41	77.80	85.21	92.60	100.01
13	Paint	1.52299	29.64	37.47	45.30	53.10	60.76	68.66	76.57	83.98	92.27	99.78
	Overall Weight/Index	100.000	33.338	40.3546	44.6878	53.7737	60.7435	67.7867	74.9128	82.0022	89.0248	97.635

Sl. No.	Commodity/ Product	Base Year Weight W0	Price Relatives									
			1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
(1)	(2)	(3)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
1	H.O. Sprayers	0.30541	109.02	135.74	138.52	138.52	138.52	154.92	154.92	154.92	154.92	154.92
2	Power Sprayers	0.21897	112.97	121.16	124.11	124.11	124.11	164.59	164.59	164.59	164.59	164.59
3	Iron Plough	0.05445	100.00	117.65	168.63	168.63	168.63	282.35	282.35	282.35	282.35	282.35
4	D.E. Pump Sets	2.06352	108.15	108.15	108.15	122.26	122.26	122.26	150.47	150.47	150.47	169.28
5	Electric Motors 5hp	10.9334	102.56	102.56	102.56	115.02	115.02	115.02	126.52	126.52	126.52	143.77
6	Tractors 35hp	10.2839	112.52	128.14	143.48	144.02	159.91	164.22	177.37	208.61	223.32	247.21
7	Cement	12.3718	116.97	123.99	140.96	155.72	171.25	201.22	199.34	201.55	201.48	179.70
8	Lime	0.86707	107.11	114.27	121.4	128.71	135.69	84.21	106.46	129.58	163.61	102.53
9	Bricks	31.1616	111.46	117.18	124.82	132.46	138.37	148.1	191.41	215.27	220.76	224.58
10	Iron & Steel	10.5662	112.50	123.58	125.74	130.34	146.25	148.04	156.79	160.72	158.35	157.69
11	Logs & Timber	12.6210										
12	Stone	7.02968	107.39	114.81	122.19	129.61	137.19	122.47	157.19	164.11	176.12	163.01
13	Paint	1.52299	107.93	115.59	123.49	131.40	139.25	128.43	145.23	146.22	145.23	142.26
	Overall/ Weights/Index	100.000	113.341	121.238	128.437	137.320	147.676	155.007	177.869	192.589	199.873	199.890

Appendix 13. Index of Prices Paid for Items Purchased for Capital Formation Based on Current Year Weights in A.P (1988-91=100)

Sl. No	Item	Current Year Weights									
		1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	H.O.Sprayers	0.338	0.337	0.224	0.208	0.452	0.427	0.396	0.361	0.273	0.331
2	Power Sprayers	0.156	0.185	0.121	0.109	0.197	0.191	0.217	0.197	0.223	0.204
3	Iron Plough	0.249	0.259	0.176	0.154	0.32	0.304	0.29	0.29	0.059	0.054
4	D.E. Pump sets	2.586	2.985	2.168	2.427	2.01	2.012	1.982	1.879	1.883	2.221
5	Electric Motors 5hp	11.56	12.30	8.396	8.063	15.70	15.25	14.84	14.45	11.31	11.16
6	Tractors 35hp	7.867	8.309	5.317	5.028	7.704	7.386	6.883	7.083	9.788	10.25
7	Cement	12.47	12.47	14.54	14.05	12.22	12.30	12.40	12.40	12.47	12.31
8	Lime	0.915	0.892	1.358	1.348	1.182	0.846	0.858	0.863	0.868	0.864
9	Bricks	30.56	29.79	34.90	34.30	30.04	30.50	30.88	31.01	31.29	31.02
10	Iron & Steel	11.91	11.61	10.99	11.42	10.05	10.24	10.41	10.48	10.60	10.52
11	Logs & Timber	11.83	11.54	13.14	13.67	12.01	12.25	12.43	12.51	12.66	12.56
12	Stone	7.728	7.535	7.094	7.596	6.681	6.814	6.921	6.971	7.048	6.996
13	Paint	1.83	1.784	1.58	1.63	1.441	1.473	1.498	1.512	1.526	1.518
	Price index	33.0911	40.4999	45.4607	52.6022	61.2188	68.1182	73.7897	82.2591	80.0631	97.6784

Sl. No	Item	Current Year Weights									
		1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
(1)	(2)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1	H.O.Sprayers	0.309	0.342	0.319	0.294	0.375	0.395	0.37	0.34	0.32	0.30
2	Power Sprayers	0.23	0.219	0.205	0.35	0.244	0.305	0.28	0.26	0.25	0.23
3	Iron Plough	0.051	0.053	0.069	0.064	0.053	0.073	0.07	0.06	0.06	0.06
4	D.E. Pump sets	2.07	1.841	1.682	1.336	1.11	1.045	1.20	1.11	1.05	1.09
5	Electric Motors 5hp	10.40	9.248	8.454	8.751	10.22	9.628	9.83	9.18	8.62	9.11
6	Tractors 35hp	10.74	10.87	11.13	10.31	16.64	16.10	16.10	17.70	17.80	18.30
7	Cement	12.34	12.51	12.66	12.81	11.60	11.80	11.80	11.70	11.70	11.60
8	Lime	0.868	0.955	0.897	0.909	0.825	0.838	0.84	0.84	0.84	0.83
9	Bricks	31.18	31.64	32.06	32.46	29.42	29.93	29.80	29.80	29.90	29.40
10	Iron & Steel	10.59	10.76	10.83	10.89	9.827	9.956	9.89	9.85	9.81	9.68
11	Logs & Timber	12.65	12.85	12.94	13.01	11.73	11.88	11.80	11.10	11.70	11.50
12	Stone	7.045	7.16	7.204	7.249	6.539	6.624	6.58	6.56	6.53	6.44
13	Paint	1.525	1.552	1.561	1.572	1.419	1.437	1.43	1.42	1.42	1.40
	Price index	113.394	121.653	129.340	137.966	148.694	156.224	178.34	194.800	203.512	205.633

Note: Price relatives are taken from Appendix 12 above.

Appendix 14.: Calculation of Index of Net Barter Terms of Trade Based on Base Year Weights in Andhra Pradesh

(1988-91 =EAR) (1)	IPFC (2)	Prop of exp on FC (3)	Adjusted IPFC (4=2*3) (4)	IPIC (5)	Prop of exp on IC (6)	Adjusted IPIC (7=5*6) (7)	IPCF (8)	Prop of exp on CF (9)	Adjusted IPCF (10=8*9) (10)	Combined Index of Prices Paid (11= 4+7+10) (11)	Index of Prices received (12)	NBTT (13)
1980-81	59.31	0.40819	24.2097	53.96	0.53251	28.7343	33.338	0.05929	1.97687	54.9209	51.78	94.28
1981-82	62.09	0.40383	25.0743	60.95	0.54312	33.1031	40.3546	0.05304	2.14052	60.3179	54.01	89.54
1982-83	64.45	0.39275	25.3129	64.66	0.53527	34.6107	44.6878	0.07197	3.21636	63.1400	56.24	89.07
1983-84	68.50	0.40151	27.5036	69.69	0.52144	36.3395	53.7737	0.07704	4.14278	67.9859	66.54	97.87
1984-85	72.67	0.37283	27.0938	74.37	0.53383	39.7009	60.7435	0.09333	5.66955	72.4643	72.42	99.93
1985-86	77.05	0.37155	28.6282	78.07	0.52655	41.1080	67.7867	0.10189	6.90699	76.6433	68.99	90.01
1986-87	82.21	0.34510	28.3707	84.05	0.54477	45.7886	74.9128	0.11012	8.24939	82.4088	73.53	89.23
1987-88	89.26	0.38355	34.2361	87.85	0.51645	45.3708	82.0022	0.09998	8.19915	87.8061	87.78	99.97
1988-89	92.24	0.33604	30.9970	92.62	0.56842	52.6471	89.0248	0.09553	8.50462	92.1488	92.56	100.45
1989-90	96.71	0.37174	35.9515	99.07	0.53056	52.5632	97.635	0.09768	9.53767	98.0525	93.03	94.88
1990-91	110.91	0.36887	40.9123	108.16	0.54909	59.3905	113.341	0.08202	9.29659	109.599	114.27	104.26
1991-92	127.45	0.30656	39.0719	126.94	0.60838	77.2285	121.238	0.08504	10.3109	126.611	137.29	108.43
1992-93	137.97	0.32331	44.6080	137.36	0.58900	80.9055	128.437	0.08767	11.2613	136.774	127.53	93.24
1993-94	146.65	0.39284	57.6110	142.91	0.52822	75.4884	137.320	0.07892	10.8385	143.938	146.49	101.77
1994-95	157.02	0.31297	49.1433	166.92	0.59968	100.099	147.676	0.08733	12.8979	162.140	169.16	104.33
1995-96	178.76	0.29469	52.6793	188.64	0.62558	118.010	155.007	0.07972	12.3572	183.047	189.63	103.60
1996-97	201.55	0.33432	67.383	204.97	0.59520	121.998	177.869	0.07047	12.5353	201.916	193.12	95.64
1997-98	210.30	0.31835	66.9494	214.81	0.60356	129.652	192.589	0.07808	15.0377	211.639	213.19	100.73
1998-99	230.14	0.30385	69.9285	224.02	0.62546	140.116	199.873	0.07068	14.1280	224.172	223.13	99.53
1999-2K	256.16	0.32270	82.6646	240.66	0.60607	145.857	199.890	0.07122	14.2367	242.758	221.48	91.23

Note: IPFC=Index of Prices Paid for Family Consumption; IPIC= Index of prices Paid for Intermediate Consumption
IPCF= Index of prices Paid for Capital formation; IC= Intermediate Consumption
FC= Final Consumption; CF= Capital formation; Exp= Expenditure; Prop=proportion

Appendix 15. Calculation of Net Barter Terms of Trade Based on Current Year Weights in A.P. (1988-91=100)

Year (1)	IPFC (2)	Prop of exp on IPFC (3)	Adjusted IPFC (4)	IPIC (5)	Prop of exp on IC (6)	Adjusted IPIC (7)	IPCF (8)	Prop of exp on CF (9)	Adjusted IPCF (10)	Combined Index of Prices Paid (11)	Index of prices Received (12)	NBTT (13)
1980-81	60.35	0.40819	24.6342	54.56	0.53251	29.0538	33.0911	0.05929	1.96223	55.6503	53.99	97.016
1981-82	63.27	0.40384	25.5508	62.20	0.54312	33.7820	40.4999	0.05304	2.14823	61.4811	55.15	89.702
1982-83	66.09	0.39275	25.9570	64.94	0.53527	34.7606	45.4607	0.07197	3.27198	63.9896	57.17	89.343
1983-84	69.80	0.40151	28.0256	70.86	0.52144	36.9496	52.6022	0.07704	4.05252	69.0278	68.76	99.612
1984-85	73.44	0.37283	27.3809	75.15	0.53383	40.1173	61.2188	0.09333	5.71391	73.2121	80.58	110.06
1985-86	77.48	0.37155	28.7880	78.77	0.52655	41.4766	68.1182	0.10189	6.94076	77.2054	71.30	92.351
1986-87	81.87	0.34510	28.2534	84.81	0.54477	46.2027	73.7897	0.11012	8.12572	82.5818	75.26	91.134
1987-88	89.24	0.38356	34.2284	87.51	0.51645	45.1952	82.2591	0.09998	8.22484	87.6485	88.27	100.71
1988-89	92.26	0.33605	31.0037	92.57	0.56842	52.6187	89.0631	0.09553	8.50828	92.1308	93.16	101.12
1989-90	96.98	0.37175	36.0519	99.05	0.53056	52.5526	97.6784	0.09768	9.54191	98.1465	93.81	95.582
1990-91	111.14	0.36888	40.9972	108.47	0.54909	59.5607	113.394	0.08202	9.30093	109.858	114.92	104.61
1991-92	128.58	0.30657	39.4183	126.94	0.60838	77.2285	121.653	0.08504	10.3462	126.993	141.34	111.30
1992-93	137.95	0.32332	44.6015	137.58	0.58900	81.0351	129.340	0.08767	11.3404	136.977	129.71	94.695
1993-94	147.87	0.39285	58.0902	144.06	0.52822	76.0959	137.966	0.07892	10.8895	145.075	150.18	103.52
1994-95	161.40	0.31298	50.5141	144.40	0.59968	86.5946	148.694	0.08733	12.9867	150.095	176.28	117.45
1995-96	180.73	0.29469	53.2598	193.96	0.62558	121.339	156.224	0.07972	12.4542	187.053	194.45	103.95
1996-97	214.01	0.33432	71.5486	211.17	0.59520	125.688	178.340	0.07047	12.5685	209.805	197.22	94.001
1997-98	209.16	0.31835	66.5865	217.56	0.60356	131.311	194.800	0.07808	15.2104	213.108	222.65	104.48
1998-99	230.72	0.30385	70.1047	223.97	0.62546	140.084	203.512	0.07068	14.3853	224.574	230.02	102.42
1999-2K	256.43	0.32271	82.7517	240.64	0.60607	145.844	205.633	0.07122	14.6458	243.242	231.31	95.094

Note: FC= Final Consumption; IC= Intermediate Consumption; CF= Capital formation; IPFC= Index of prices paid for final consumption; IPIC= Index of prices paid for intermediate consumption
IPCF= Index of prices paid for capital formation; Prop = Proportion; Exp= Expenditure

Appendix 16. Index of Net Barter Terms of Trade for Crops, Food grains and Non-food grains based on Laspeyre's Index in A.P.

Year	Crops			Food grains			Non-food grains		
	IPP	IPR	NBTT	IPP	IPR	NBTT	IPP	IPR	NBTT
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1980-81	54.92	52.61	95.79	54.92	52.24	95.12	54.92	52.79	96.12
1981-82	60.32	54.27	89.97	60.32	56.82	94.19	60.32	53.02	87.89
1982-83	63.14	55.44	87.81	63.14	61.43	97.29	63.14	52.50	83.15
1983-84	67.99	65.85	96.85	67.99	68.60	100.90	67.99	64.50	94.87
1984-85	72.46	72.15	99.57	72.46	65.78	90.78	72.46	75.27	103.88
1985-86	76.64	65.56	85.54	76.64	70.41	91.87	76.64	63.18	82.44
1986-87	82.41	70.62	85.69	82.41	73.32	88.97	82.41	69.30	84.09
1987-88	87.81	87.89	100.09	87.81	80.89	92.12	87.81	91.33	104.01
1988-89	92.15	91.50	99.29	92.15	92.98	100.90	92.15	90.77	98.50
1989-90	98.05	91.16	92.97	98.05	93.89	95.76	98.05	89.82	91.61
1990-91	109.60	117.13	106.87	109.60	112.47	102.62	109.60	119.42	108.96
1991-92	126.61	139.61	110.27	126.61	132.67	104.79	126.61	143.02	112.96
1992-93	136.77	124.13	90.76	136.77	131.90	96.44	136.77	120.32	87.97
1993-94	143.94	146.56	101.82	143.94	153.01	106.30	143.94	143.38	99.61
1994-95	162.14	171.25	105.62	162.14	187.26	115.49	162.14	163.38	100.76
1995-96	183.05	189.69	103.63	183.05	196.22	107.19	183.05	186.46	101.86
1996-97	201.92	187.93	93.07	201.92	200.57	99.331	201.92	181.72	89.99
1997-98	211.64	209.35	98.92	211.64	206.97	97.79	211.64	210.51	99.47
1998-99	224.17	219.34	97.85	224.17	227.55	101.51	224.17	215.30	96.04
1999-2000	242.76	214.45	88.34	242.76	228.98	94.32	242.76	193.87	79.86
			94.59			95.50			94.14
			98.92			102.57			96.50
			96.54			98.68			95.20

Appendix 17. Index of Net Barter Terms of Trade for Crops, Food grains and Non-Food grains based on Current Year Weights in A.P.

Year	Crops			Food grains			Non-food grains		
	IPP	IPR	NBTT	IPP	IPR	NBTT	IPP	IPR	NBTT
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1980-81	55.65	55.35	99.46	55.65	53.36	95.89	55.65	56.60	101.71
1981-82	61.48	55.46	90.21	61.48	58.47	95.10	61.48	53.77	87.46
1982-83	63.99	56.21	87.84	63.99	61.47	96.06	63.99	52.76	82.45
1983-84	69.03	68.66	99.46	69.03	68.66	99.46	69.03	68.67	99.48
1984-85	73.21	83.34	113.80	73.21	66.23	90.47	73.21	90.68	123.86
1985-86	77.21	67.12	86.93	77.21	70.17	90.88	77.21	65.33	84.61
1986-87	82.58	71.35	86.40	82.58	73.09	88.51	82.58	70.38	85.23
1987-88	87.65	88.57	101.00	87.65	80.85	92.24	87.65	92.11	105.09
1988-89	92.13	92.20	100.10	92.13	92.93	100.87	92.13	91.79	99.63
1989-90	98.15	92.00	93.73	98.15	93.98	95.75	98.15	90.98	92.69
1990-91	109.86	117.63	107.10	109.86	112.55	102.45	109.86	119.81	109.06
1991-92	126.99	144.15	113.50	126.99	133.19	104.88	126.99	148.59	117.01
1992-93	136.98	126.20	92.13	136.98	133.04	97.12	136.98	122.90	89.72
1993-94	145.08	151.20	104.20	145.08	153.24	105.62	145.08	150.35	103.63
1994-95	150.09	180.85	120.50	150.09	186.21	124.07	150.09	178.35	118.83
1995-96	187.05	195.64	104.60	187.05	199.01	106.39	187.05	194.33	103.89
1996-97	209.81	191.89	91.46	209.81	200.75	95.68	209.81	187.58	89.41
1997-98	213.11	221.07	103.70	213.11	209.41	98.26	213.11	226.22	106.15
1998-99	224.57	227.69	101.40	224.57	227.77	101.42	224.57	227.65	101.37
1999-2000	243.24	225.00	92.50	243.24	228.89	94.10	243.24	207.03	85.11
Pre-reform			96.92			95.24			97.39
Post-reform			102.67			103.06			101.68
Overall period			99.57			98.76			99.32

Appendix 18. Indices of Net Barter Terms of Trade (based on Base Year Weights), Total Factor Productivity and Single Factorial Terms of Trade in Andhra Pradesh

Year	Agriculture Sector of A.P			Crops Sector of A.P			Foodgrain crops			Non-foodgrain crops		
(1)	Index of NBTT (2)	Index of TFP (3)	Index of SFTT (4)	Index of NBTT (5)	Index of TFP (6)	Index of SFTT (7)	Index of NBTT (8)	Index of TFP (9)	Index of SFTT (10)	Index of NBTT (11)	Index of TFP (12)	Index of SFTT (13)
1980-81	94.28	100.00	94.28	95.79	100.00	95.79	95.12	100.00	95.12	96.12	100.00	96.12
1981-82	89.54	106.31	95.19	89.97	109.69	98.69	94.19	103.00	97.02	87.89	117.00	102.84
1982-83	89.07	88.72	79.02	87.81	85.47	75.05	97.29	91.99	89.49	83.15	79.31	65.95
1983-84	97.87	121.41	118.82	96.85	123.38	119.50	100.90	114.32	115.35	94.87	133.17	126.33
1984-85	99.93	86.44	86.38	99.57	82.91	82.56	90.78	71.10	64.55	103.88	93.82	97.46
1985-86	90.01	67.70	60.94	85.54	99.11	84.78	91.87	116.84	107.34	82.44	86.67	71.45
1986-87	89.23	145.66	129.97	85.69	91.06	78.03	88.97	88.47	78.71	84.09	93.54	78.66
1987-88	99.97	108.34	108.31	100.09	115.45	115.56	92.12	103.26	95.12	104.01	126.19	131.25
1988-89	100.45	102.99	103.45	99.29	107.09	106.33	100.90	117.18	118.24	98.50	99.61	98.12
1989-90	94.88	104.03	98.70	92.97	102.85	95.62	95.76	100.28	96.03	91.61	105.09	96.27
1990-91	104.26	92.82	96.77	106.87	97.53	104.23	102.62	87.72	90.02	108.96	106.24	115.76
1991-92	108.43	99.56	107.95	110.27	97.91	107.96	104.79	95.54	100.11	112.96	99.54	112.44
1992-93	93.24	89.52	83.47	90.76	82.85	75.19	96.44	91.08	87.84	87.97	76.79	67.55
1993-94	101.77	118.76	120.86	101.82	121.12	123.32	106.30	112.17	119.24	99.61	128.07	127.57
1994-95	104.33	89.99	93.89	105.62	86.57	91.43	115.49	92.88	107.27	100.76	82.30	82.93
1995-96	103.60	98.92	102.48	103.63	99.41	103.02	107.19	88.02	94.35	101.86	108.27	110.29
1996-97	95.64	89.92	85.99	93.07	86.66	80.66	99.331	101.00	100.32	89.99	77.81	70.03
1997-98	100.73	92.74	93.42	98.92	86.60	85.66	97.79	82.50	80.68	99.47	89.79	89.31
1998-99	99.53	113.32	112.79	97.85	123.47	120.81	101.51	123.94	125.81	96.04	123.16	118.29
1999-2000	91.23	88.39	80.64	88.34	83.71	73.95	94.32	99.27	93.64	79.86	72.21	57.67
		102.22	97.44		101.32	96.01		99.47	95.18		103.69	98.20
		97.90	97.94		96.48	95.78		98.49	101.03		95.33	92.90
		100.28	97.67		99.14	95.91		99.03	97.81		99.93	95.81

NBTT= Net barter terms of trade; TFP= Total factor productivity; SFTT= single factorial terms of trade

Appendix 19. Indices of Net Barter Terms of Trade (based on Current Year Weights), Total Factor Productivity and Single Factorial Terms of Trade in Andhra Pradesh

Year	Agriculture Sector			Crops Sector			Foodgrain Sector			Non-foodgrain Sector		
(1)	Index of NBTT (2)	Index of TFP (3)	Index of SFTT (4)	Index of NBTT (5)	Index of TFP (6)	Index of SFTT (7)	Index of NBTT (8)	Index of TFP (9)	Index of SFTT (10)	Index of NBTT (11)	Index of TFP (12)	Index of SFTT (13)
1980-81	97.02	100.00	97.02	99.46	100.00	99.46	95.89	100.00	95.89	101.71	100.00	101.71
1981-82	89.70	106.31	95.36	90.21	109.69	98.95	95.10	103.00	97.96	87.46	117.00	102.33
1982-83	89.34	88.72	79.26	87.84	85.47	75.08	96.06	91.99	88.37	82.45	79.31	65.39
1983-84	99.61	121.41	120.94	99.46	123.38	122.72	99.46	114.32	113.71	99.48	133.17	132.48
1984-85	110.06	86.44	95.14	113.80	82.91	94.38	90.47	71.10	64.32	123.86	93.82	116.21
1985-86	92.35	67.70	62.52	86.93	99.11	86.16	90.88	116.84	106.19	84.61	86.67	73.33
1986-87	91.13	145.66	132.74	86.40	91.06	78.68	88.51	88.47	78.30	85.23	93.54	79.72
1987-88	100.71	108.34	109.11	101.00	115.45	116.66	92.24	103.26	95.25	105.09	126.19	132.61
1988-89	101.12	102.99	104.14	100.10	107.09	107.17	100.87	117.18	118.20	99.63	99.61	99.24
1989-90	95.58	104.03	99.43	93.73	102.85	96.41	95.75	100.28	96.02	92.69	105.09	97.41
1990-91	104.61	92.82	97.09	107.10	97.53	104.43	102.45	87.72	89.87	109.06	106.24	115.86
1991-92	111.30	99.56	110.81	113.50	97.91	111.14	104.88	95.54	100.20	117.01	99.54	116.47
1992-93	94.69	89.52	84.77	92.13	82.85	76.33	97.12	91.08	88.46	89.72	76.79	68.89
1993-94	103.52	118.76	122.94	104.20	121.12	126.23	105.62	112.17	118.48	103.63	128.09	132.72
1994-95	117.45	89.99	105.69	120.50	86.57	104.31	124.07	92.88	115.23	118.83	82.30	97.79
1995-96	103.95	98.92	102.83	104.60	99.41	103.98	106.39	88.02	93.65	103.89	108.27	112.48
1996-97	94.00	89.92	84.52	91.46	86.66	79.26	95.68	101.00	96.64	89.41	77.81	69.57
1997-98	104.48	92.74	96.89	103.70	86.60	89.84	98.26	82.58	81.07	106.15	89.79	95.31
1998-99	102.42	113.32	116.06	101.40	123.47	125.19	101.42	123.94	125.71	101.37	123.16	124.85
1999-2000	95.09	88.39	84.05	92.50	83.71	77.43	94.10	99.27	93.41	85.11	72.21	61.46
Pre-reform		102.22	99.34		101.32	98.19		99.47	94.91		103.69	101.48
Post-reform		97.90	100.95		96.48	99.29		98.49	101.43		95.33	97.73
Overall period		100.28	100.07		99.14	98.69		99.03	97.85		99.93	99.79

NBTT=Net barter terms of trade; TFP= total factor productivity; SFTT= Single factorial terms of trade.

Appendix 20. Data set Used for Regressions in Table 6

Year	Value of output in Rs. Cr at 1993-94 prices			Price a (Current year weights)			Price a (Base year weights)			Price b			Total factor productivity			Irrigation Ratio			Average annual rainfall in mm.
(1)	C (2)	FG (3)	NFG (4)	C (5)	FG (6)	NFG (7)	C (8)	FG (9)	NFG (10)	C (11)	FG (12)	NFG (13)	C (14)	FG (15)	NFG (16)	C (17)	FG (18)	NFG (19)	(20)
1980-81	8,011.19	4159.81	3851.38	99.46	95.89	101.71	95.79	95.12	96.12	105.61	101.81	101.73	100.00	100.00	100.00	36.57	41.78	20.53	884
1981-82	9657.41	4702.56	4954.85	90.21	95.10	87.46	89.97	94.19	87.89	92.02	97.02	89.69	109.69	103.00	117.00	37.16	42.09	22.42	945
1982-83	8869.73	4654.08	4215.65	87.84	96.06	82.45	87.81	97.29	83.15	89.748	98.15	84.28	85.47	91.99	79.31	36.53	41.64	22.34	819
1983-84	10211.17	4962.68	5248.49	99.46	99.46	99.48	96.85	100.90	94.87	100.22	100.22	95.36	123.38	114.32	133.17	39.42	45.49	22.44	1198
1984-85	8481.58	3547.00	4934.58	113.80	90.47	123.86	99.57	90.78	103.88	114.04	90.63	104.05	82.91	71.10	93.82	38.16	43.92	24.21	734
1985-86	7961.03	3914.42	4046.61	86.93	90.88	84.61	85.54	91.87	82.44	87.12	91.08	82.69	99.11	116.84	86.67	37.55	44.08	22.48	865
1986-87	6979.77	3334.09	3645.68	86.40	88.51	85.23	85.69	88.97	84.09	86.008	88.11	83.99	91.06	88.47	93.54	39.05	45.13	23.83	868
1987-88	8770.10	3744.70	5025.4	101.00	92.24	105.09	100.09	92.12	104.01	102.21	93.29	105.10	115.45	103.26	126.19	37.15	43.53	23.57	954
1988-89	10827.72	5069.67	5758.05	100.10	100.87	99.63	99.29	100.90	98.50	100.15	100.94	98.55	107.09	117.18	99.61	43.20	53.08	23.94	1144
1989-90	10417.59	4756.68	5660.91	93.73	95.75	92.69	92.97	95.76	91.61	93.083	95.09	90.87	102.85	100.28	105.09	43.34	52.60	24.79	1343
1990-91	11854.72	4855.02	6999.70	107.10	102.45	109.06	106.87	102.62	108.96	107.81	103.15	109.73	97.53	87.72	106.24	42.83	52.19	25.41	982
1991-92	12148.32	4856.44	7291.88	113.50	104.88	117.01	110.27	104.79	112.96	114.14	105.46	113.29	97.91	95.54	99.54	43.81	53.28	27.03	981
1992-93	9566.89	4221.28	5345.61	92.13	97.12	89.72	90.76	96.44	87.97	92.446	97.46	88.34	82.85	91.08	76.79	42.95	51.85	27.53	837
1993-94	10612.79	4345.81	6266.98	104.20	105.62	103.63	101.82	106.30	99.61	105.54	106.96	100.84	121.12	112.17	128.07	41.47	51.80	25.16	817
1994-95	10185.03	4469.00	5716.03	120.50	124.07	118.83	105.62	115.49	100.76	124.77	128.47	99.34	86.57	92.88	82.30	42.43	53.00	25.69	1018
1995-96	11286.58	4386.69	6899.89	104.60	106.39	103.89	103.63	107.19	101.86	103.13	104.91	100.88	99.41	88.02	108.27	42.33	54.01	24.92	971
1996-97	10938.61	4916.47	6022.14	91.46	95.68	89.41	93.07	99.331	89.99	92.391	96.66	89.92	86.66	101.00	77.81	45.53	56.91	26.93	1110
1997-98	8598.81	3686.70	4912.11	103.70	98.26	106.15	98.92	97.79	99.47	102.85	97.42	99.17	86.60	82.5	89.79	45.72	55.31	29.26	815
1998-99	12088.27	5221.79	6866.48	101.40	101.42	101.37	97.85	101.51	96.04	102.61	102.65	97.17	123.47	123.94	123.16	47.75	59.33	28.60	1128
1999-00	10217.02	5215.07	5001.95	92.50	94.10	85.11	88.34	94.32	79.86	94.953	96.59	82.02	83.71	99.27	72.21	46.00	55.00	26.00	670

C = Crops; FG = Foodgrains; NFG = Non-foodgrains
Source: Rao [2003].

OCCUPATIONAL STRUCTURE OF WORKERS IN RURAL ANDHRA PRADESH

A. Amarender Reddy and Praduman Kumar

The paper examines the determinants of workforce structure with respect to status and sector. It develops multinomial regression model by using National Sample Survey Organisation (NSSO) household survey data to analyse factors that influence types of employment of workers in rural Andhra Pradesh. The variables considered for the study are total assets (land cultivated), social group, religion, educational level, age (experience), and other regional factors of the workers. The selected variables in the model explain about 80 per cent of variation in the type of employment of a worker. The educational level has significant impact on the choice of non-agricultural employment, especially in services and regular employment, in rural Andhra Pradesh. As expected, income, size of land holding, state of being regular employee in non-agriculture is negatively associated with part-time employment compared to full-time employment. On the other hand, the probability of self-employees in agriculture is higher in part-time work. Surprisingly, workers with technical education are more likely to be part-time employees. The probability of women workers to be employed as part-time workers is higher than that for male workers. There is significant increase in weekly wage rates of the non-agricultural workers as educational level increases, but there has been no significant increase in weekly wage earnings of casual labourers as educational level increases. There are significant wage differentials across different types of employment, by educational level of workers, by social group, and among male and female workers.

Key words: employment structure, multinomial logit model

I. INTRODUCTION

Work force structure with respect to status, (i.e., proportion of self-employed, regular employed, and casual workers and underemployed in total work force) and with respect to sector (i.e., agriculture, industry, and services) are the important characteristics of a labour market that may impact the level of development and standard of living of the people in rural areas. The choice of status and of sector of employment of workers is dependent on many socio-economic factors, such as possession of physical capital, human capital in terms of level of education and experience, and social background, such as religion, social group, and regional factors, etc. Many earlier studies point out that the structure of employment in rural areas has been stagnated with no reward for educational level of households in both, agricultural and non-agricultural sectors. The choice of type of employment depends on factors like caste and religion of the worker rather than human capital and physical capital of households. On the other hand, some studies indicate that even rural labour market has been vibrant in response to human capital levels, i.e., the better educated workers specialise in knowledge intensive non-agricultural sector with higher levels of income, while the illiterate mostly depend on agricultural sector. With this background, this paper tries to explore relative influence of educational levels, physical capital, and socio-economic background of the workers on the choice of type of employment. It is followed by an analysis of wage differentials for different

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educational levels among casual labourers in agriculture and the regular employed in non-agriculture.

In the next section, a brief review of literature is given, in Section III a short description of the personal characteristics of different types of workers is given, in order to explore association among different personal characteristics with type of employment. In Section IV, a multinomial (logit) regression model has been developed to find out determinants of type of employment of workers. Section V deals with the effect of educational level on wage rates among casual labourers in agriculture and among the regular employed in non-agriculture, separately. Section VI concludes with a few policy options.

II. REVIEW OF LITERATURE

In India, unemployment rate is five per cent but poverty is more than 30 per cent [Dev, 2000]. In other words, much of the employment is not adequately productive or remunerative [Dev, 2000]. It indicates that access to different types of employment can determine 25 per cent of poverty levels in India. The recent NSS 55th round household employment data shows that there is a greater variation in incomes from different types of employment. In an overview, Sundaram [2001] concluded that the average wage incomes of regular wage/salaried workers would be higher than those received by the casual labourers (agricultural and non-agricultural) and also higher than incomes of self-employed with asset base.

A complex web of socio-economic characteristics determines access to different sources of income and types of employment. The importance of incorporating household composition in the analysis of type of employment has long been recognised [Buhmann *et al.,* 1988, Pp. 115-42]. There is clear evidence that education, skill, and assets determine most part of the variation in types of employment of workers. Even where the educational and skill levels are similar, gender, kinship, caste, tribe, etc., remain important determinants of access to different types of employment [Ghose, 1999]. Empirical work on Indian data has been relatively scarce, with the exception of the study by Dreze and Srinivasan [1997, Pp. 217-34], who have utilised disaggregated data on household size and composition to analyse the type of employment of female-headed households in India. In another study, Ray [2000] concludes that the workers belonging to SC/ST, whose sole employment source has been agricultural labour or other labour, generally experience significantly lower standards of living than others in rural India.

Importance of education in variations in productivity is recognised by many researchers at the individual as well as regional level. The research indicates that literacy scores, as a direct measure of human capital, perform better in growth regressions than indicators of schooling. In cross-country comparison of 14 OECD countries, revealed that a country able to attain literacy scores 1 per cent higher than the international average will achieve levels of labour productivity and GDP per capita that are 2.5 per cent and 1.5 per cent higher, respectively, than other countries [Coulombe, *et al.*, 2004]. The results using other measures of average education at the regional level indicate similar results. For example, an increase of one percentage point in the percentage of graduates in total population generates external returns of 24 per cent in urban India [Shira Klein, 2002].

In all advanced industrial market economies, university graduates have consistently earned significantly more than high-school graduates since 1970, especially in non-agricultural sector and in urban areas [Livingstone, *et al.,* 1999], but the same is not true in case of rural areas in India. As the aggregate knowledge increases, the

opportunities to apply it in workplaces have not kept pace. As a result, most of the educated either remained in low productive agricultural sector or underemployed. The notion of 'knowledge-based economy' remains largely illusory for most of the rural labour force. Some human capital advocates have suggested that declining or non-improving quality of schooling in terms of relevance of education for employment creation is now the central problem. Ultimately, acquiring higher levels of education becomes a less and less viable means of increasing income and employment options in rural areas [Livingstone, 2002].

A widely cited survey by Lockheed *et al.*, [1980, Pp. 37-76] summarises 39 equations from 18 different studies in 13 countries, and concludes that education has a positive effect on incomes of agricultural workers. Phillips [1987, Pp. 637-44] argues that these results vary substantially by geographic region. In explaining interstate differences in Total factor Productivity growth of agriculture and agriculture production growth Madhusudan and Narayanamoorthy [2003] concluded that a 1 per cent increase in literacy leads to 0.41 per cent increase in total factor productivity growth in agriculture and 1.07 per cent growth in agricultural production. Surabhi and Kumar [2000] also highlighted significance of literacy in productivity growth in agriculture in India.

Although there is little doubt that better educated workers earn higher wages in the modern sector, whether education raises incomes in agriculture remains a contentious issue. While studying Pakistani rural labour market, Fafchamps and Agnes [1998] find that households with better-educated males earn higher off-farm income, and divert labour resources away from farm activities toward non-farm work. Education has no significant effect on income from agricultural sector. The effect of human capital on household incomes is partly realised through the reallocation of labour from low productive activities to more remunerative non-farm work. Female education does not affect productivity and labour allocation in any systematic fashion in rural Pakistan.

Jolliffe [1996] estimates the returns to education in farm and off-farm work, and finds that they are much higher in the latter, thus affecting the allocation of labour in Ghanaian farm households. Yang [1997, Pp. 613-632] considers selectivity of better-educated household members into off-farm activities in China, and finds that schooling does not contribute to higher earnings in farming but that it raises off-farm wages. The above studies raise questions whether education and other socio-economic factors allocate labour in favour of non-agricultural employment, if yes, in what sectors the better educated people work, and whether there are any differences in wages of agricultural workers and non-agricultural sectors, due to variation in educational levels. This paper tries to answer some of these questions in the context of rural Andhra Pradesh.

The data used in this study relating to types of employment are drawn from schedule 10.0 of the *Quinquennial Survey on Employment and Unemployment,* conducted by the National Sample Survey Organisation, (NSSO) in its 55th round for the period July 1999 to June 2000. [NSSO, 2003] The geographical coverage in the rural Andhra Pradesh is 432 villages, covering 5,185 households and 10,191 persons in three regions, *viz.,* coastal, Telangana, and Rayalaseema. For easy classification, sector and status of employment are combined together and reclassified into types of employment with nine classes, namely, self-employed in agriculture, self-employed in industry, self-employed in services, regular employees in agriculture, regular employees in industry, regular employees in services, casual labour in agriculture, casual labour in industry and casual labour in services.

III. DISTRIBUTION OF MALE WORKERS BY TYPE OF EMPLOYMENT

III.1 Distribution of Male Workers by Type of Employment and Physical Capital of Household

A glance at Table 1 reveals that the proportion of very poor is high in casual labour class. Among the casual labourers, concentration of the very poor is high among casual labourers in agriculture, whereas the proportion of very poor is less and that of the non-poor high among the regular employed in services. However, the self-employed are spread among all income groups, and within the self-employed, there is not much difference in income between the agriculture and non-agricultural sectors.

Table 1. Distribution of Male Workers by Type of Employment and Income Group

Type of Employment	Income Groups						
	Very Poor %	Poor %	Medium %	Non-Poor Low %	Non-Poor High %	%	No. of Sample Workers
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Self-employed in agriculture	13.9	15.4	20.1	22.4	28.2	100	2,723(43.1)
Self-employed in industry	11.2	15.8	22.1	24.6	26.2	100	673(10.7)
Self-employed in services	14.5	22.3	17.4	19.5	26.3	100	325(5.1)
Regular employed in agriculture	11.3	15.0	12.4	19.9	40.8	100	83(1.3)
Regular employed in industry	9.4	12.1	21.0	28.2	29.0	100	122(1.9)
Regular employed in services	4.8	8.6	13.6	19.2	53.6	100	302(4.8)
Casual labour in agriculture	24.7	23.2	21.8	20.5	9.7	100	1,692(26.8)
Casual labour in industry	23.1	23.3	21.3	20.8	11.6	100	331(5.2)
Casual labour in services	23.0	21.1	19.6	23.3	12.5	100	59(0.9)
Total number of sample workers	1,046	1,133	1,283	1,377	1,472	6,311	6,311(100)

[the workers have been classified in to five quintile groups based on their monthly per capita expenditure; 1st quintile = very poor; 2nd quintile = poor; 3rd quintile = medium; 4th quintile = non-poor-low; 5th quintile = non-poor-high]

Table 2. Distribution of Male Workers by Type of Employment and Land Holding Group

Type of Employment	Land Holding Groups						
	Landless	Marginal (<0.4ha)	Small (0.4 to 1 ha)	Medium (1 to 2 ha)	Semi-large (2 to 4 ha)	Large (> 4 ha)	All
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Self-employed in agriculture	5.4	12.4	50.4	73.7	80.6	88.6	43.1
Self-employed in industry	17.5	17.1	5.7	5.0	6.1	3.6	10.6
Self-employed in services	13.3	7.9	3.2	2.7	2.2	1.5	5.1
Regular employed in agriculture	2.4	1.5	1.2	0.8	0.3	2.0	1.3
Regular employed in industry	3.6	3.2	1.3	1.1	0.4	0.6	2.0
Regular employed in services	6.6	7.4	2.6	2.3	3.3	2.4	4.8
Casual labour in agriculture	38.0	40.1	31.6	11.6	5.5	0.9	26.8
Casual labour in industry	11.4	8.9	3.2	2.2	1.6	0.2	5.2
Casual labour in services	1.8	1.5	0.9	0.6	-	0.2	1.0
Total	100	100	100	100	100	100	100
Total number of sample workers	166	2,712	1,274	825	675	659	6,311

The share of self-employed in agriculture is very high (89 per cent) among large landholders (with farm size of more than 4 ha) and even among small landholders (land size between 0.4 to 1 ha), the share of self-employed in agriculture is more than 50 per cent. However, among the marginal land holders (less than 0.4 ha) the share of self-employed steeply decreases to 12 per cent (Table 2). The share of self-employed in industry and services is high among landless and marginal landholders. The above figures indicate that a certain minimum land is needed for workers to be

engaged as self-employed in agriculture. Regular employed in all sectors constitute a very small per cent of total workers in rural Andhra Pradesh. The landless and marginal landholders mostly work as casual labourers. About 38 per cent of landless, 40 per cent of marginal and 32 per cent of small farmers are casual labourers in agriculture.

III.2 Distribution of male workers by type of employment and human capital (level of education and age)

The share of illiterate is the highest among casual labourers in services (73 per cent) followed by casual labourers in agriculture (68 per cent) and casual labourers in industry (49 per cent). Middle and secondary level educated workers are spread across all sectors, except with somewhat less concentration among casual labourers. The proportion of higher secondary level educated is high among regular employed in services (16 per cent), and the share of graduate workers is still higher among regular employed in services (28 per cent).

This indicates that in human capital hierarchy, the class of self-employed in agriculture comes at the lowest end, followed by industrial workers, and service workers come at the upper end. The proportion of the illiterate and the primary educated is higher among casual workers, irrespective of the sector of employment. However, here also workers in the service and industrial sectors skew towards better educational levels, compared to casual labourers in agriculture (Table 3). The share of better educated is high among the regular employed in services.

The self-employed in non-agricultural sector are widely distributed in all educational and income classes as the self-employed in non-agricultural sectors constitute a heterogeneous lot, that is, it ranges from traditional handicrafts (which are mostly in distress condition, due to lack of demand, low productivity, low technology, less capital) to newly emerging sectors in rural areas (like trade, transport which are demand driven).

Table 3. Distribution of Male Workers Among Type of Employment by Educational Level

Type of Employment	General Education Level						
	Illiterate	Below Primary	Primary	Middle & Secondary	Higher Secondary	Graduate & Higher	All
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Self-employed in agriculture	47.6	12.4	11.1	21.8	4.0	3.0	100(2729)
Self-employed in industry	28.4	14.9	16.1	30.7	5.7	4.2	100(672)
Self-employed in services	46.5	12.9	7.1	22.4	5.9	5.3	100(325)
Regular employed in agriculture	29.7	5.4	21.7	34.8	5.2	3.3	100187)
Regular employed in industry	11.5	24.2	10.5	43.8	4.4	5.5	100(160)
Regular employed in services	9.2	5.7	10.5	31.3	15.9	27.5	100(302)
Casual labour in agriculture	68.4	12.3	7.6	10.4	0.9	0.4	100(1693)
Casual labour in industry	48.6	14.8	15.1	19.3	1.9	0.3	100(330)
Casual labour in services	72.8	18.4	2.8	3.4	2.6	0.0	100(381)
Total	48.8	12.3	10.7	20.6	3.9	3.7	100(6309)
Total number of sample workers	3,081	777	674	1,299	244	234	6,309

The labour market is highly segmented in respect of educational standards, that is, the illiterate and primary educated are concentrated in agricultural sector, mostly as casual labourers, whereas the better educated are mostly engaged in regular employment, particularly in service sector.

The share of children (5-14 years of age) were disproportionately high in regular employed in agriculture. Most of these child workers in agriculture sector are low-paid, highly exploitative,

having longer hours of work (like cattle rearing, etc.) (Table 4). The share of young was disproportionately high in regular employed in industry and casual labourer in industry and services. High concentration of young workers in inferior employment, may have been due to lack of experience and also because those who enter labour market at 'younger age' are comparatively less educated, come from low per capita income households, and also do not have any other source of income. However, the share of casual labourers has decreased with age. The share of aged workers is high among regular employed in services (74 per cent), while, their share was low among regular employed in agriculture (only 32 per cent). The share of old aged was high among self-employed in agriculture (11 per cent), whilst their share is low among casual workers across all sectors.

Table 4. Distribution of Male Workers by Type of Employment and Age Group

Sector/status	Age Group				
	Child	Young	Aged	Old	Total Number of Sample Workers
(1)	(2)	(3)	(4)	(5)	(6)
Male					
Self-employed in agriculture	4.6	32.0	52.9	10.5	2855(100)
Self-employed in industry	1.1	33.4	58.0	7.5	677(100)
Self-employed in services	2.1	32.3	57.0	8.5	332(100)
Regular employed in agriculture	18.1	42.4	31.8	7.2	99(100)
Regular employed in industry	4.6	51.6	42.8	0.7	131(100)
Regular employed in services	0.4	24.5	73.7	1.3	304(100)
Casual labour in agriculture	5.5	38.9	51.2	4.3	1791(100)
Casual labour in industry	4.6	48.9	45.3	1.1	348(100)
Casual labour in services	1.8	52.7	39.6	6.1	62(100)
Total	4.3	35.4	53.1	7.2	6596(100)

Child = 5-14; Young = 15-29; Aged = 30-59, Old > 59.

III.3 Distribution of male workers by type of employment and social group, and religion

About 59 per cent of scheduled tribes are working as self-employed in agriculture, and only 21 per cent of scheduled castes are self-employed in agriculture. Whereas the share of casual labourers in agriculture is high among the scheduled castes (51 per cent) and low in the so-called upper (other) castes (21 per cent). The so-called upper (other) castes are mostly engaged in the self-employed in agriculture and the regular employed in services. (Table 5).

Table 5. Distribution of Male Workers Among Types of Employment by Social Group

Type of Employment	Social Group			Religion		
	Scheduled Tribes	Scheduled Castes	Other Castes	Hindus	Non-Hindus	All
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Self-employed in agriculture	58.7	21.1	46.5	44.8	22.4	43.1
Self-employed in Industry	5.5	5.7	12.5	9.8	20.8	10.6
Self-employed in Services	0.7	3.8	6.0	5.0	6.6	5.1
Regular employed in agriculture	1.9	2.0	1.1	1.3	1.1	1.3
Regular employed in Industry	0.7	1.3	2.3	1.9	2.9	2.0
Regular employed in services	1.9	5.5	5.0	4.6	7.2	4.8
Casual labour in agriculture	27.9	50.9	20.8	26.8	26.8	26.8
Casual labour in Industry	2.2	8.4	4.9	4.8	10.7	5.2
Casual labour in services	0.5	1.3	0.9	0.9	1.5	1.0
Total	100	100	100	100	100	100
Total number of sample workers	581	1,119	4,611	5,855	456	6,311

The shares of the self-employed in industry, and casual labourers in industry and services are high among non-Hindu workers, compared to Hindu workers, whereas the shares of self-employed in agriculture and regular employed in agriculture are less among non-Hindu workers.

In order to analyse complex interrelations among type of employment and other socio-economic characteristics, we estimate a multinomial regression model in next section, to determine choice/determinants of type of employment of workers. We used type of employment as a categorical dependent variable and different socio-economic characteristics as predictor variables.

IV. MULTINOMIAL REGRESSION ANALYSIS

Multinomial regression analysis was used to analyse choice of type of employment. The dependent variable was a categorical variable (type of employment) with more than two categories (in this case six categories) and it has been regressed upon a set of independent variables. As the multinomial model requires that a particular category to be designated as the numerate against which all results should be compared. This implies that parameter estimates for the categories should be interpreted as indicators of the strength of association of a particular explanatory variable with the respective category relative to the same explanatory variable with 'numerate' (comparison) category.

The Model specification:

The general form of multinomial logit models is:

$$U_{ij} = \beta_j X_i + u_{ij} \quad (1)$$

where U_{ij} is the ith individual's utility of the jth choice, and X_i is a vector of values of the ith individual on the independent variables. The model estimates a set of regression coefficients for each of the alternatives (except for the choice option that has been defined as reference category), hence the subscript in β_j [DeCoster, 2004].

Y (type of employment) = f (physical capital of workers, human capital of workers, socio-economic characteristics, work related variables and regional factors).

The dependent variable (Y: type of employment) takes six categories namely (I) Self-employed in agriculture, (II) Self-employed in non-agriculture, (III) Regular employed in Agriculture, (IV) Regular employed in non-agriculture, (V) Casual labourer in non-agriculture and (VI) Casual labourer in agriculture.

The independent variables included in employment choice model were given below:

Explanatory Variables Included in Employment Choice Models

Variable (1)	Rationale for Inclusion (2)
Physical capital variables	
Monthly per capita expenditure	Indicator of living standard
Land holding size	Access to ready source of income/asset
Human capital variables	
Age of head of the family	Proxy for experience in work
General education level of worker	Level of human capital of workers
Literate but below primary	
Primary education	
Middle and secondary education	
Higher secondary	
Graduate and above	
Social and other factors	
Social group	Proxy for social and historical discrimination
Religion	Proxy for traditional preferences and contacts
Sex of head of household	Proxy for gender discrimination in society
Sex of person	
Regional factors	
Telangana region	Economically backward region but having strong trade union movement and major urban center located in this region
Coastal region	Agriculturally and industrially developed region, rice bowl of Andhra

Multinomial logistic regression is used when nominal response variable (dependent variable) has more than two categories. Multinomial logit models are multi-equation models. A response variable with k+1 categories will generate *k* equations. Each of these *k* equations is a binary logistic regression comparing a group with the reference group. Multinomial logistic regression simultaneously estimates the *k* logits. Further, it only displays coefficients for the *k* comparisons. Thus, the coefficients, β_j represent the log odds of being in the target groups relative to the reference group. Thus a simplified multinomial logit model has the form:

$$p_j = \frac{\exp(\beta_j' x)}{\sum_j \exp(\beta_j' x)} \qquad \text{for} j = 1, \ldots, k+1$$

where exp() stands for the exponential function and *x* is the vector of independent (or explanatory) variables.

β_{k+1} can be set to 0 (zero vector) as a normalization and thus:

$$p_{k+1} = \frac{1}{\sum_j \exp(\beta_j' x)}$$

As a result, the *j* logit has the form:

$$\log \frac{p_j}{p_{k+1}} = \beta_j' x \qquad \text{for} \quad j = 1, \ldots, k$$

For example, the 1st equation can be represented as

log[probability of being in self-employed in agriculture/ probability of being casual labourer in agriculture] = -1.31+0.01 * [per capita income of household (Rs)] + 1.17 * [landholding size(Ha)] + 0.02 * [age of worker] + 0.45 * [below primary dummy] + 0.71 * [primary dummy] + 0.83 * [Middle] + 0.87 * [higher secondary] + 1.11 * [graduate & above] + 0.38 * [scheduled tribe = 1; else = 0] -1.03 * [scheduled caste = 1; else = 0] -0.5 * [non-hindu = 1; else = 0] -.34 [female headed hhs = 1, else = 0] -0.23 * [female = 1; male = 0] + 0.35 * [coastal region = 1; else = 0] + 0.41 * [telangana region = 1; else = 0]

For example, the slope coefficient [for landholding size] in above equation represents change in the log odds of being in self-employed in agriculture *versus* casual labourer in agriculture for a person with an increase of one hectare of land. The significance of the parameter estimates can be assessed through standard errors of the parameters.

However, the most common way of interpreting a logit is to convert it (log odd ratios) to an odds ratio using the exp (B) function. The closer the odds ratio is to 1.0, the more the independent variable's categories (ex., landholding size does not matter in this case in deciding choice between self-employment in agriculture versus casual labourer in agriculture) are independent of the dependent variable, with 1.0 representing full statistical independence. For instance, if the logit b_1 = 1.17 as in the case of landholding size in above equation, then the corresponding odds ratio (the exponential function, e^B) is 3.23, then we may say that when the independent variable increases one unit, the odds that the dependent = self-employed in agriculture increase by a factor of 3.23 compared to casual labourer in agriculture, when other variables are controlled.

The overall model fit can be tested by either -2 Log Likelihood or Pseudo-R^2. - 2-Log likelihood is a measure of how well the model fits the data. The smaller the value of 2-Logliklihood betters the fit. In stepwise methods, the change in -2 log likelihood tests the null hypothesis that the coefficients of the terms removed from the model are zero. However Cox and Snell R^2 statistics can also tell about goodness of fit of the model as that of standard R^2 in OLS. Cox and Snell's R-Square is an attempt to imitate the interpretation of multiple R-Square based on the likelihood, but its maximum can be (and usually is) less than 1.0, making it difficult to interpret. Nagelkerke's R-Square is a further modification of the Cox and Snell coefficient to assure that it can vary from 0 to 1. That is, Nagelkerke's R^2 divides Cox and Snell's R^2 by its maximum in order to achieve a measure that ranges from 0 to 1. Therefore Nagelkerke's R^2 will normally be higher than the Cox and Snell measure but will tend to run lower than the corresponding OLS R^2.

Table 6. Parameter Sstimates of Multinomial Regression of Type of Employment Choice Model (casual labourer in agriculture as comparison group)

	Self-Employed in Agriculture			Self-Employed in Non-Agriculture			Regular Employed in Agriculture			Regular Employed in Non-Agriculture			Casual Labourer in Non-Agriculture		
(1)	B (2)	SE (3)	Exp(B) (4)	B (5)	S.E. (6)	Exp(B) (7)	B (8)	S.E. (9)	Exp(B) (10)	B (11)	S.E. (12)	Exp(B) (13)	B (14)	S.E. (15)	Exp(B) (16)
Intercept	-1.31*	0.22		-2.86*	0.25		-4.47*	0.69		-6.14*	0.38		0.20	0.36	
Per capita income of household in Rs	0.001	0.001	1.00	0.001	0.001	1.00	0.001	0.001	1.00	0.001	0.001	1.00	0.001	0.001	1.00
Landholding size in ha	1.17*	0.04	3.23	0.38*	0.05	1.47	1.00*	0.06	2.72	0.42*	0.06	1.52	-0.51*	0.11	0.60
Age of worker	0.02*	0.001	1.02	0.02*	0.001	1.02	-0.02*	0.01	0.98	0.02*	0.001	1.02	-0.01*	0.001	0.99
Educational level dummies															
Below primary=1; else=0	0.45*	0.09	1.57	0.71*	0.11	2.04	0.20	0.28	1.23	1.01*	0.20	2.74	0.41*	0.15	1.51
Primary=1; else=0	0.71*	0.11	2.02	1.19*	0.12	3.28	-0.49	0.48	0.61	2.06*	0.18	7.85	0.73*	0.16	2.08
Middle=1; else=0	0.83*	0.10	2.28	1.73*	0.11	5.64	-0.13	0.33	0.88	3.03*	0.15	20.76	0.75*	0.15	2.12
Higher secondary=1; else=0	0.87*	0.31	2.38	2.49*	0.30	12.02	0.16	0.78	1.17	4.28*	0.32	72.07	0.99*	0.45	2.68
Graduate & above=1; else=0	1.11*	0.43	3.03	2.72*	0.42	15.21	2.21*	0.55	9.09	5.36*	0.41	212.51	-0.36	1.08	0.70
Social group dummies															
Scheduled tribe=1; else=0	0.38*	0.08	1.46	-0.92*	0.15	0.40	0.30	0.30	1.35	-0.41	0.23	0.66	-0.79*	0.23	0.45
Scheduled caste=1; else=0	-1.03*	0.07	0.36	-1.40*	0.09	0.25	0.43*	0.21	1.54	-0.48*	0.13	0.62	-0.43*	0.11	0.65
Non-Hindu=1; else=0	-0.50*	0.12	0.61	0.46*	0.11	1.58	0.10	0.35	1.10	0.45*	0.16	1.57	0.32*	0.16	1.38
Female headed hhs=1; else=0	-0.34*	0.10	0.71	-0.27*	0.12	0.76	0.79*	0.28	2.19	0.30	0.17	1.36	0.14	0.17	1.15
Sex of person (male=0; female=1)	-0.23*	0.06	0.80	-0.07	0.07	0.93	-1.46*	0.23	0.23	0.07	0.12	1.07	-1.20*	0.12	0.30
Coastal region=1; else=0	0.35*	0.08	1.42	0.22*	0.09	1.24	0.11	0.32	1.12	-0.06	0.14	0.94	-1.04*	0.13	0.35
Telangana region=1; else=0	0.41*	0.08	1.51	-0.09	0.10	0.92	0.82*	0.29	2.27	0.40*	0.14	1.49	-0.78*	0.13	0.46
Sample size	4,365			1,444			103			569			461		3,249
Model	-2 LLR	X2	Df	Sign.	Cox and Snell's $-R^2$	Nagelkerke's R^2									
Intercept only	27,421.0														
Final	19,374.5	8,046.5	75	0	0.50	0.53									

* Indicates significance at 5 per cent level.

IV.1 Influence of physical capital on choice of type of employment

Except casual labour in non-agriculture, all other types of employment have significant positive association with income. Compared to the category of casual labour in agriculture, the magnitude of the coefficient is large in regular employed in agriculture and non-agriculture, and low for the self-employed in non-agricultural workers. This shows that most of the self-employed in non-agriculture were not as well off as the self-employed in agriculture. However, they are economically better off compared to casual labourers in agriculture and non-agricultural workers (Table 6).

The probability of self-employment and regular employment in agriculture increases, as one possesses more land. On the other hand, probability of being self-employed or regular employed in non-agriculture, and that of casual labourers in non-agriculture reduces with increase in the size of landholding.

IV.2 Influence of human capital on choice of type of employment

Here we introduce five education level dummies to represent the workers' educational levels which include literate but below primary, primary, middle and secondary, higher secondary, and graduate and above, to compare with the illiterate. Except for the regular employed in agriculture, for all other types of workers, all educational level dummies (literate but below primary, up to higher secondary educated) have positive association, compared to the illiterate. However, there is a significant difference in the magnitude of the coefficient. As for the regular employed in non-agriculture, the magnitude of coefficient is higher, followed by the self-employed in non-agriculture, casual labour in non-agriculture. Lower magnitude is reported in the case of self-employed in agriculture. This indicates that the importance of having up to higher secondary education is high in the case of all non-agricultural sectors, compared to agricultural sector. In all the cases, the magnitude of coefficient increases as one goes to higher educational levels from below primary education.

Graduate and higher level of education has significant positive association with all sectors, except casual labour in non-agriculture. The magnitude of coefficient is higher in the regular employed in non-agriculture, followed by the self-employed in non-agriculture, and the regular employed in agriculture, and the least is for the self-employed in agriculture. The above figures indicate that higher educational level (above secondary education) definitely increases chances of getting regular employment and self-employment in non-agricultural sectors in rural Andhra Pradesh, which are highly remunerative.

IV.3 Influence of other socio-economic characteristics on choice of type of employment

Persons belonging to the scheduled tribes are more likely to be engaged as self-employed in agriculture and less likely to be engaged as self-employed or casual labourers in non-agriculture, compared to casual labourers in agriculture. On the other hand, members of the scheduled castes are less likely to be engaged in all types of employment, except as regular employees in agriculture (where it turned out to be insignificant) compared to casual labourers in agriculture. This indicates that scheduled castes are more likely to be employed as casual labourers or regular employed in agriculture, compared to all other types of employment. They are less likely to be engaged as self-employed in non-agriculture or self-employed in agriculture, as the coefficients are significantly negative for both types of employment.

The probability of non-Hindu workers being self-employed in non-agriculture is significantly higher and that of being self-employed in agriculture is significantly lower, compared with that of being casual labourers in agriculture. This is especially true in the case of Muslims, who are

predominant in Andhra Pradesh. The probability of workers belonging to female headed households engaged as regular employed in agriculture is higher, and those engaged as self-employed in agriculture and self-employed in non-agriculture lower, compared to that of their being engaged as casual labourers in agriculture.

The probability of finding female workers as self-employed or regular employed in non-agriculture is more, but that of finding them as self-employed or regular employed in agriculture, and casual labourers in non-agriculture is less, compared to that of finding them as casual labourers in agriculture.

Workers belonging to the coastal regions have significant positive association with self-employment in agriculture, but negative association with regular employment in non-agriculture and casual labour in non-agriculture, whereas workers of Telangana region have significant negative association with self-employment or casual labour in non-agriculture, when compared to casual labour in agriculture. This indicates that, in case of workers belonging to Telangana and coastal regions, the probability to be engaged in non-agricultural sector is less compared to the probability of those belonging to Rayalaseema region.

The selected socio-economic variables, i.e., household characteristics, i.e., household income, assets (land cultivated), social group, religion, personal characteristics, such as educational level, age (experience), etc., and regional factors together explain about 58 per cent of variation in sectoral choice, which is considered as satisfactory.

V. DETERMINANTS OF WAGES OF RURAL WORKERS IN ANDHRA PRADESH

The average weekly wages in rural Andhra Pradesh are Rs 324.4 among males and Rs 164.8 among females in 1999-2000. Wage rates are high among the better-educated, compared to the less-educated workers. Among the scheduled tribes and scheduled castes, low wage rates are reported, compared to those of the so-called upper castes. Agriculturally developed regions (coastal) have reported higher wage rates, followed by Rayalaseema, and the least are reported in Telangana region. The regular employed male worker in service sector has higher wages (Rs 874.7 per week) while a casual labourer in all sectors has the lowest wage rates (for example, among casual labourers in agriculture, the average wage rate is Rs 220.9 which is four times less than that of a regular employee in services) (Table 7).

Table 7. Mean Wage Rates Among Different Socio-Economic Groups and Type of Employment

(1)	1999-00 (2)	(3)	1999-00 (4)
Social group (males)		*Religion (males)*	
Scheduled tribes	273.7	Hindu	321.2
Scheduled castes	279.4	Non-Hindu	358.5
Other castes	354.6	Total	324.4
Total	324.4		
Education Level (Males)		*Employment Sector Males*	
Illiterate	237.3	Regular employed in agriculture	325.1
Below primary	290.6	Regular employed in Industry	470.8
Primary	340.5	Regular employed in services	874.7
Middle &secondary	467.7	Casual labour in agriculture	220.9
Higher secondary	1,048.7	Casual labour in Industry	305.9
Graduate &>	1,335.0	Casual labour in services	275.1
Total	324.4	Total	324.4
Age Group (Males)		*Females*	
Child	172.9	Regular employed in agriculture	348.1
Young	275.1	Regular employed in Industry	160.3
Aged	368.8	Regular employed in services	579.3
Old	213.9	Casual labour in agriculture	140.0
Total	315.0	Casual labour in Industry	187.3
		Casual labour in services	182.9
		Total	164.8

The size of landholding does have negative association with wage earnings, which might be explained by multiple works undertaken by landholders and also due to working within the villages for neighbouring farmers, for which they get less than market wages. And many a time, these landholders work in neighbouring farms through mutual exchange of work in peak seasons, for which they don't get any wages directly. These workers work most of the time as self-employed, for which they cannot get any wages, and spend very little time as casual or regular employed, for which they get wages. Because of these reasons, their wage earnings are less, compared to those of the landless who depend exclusively on wage labour. All educational levels have positive signs, and the magnitudes and the levels of significance increase as one goes to higher educational levels, which is in agreement with human capital theory. For similar reasons, age also has a positive association with wages. Workers belonging to female headed households and the scheduled caste households have exhibited significantly negative relation to wages; however, workers belonging to non-Hindu households have a negative but insignificant coefficient. Workers with regular employment in industry and services and those with casual employment in industry do have statistically significant positive association with wages (Table 8).

Table 8. Determinants of Weekly Wage Levels Among Rural Workers in Rural Andhra Pradesh

	All Wage Labour			Regular Employed in Non-Agriculture		Casual Labour in Agriculture	
	Regression Coefficient	t- statistics		Regression Coefficient	t- statistics	Regression Coefficient	t- statistics
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(Constant)	146.07	4.53	(Constant)	-697.2	-2.1	99.9	8.2
Age Group	42.76*	6.63	Age Group	266.9*	6.7	2.1	0.9
Log-land	-4.72*	-2.73	Log-land	-9.8	-1.0	-4.7*	-7.1
Educational level dummies			*Education level dummies*				
Below primary	-0.63	-0.05	Below primary	27.1	0.3	2.7	0.6
Primary	12.37	0.82	Primary	65.4	0.7	9.1	1.5
Middle & secondary	56.09*	4.37	Middle & secondary	181.8*	2.7	14.7*	2.6
Higher secondary	352.00*	13.19	Higher secondary	619.6*	7.3	14.9	0.8
Graduate &>	568.00*	23.38	Graduate &>	762.7*	10.2	31.6	1.1
Sex (male=0; female=1)	-88.99*	-11.93	SEX (male=0; female=1)	-152.5*	-2.8	-63.2*	-23.2
Social group							
Scheduled tribes	3.61	0.28	Scheduled Tribes	119.1	1.1	10.3*	2.3
Scheduled castes	-9.97	-1.29	Scheduled castes	-78.6	-1.3	7.7*	2.7
Religion (Hindu=0; non-Hindu=1)	-5.35	-0.42	Religion	0.89	0.4	1.23	0.5
Type of worker dummies			*Work status dummies*				
Regular employed in agriculture	59.53*	2.39	Additional work dummy	264.2	1.6	14.2	1.8
Regular employed in industry	106.92*	6.18	Alternate work dummy	-380.3*	-2.8	13.4	1.7
Regular employed in services	379.91*	23.29	Work intensity	45.9	1.2	25.5*	29.8
Casually employed in industry	72.95*	5.81					
Casual labour in services	49.88*	1.79					
Regional dummies							
Coastal	32.05*	3.25	Coastal	20.2	0.3	33.4*	8.7
Telangana	21.29*	2.17	Telangana	-21.1	-0.3	19.4*	5.1
R Square	0.46		R Square	0.36		0.4	
Adjusted R square	0.46		Adjusted R Square	0.34		0.4	
Total sample workers	4,382		Total sample workers	569		3,249	

* Indicates significance at 5 per cent level.

The above regression results are for all wage labourers; however, to estimate the differential impact of human capital and the influence of physical capital independently on two different types of wage labourers (i.e., casual labourers in agriculture who do not require much human capital, and those with regular employment in non-agricultural sector who require additional human capital), the study runs two separate regressions for casual labourers in agriculture and those with regular employment in non-agricultural sector. As expected, returns to increase in educational levels are high in regular employment in non-agricultural sector for all educational levels from middle up to graduate levels. However, among casual labourers, only middle educational level has a statistically significant positive association with wage rates. This is also in confirmation with earlier findings (See, Fatchamps and Agnes [1998] for rural Pakistan, and Yang [1997, Pp. 613-32] for rural China). The wage rates of casual labourers are related to education up to upper primary level only. Beyond upper primary level, the casual labour is unlikely to benefit from education. However, the significant positive association of wage rates with educational levels among the regular employed is an indicator that rural non-farm sector provides opportunities for educated workers to improve their wage earnings. These results also confirm the conclusion of earlier studies that an important way to enhance wages/earnings of educated workers in rural areas is to increase the non-agricultural and regular employment options in rural areas.

VI. FACTORS INFLUENCING PART-TIME/ FULL-TIME POSITION OF WORKERS (BINARY LOGIT MODEL)

NSSO measures quality of employment by two ways (i) visible underemployment, where a worker is available for work for shorter reference period.

It is measured by cross classifying persons by their a) usual and current weekly statuses, b) usual and current daily statuses and c) current weekly and daily statuses, and another type of under-employment is (ii) invisible underemployment, is a proportion of the usually employed who are available for additional /alternative work, provides, by and large, an overall share of the employed who do not have enough work and/or not having enough income from their existing employment.

In our analysis the workers who are categorized as employed according to usual principal status, but available for additional/alternate work (invisible underemployment) are treated as part-time workers and who are not available for additional/alternate work are treated as full-time workers. Accordingly, we have constructed a binary variable such that those available for additional/alternate work=1; not available = 0.

As expected, income, size of land holding, regular employment in non-agriculture are negatively associated with part-time employment against full-time employment. On the other hand, the probability of the self-employed in agriculture being engaged in part-time work is higher than that of their being engaged in full-time work. Surprisingly, workers with technical education are more likely to be part-time employees. Probability of women workers to be employed as part-time workers is higher than that of the male workers. The probability of the Telangana and Coastal regions workers to be employed as part-time worker is higher compared to that of the workers in Rayalaseema region.

Table 9. Factors, Which Influence Time Status of Workers (part time/full time workers)

(1)	B (2)	S.E. (3)
Constant	-4.234*	0.59
Income (Rs)	-0.002*	0.01
Sex of head male 1; female=2	-0.028	0.19
Land holding (ha)	-0.539*	0.08
Married =1; unmarried =2	0.211	0.15
Technical educated dummy	0.919*	0.41
Male=1; female=2	-0.245*	0.11
Age (in years)	-0.009	0.01
Coastal region dummy	1.503*	0.22
Telangana region dummy	1.108*	0.22
Self-employed in agril. dummy	0.694*	0.13
Regular employed in non-agril dummy	-0.382	0.27
Casual employed in agril. dummy	0.000	0.11
Below primary dummy	0.085	0.15
Primary dummy	-0.026	0.19
Middle & secondary dummy	-0.023	0.17
Higher secondary dummy	0.021	0.41
Graduate & above dummy	0.699	0.36
Scheduled tribe dummy	0.305*	0.15
Scheduled tribe cast dummy	0.103	0.12

CONCLUSION

The study examines the interrelation between the type of employment among the rural male workers and the other socio-economic and regional factors of the workers. In rural Andhra Pradesh, the share of the self-employed in agriculture is 43 per cent and that of the casual labourers is 27 per cent. The next comes the category of the self-employed in industry, which is about 10 per cent. All other types of employment contribute less than or equal to five per cent each of the total employment. Given the very small share of non-agricultural and regular employment, there is an urgent need for structural diversification in rural workforce in Andhra Pradesh.

The educational level has a statistically significant impact on choice of non-agricultural employment, especially in services and regular employment, in rural Andhra Pradesh. There is a numerically significant increase in weekly wage rates of the non-agricultural workers as educational level increases, but there is no significant increase in weekly wage earnings of casual labourers beyond the upper primary level. There are numerically significant wage differentials across different types of employment, educational levels of workers, social groups, and among the male and female workers.

This point to the need to spread education at least up to primary level among large sections of the poor and casual labourers in rural areas, to immediately improve their wage levels and livelihoods. As odd ratios of upto primary educated persons increase by 2 to 3 times to be engaged in superior employment like self-employed and regular employed compared to casual labourer in agriculture. Also wage earnings also higher by 44 per cent for primary educated compared to illiterate on average.

As expected, those with a higher income or possessing a larger size of land holding or having regular employment in non-agricultural sector are less likely to be engaged in part-time employment than in full-time employment. On the other hand, the probability is higher for the self-employed in agriculture to be engaged in part-time work rather than in full-time work. Surprisingly, the workers with technical education are more likely to be part-time employees. The probability of women workers being employed as part-time workers is higher than that of the male workers.

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SAVING, INVESTMENT AND INTEREST RATES: EXPLORING THE LONG-TERM RELATION UNDER FINANCIAL REPRESSION AND LIBERALISATION IN INDIA

D. Tripati Rao

The paper examines long-term relations among saving, investment, and interest rates during the periods of financial repression, and financial liberalisation in India. We find that interest rate movements are non-responsive to the deviations of lending flows from savings flows. The examination of causal relation between saving and lending shows that there is no support to the view that saving flows determine or cause lending flows; rather, in the financially deregulated post-reform India, it is found that the causality, in fact, runs from lending to saving flows. Finally, the existence of interest rate rigidity or financial inefficiency even in a deregulated regime suggests that financial market is yet to become sufficiently mature, and that the ability of higher interest rates to raise the rate of savings is rather limited. One can, alternatively, also interpret our empirical results in the light of an alternative theoretical framework, namely, the post-Keynesian approach that embeds liquidity preference of intermediaries as well as non-financial firms' behaviour and their interrelationship, financial institutional structure, and central bank policy as important determinants of the provision of credit and, hence, investment.

Key Words: Interest Rate, Savings, and Credit

I. INTRODUCTION

Financial sector reforms in India, in the main, focused on the relaxation of quantitative controls (progressive reduction of statutory liquidity ratios (SLR) and cash reserve ratios (CRR), easing of directed credit), and price controls (deregulation of interest rates), reforming the banking system, and developing the capital market. These measures were aimed at improving the functioning, competitiveness and efficiency of the financial markets, impinging on the behaviour of three crucial macro-monetary variables, viz., saving, investment, and the rate of interest. It would be of interest to examine the inter-relationship among these three variables during the post-liberalisation period, and compare the same with a longer-term analysis.

II. ANALYTICAL FOUNDATIONS

The first fundamental issue is: does saving respond positively to interest rate changes? Why total saving does not usually respond positively to interest rate changes is provided a theoretical justification in the literature. Economic theory predicts that given complete information, and with the absence of market imperfections, optimising agents smoothen their inter-temporal consumption with the result that movements in interest rates affect future consumption behaviour [Hall, 1978, Pp. 971-87]. However, a model in the optimising framework is not well supported by the empirical evidence [Taylor, 2000, Pp. 95-113]. Rather, empirically it is found that the periods, in which consumption is high relative to income, are typically followed by growth in income, suggesting that the 'excess sensitivity' of

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aggregate consumption expenditure to movements in income [Flavin, 1981, Pp. 974-1009] shows that the forward-looking consumers' knowledge of future income is reflected in current consumption [Campbell and Mankiw, 1989]. Expected changes in income are correlated with expected changes in consumption whereas expected real interest rates are not. This, in turn, implies that in periods of high interest rate, *other things remaining the same,* since consumption does not show much decrease, saving may not increase. In responding to interest rate movements, forward-looking agents (consumers) consume their permanent income, but are reluctant to substitute consumption inter-temporally in response to interest rate movements. So, their inter-temporal elasticity of substitution between consumption at different dates must be close to zero and, therefore, saving does not respond to interest rate variations.[1] The relationship between consumption (saving), income, and interest rate depends on the broader macroeconomic environment (for example, expected future income), and may not be stable over time [Campbell and Mankiw, 1989 and 1991, Pp. 715-21].

A second issue is to look into the relationship between saving and investment. In the classical framework, as interest rate is viewed as a reward for abstinence or thrift to the households, the higher the interest rate the greater the willingness to postpone their consumption. Hence saving rises whereas, investment expenditure, financed through loanable funds, is a declining function of the rate of interest. Hence, the interest rate is the variable that restores equilibrium between saving and investment. Higher saving rates, providing for higher supply of loanable funds and lowering the equilibrium interest rate become the wherewithal of investment, and low rates of saving act as a constraint on credit and hence on financing investment activities. The policy conclusion, then, is that measures that encourage domestic saving would yield the appropriate level of investment. However, both Keynes and Kalecki, rejecting the classical view, tried to establish the independence of investment from saving [Pollin, 1994]. They considered that investment is the independent or autonomous of the two, and saving adjusts to the given level of investment.

More recently, the new Keynesians, recognising the importance of imperfect information and the post-Keynesians, applying Keynes' postulate of fundamental uncertainty in the markets, underscore both the quality and quantity of credit as important determinants of the pace of investment [Dymski, 1994]. The heterodox monetary approach - the credit theory of money', emphasising the underlying institutional linkages between financial and non-financial economic activity in capitalist economies, is concerned with broad credit conditions - the amount of borrowing and lending. The modern financial system is flexible enough to accommodate the demand for credit. Investment demand generates a commensurate level of saving. The equilibrating mechanism between investment demand and the willingness to save is the level of aggregate income which is similar to the Keynesian view. In an open economy, the investment-saving gap or the current account deficit could be financed with matching international capital flows. It could be finance, not saving, that acts as a constraint on investment [Asimakopulos, 1986, Pp. 79-90].

Exploring the links between corporate saving and investment, Fazzari et.al [1998, Pp. 141-95] finds that under liquidity constraints, firms take recourse to saving only for financing investments. Hence, investment decisions should explain a substantial component of saving [Agosin, 2001, Pp. 503-16]. Firms are intrinsically guided not by prior saving but by their profit expectations and

credit availability for financing investment decisions. Financial savings translate into productive investments in a stable and conducive macroeconomic environment.

An increase in investment spending activates economic growth through the usual investment multiplier raising the level of income and hence, given the marginal propensity to consume, the level of saving. The increase in investment during the interregnum, that is, prior to the effective completion of the multiplier, can be financed by financial institutions. Especially, the private banking system as well as the central bank is capable of financing the growth in investment demand regardless of the preceding pattern of saving flows. Thus, the supply of credit to non-financial investors depends on the behaviour of the private banks and other financial intermediaries rather than on the ultimate savers. Minsky [1982] has shown how financial institutions may lead "the transition from a lower to a higher scale of activity" independent of household saving decisions and even of central banks' strategic intervention. Of course, all else being equal, an initial increase in investment will exert upward pressure on the interest rate. However, what is contested here is the existence of a quantum of prior saving flows that can counteract this upward interest rate pressure. We conjecture that, given a financial structure, there are numerous ways in which financial variables such as, central bank policy, bank and public's (non-financial businesses' and households') liquidity preference schedules and the innovative capacity of financial intermediaries will have a greater influence than saving in determining investment activity as well as the interest rate response to the rise in investment . In a nutshell, consumption (saving), lending and investment are linked to income not so much with interest rate movements.

III. EMPIRICAL ISSUES FOR EXPLORATION

The above account throws up some important empirical issues for exploration. Does prior saving act as a constraint on investment? If so, how far does saving influence the availability of credit and on interest rates? To what extent are lending flows independent of saving flows? If lending flows rise more rapidly than saving, for any increase in the demand for credit, to what extent is the level of interest rates affected? By virtue of established theory, interest rate levels will rise when lending grows more rapidly than saving. However, a more comprehensive thesis would be to investigate whether interest rate levels are a function of lending or saving flows or of changes in the macroeconomic environment, or both. Do business cycle phases influence interest rate levels? Do inflationary expectations affect interest rate movements? It would be interesting to observe these interrelationships among saving, lending and interest rates in the Indian economy not only for understanding the behaviour of these financial variables but also for drawing policy implications for meaningful monetary policy formulation in a deregulated regime.

IV. DEFINITIONAL ISSUES, MEASUREMENT DIFFICULTIES AND DATA SOURCES

A familiar set of measurement problems are encountered in testing the above propositions, given the data reporting and accounting system in India. Caution needs to be exercised with regard to the choice of variables to be employed. Since the issue is one of studying the observable relationship between the saving and lending behaviour of private domestic units and their influence on interest rate levels, the variables of interest would be private savings, private lending and the interest rate.[2] What is important here is which available measure of saving is appropriate for the analysis. We consider gross private saving *(gps)* as an aggregate measure, and in the disaggregated form, gross household saving *(ghs)* and

gross corporate saving *(gcs)*, for ensuring the robustness of the empirical relationship. The *gcs* includes economic depreciation allowances in it and hence in *gps*. As Pollin and Justice [1994] point out, this inclusion is important since depreciation allowances are a substantial source of funds, mainly taking the form of short-term deposits with intermediaries, thus contributing to their lending capacity. Moreover, depreciation allowances service wear and tear costs as also finance the capital stock. However, we also consider two private saving measures on a net basis, namely, net household saving *(nhs)* and net corporate saving *(ncs)*. We also look at household financial saving *(hfs)* since in India, unlike in the developed economies where corporate saving is the major constituent, household saving is the major component of total savings and within it household financial savings is an important portion. Moreover, our choice of the above variable is driven by important theoretical considerations. For, if saving influences lending flows, it is not total private saving but the financial form of saving that is the focal variable. After all, lending flows are financial flows. If domestic credit is the primary asset backing the monetary liabilities of the banking system, it is financial saving which indicates the extent to which the supply of credit given by the financial system can be increased [Fry, 1988]. And it is the financial saving which would be sensitive to interest rate movements. Also, since a substantial but not the full portion of household *physical* saving represents investment in own agricultural and other (unorganised) business by households, the direction of impact of increase in household physical saving on total lending flows would be ambiguous, depending on whether the increase in household physical saving in any particular year is due to household investment in own business or household saving in precious metals. We refer to various issues of the *National Accounts Statistics* (NAS) and *Central Statistical Organisation* (CSO) for collecting data on the above variables. As is well-known, these sources provide annual data for the financial years for the variables mentioned earlier.

The measurement difficulty extends, more importantly, to choosing an appropriate variable for capturing lending or credit flows. We do not have a good measure of credit availability in the system. Almost all the empirical studies conducted in India consider bank credit as a proxy for credit availability. This may not be a good measure for our empirical exercise since our objective is to capture how the structure, development, and the behaviour of financial institutions influence the provision of credit and, specifically the extent to which, through financial market practices, the provision of credit may become less dependent on the supply of private saving, to the extent that the quantitative expansion in the former in response to the latter (the corresponding (variable) multiplier, if one may think of it as such) may be influenced by the structure, development, and the behaviour of financial institutions. Therefore, we must define lending or credit flows in such a way that it captures the lending by all financial intermediaries as well of nonfinancial units The Reserve Bank of India (RBI) [2000] recently published a long time series of a consistent flow of funds account spanning the post-nationalisation period, i.e., 1951-52 to 1995-1996. Following the data reporting system in that source, we define lending or credit flows as the total loans and advances (*lad*) by private domestic units. It comprises (i) direct lending to the ultimate borrowers and (ii) indirect lending to the ultimate borrowers through financial intermediaries. The former is the loans and advances by households (*hhs*) and private corporate business (*pcb*) and the latter is the loans and advances by banks and other financial institutions (*ofi*). The variable can be derived by

netting out the loans and advances by the rest of the world and the government sector from the total loans and advances in the domestic economy.

It is constructed by summing the data on loans and advances from the *uses* column of the banking, *ofi*, *pcb* and *hhs* given in the *financial flows - instrument-wise* classification of the flow of funds account. The definition may not be able to capture the total financial flows in the form of lending which is channelled through the capital market. Deficit units have recourse to the mobilisation of resources by floating equities and surplus units purchase these equities as a form of investment. From the point of view of the system, such investment by surplus units can be viewed as one form of lending to deficit units. In order to capture these significant leakages from surplus units which the former definition of lending or credit flows may fail to do, we follow Pollin and Justice [1994]. This definition of aggregate lending (*agl*) by private domestic units includes the direct lending of private savers, their purchase of financial assets from nonfinancial units and the lending by domestic financial intermediaries to the ultimate borrowers. To avoid double counting, this definition of lending would then have to exclude the lending by private units to intermediaries. We measure the aggregate lending by private domestic units, in this wider sense, by adding up the data on (i) total financial flows from the banking and *ofi* to all other sectors, (ii) financial flows from *pcb* to government and *hhs*, and (iii) financial flows from *hhs* to *pcb* and government. In order to avoid double counting, we subtract from the above (i) financial flows from *pcb* to banks and *ofi*, and (ii) financial flows from *hhs* to banks and *ofi*. It is important to note here that *agl* thus includes lending by private domestic units and domestic financial intermediaries to the government and the rest-of the world sectors as well, i.e., in particular, it includes government borrowing too. The data is sourced from the uses column of the respective sectors as given in the financial flows - sector-wise classification of the flow of funds account.

Conventional wisdom is that, other things being equal, interest rates should rise when lending flows increase in relation to saving flows. This is because financial intermediates reduce their liquidity position as well as undertake risk while purchasing investor's bonds in anticipating that they can profitably sell the bonds at a future date. The empirical issue at hand is to observe whether interest rates rise for any increase in the lending-saving ratio (*ls*), and if they do, then to what extent they rise. More precisely, the hypothesis, as spelt out here, says that lending to saving ratio causes interest rates to move *in the same direction*. One can also formulate another hypothesis which says that an increase in the lending to saving ratio *lowers* interest rates through the advantages of financial intermediation such as pooling of risks, economies of scale, and asset transmutation. Obviously, distinguishing between these two hypotheses would require testing the *sign* of the relevant coefficients, and so, simple causality tests cannot distinguish between these two hypotheses.

Even assuming that variations in lending relative to the saving flows will affect interest rates, in order to derive more robust observable relationships, it is necessary to embed this hypothesis within a framework that takes into account the changes in the macroeconomic environment, phases of the business cycle, inflationary expectations and structural changes, if any. Therefore, we ask: Are interest rates significantly influenced by the ls ratio only, or do changes in the macroeconomic environment and structural changes significantly influence them. In order to provide evidence in this regard, the next task is to choose an appropriate observable

interest rate variable for the interest rate responsiveness to deviations of lending and saving flows.

We choose the inter-bank call money rate as the representative (short-term) interest rate (*ir*).[3] Generally, the representative interest rate should reflect returns on government securities to approximate the return on risk-less assets. However, money market rates also are used as the representative (short-term) real interest rates [Chadha and Dimsdale, 2000, Pp. 17-45] as they approximate marginal borrowing costs of the private sector though they include risk premium in comparison with government securities [Ford and Laxton, 2000, Pp. 71-94]. Recent studies on financial integration suggest that the Treasury bill rate and call money rate are highly correlated [Taylor, 2000, Pp. 95-113] and that changes in monetary policy have immediate effects on these segments of the financial market. The changes in the call money rate will adequately reflect underlying changes in the marginal cost of borrowing from the banking sector, the leading source of short-term finance to private corporate business. Banks and other financial institutions are major players both in the markets for money and credit. Also, an important consideration specifically for India is that the call money rate is the only interest rate variable determined by market forces throughout the pre 1990s[4] for which historical data are available. We make use of the RBI *Report on Currency and Finance* (various issues) and *Handbook of Statistics on the Indian Economy* [2001] for the data on interest rates.

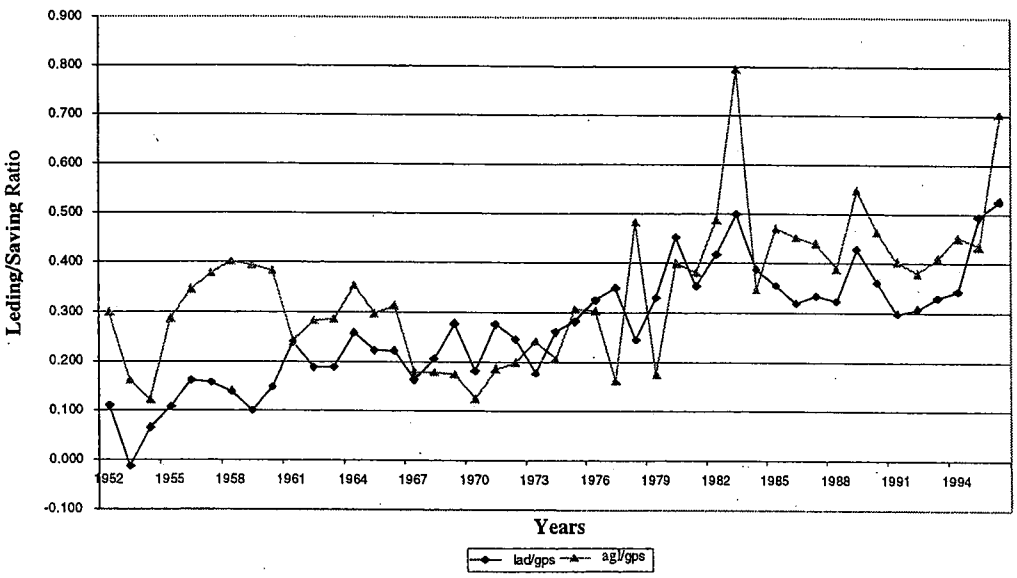
In order to test for the effects of variations in lending relative to the saving flows on interest rate levels, different *ls* ratios are constructed using six alternative measures of saving and two alternative measures of lending (see Section 5.1 and 6). Besides the control variables, macroeconomic aggregates, which are expected to exert an independent influence, are used. First, the rate of change in real gross domestic product (Δgdp) is used as a proxy for capturing effect of the business cycle phase. Generally, interest rates are viewed as pro-cyclical. With the expansion in economic activity, for any rise in income during the upward phase of the business cycle, firms expect a rise in aggregate demand, and therefore, the demand for credit goes up. At the cyclical peaks, in response to the expectations-driven investment boom, the monetary authority may take recourse to tight monetary policy, which is transmitted through the credit/interest rate channel to the financial markets. Conjointly, the interest rate is pushed up. Despite these policy interventions, lending may deviate from saving flows, as outlined earlier, as financial markets try to accommodate the rise in credit demand during the upturns. Therefore, it is important to disentangle the effects of business cycle fluctuations in order to see the independent effect of the *ls* ratio on the interest rate levels. The Indian economy has undergone structural and consequent policy changes over a long period. For instance, bank nationalisation in the seventies, the introduction of gradual financial sector reforms in the late eighties and the comprehensive real and financial liberalisation measures since 1991 may have had an impact on the behaviour of financial markets. Therefore, we adopt controlling techniques through the use of dummy variables to see whether structural changes have had any effect on the interrelationships among financial variables. The inflation rate (*inf*), measured here by the change in the implicit *gdp* deflator, is used as another control variable rather than directly deflating nominal interest rates. Here, the inflation rate is the realised ex post inflation rate but not a calculated measure of expected inflation. Since we use the call money rate, a representative short-term interest rate, the systematic errors are negligible in forecasting inflation over shorter time horizons, making actual inflation a good

proxy for expected inflation. We utilise various issues of the National Accounts Statistics for the data both on *gdp* and *inf*. We have also included the foreign lending flows to private domestic units as one of the control variables. This is included as a ratio of foreign funds available to private domestic units to the total lending flows (*fl*). Foreign funds may offset domestic credit constraints and thus counteract the interest rate pressure for any rise in the *ls* ratio. We measure *fl* by arriving at total financial flows from rest of the word to (i) banks and *ofis*, and (ii) *pcb* and *hhs*. The data is sourced from the *sources* column of the respective sectors as given in the *financial flows - sector-wise* classification of the flow of funds account. However, we do not expect *fl* to have any significant influence on the interest rate in India because the Indian economy was inward looking for long, subjected to various restrictions both on the inflow and the outflow of funds. All the same, we do not want to prejudge the effect. We have used annual time series data from 1951-52 to 1995-1996 first to overcome the unavailability of high frequency monthly data. Secondly, our interest is in the long-term equilibrium relationship among these macroeconomic aggregates, saving, lending and the interest rate, irrespective of the structural change in the macro economy.

V. ECONOMETRIC METHODOLOGY AND RESULTS

A simple plot of the broadest measures of the *ls* ratio (*lad/gps* and *agl/gps*) shows that though both have been growing over time, their relationship is not stable with their rates of growth varying cyclically and over the long period. Looking at both the ratios, lending as a percentage of saving flows, on an average, increased from 11 and 31 during the sixties to 38 and 46 in the nineties. The increasing trend that started in the seventies with the nationalisation of banks reached a peak in the first half of the eighties, whereas in the late eighties and early nineties, though it remained at higher levels in comparison with the earlier period, a moderately declining trend could be discerned with occasional upturns, in spite of financial sector reform measures.

Trends in Domestic Private Lending to Savings



With these simple observations, we proceed to investigate the causal linkages between lending and saving flows, employing time series techniques.

V.1 Unit Root Tests

In order to explore the relationship between saving and lending behaviour, we begin with the test of the time-series properties of the data. The Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) unit root tests are employed to establish that the concerned series is I(0) and the order of the series is the same. However, the distribution theory supporting the Dickey-Fuller test assumes that the errors are statistically independent and have a constant variance. Since long time series data is subjected to distributional changes, the alternative Phillips and Perron [1988, Pp. 335-46] (PP) unit root test would be more suitable. PP developed a generalisation of the Dickey-Fuller procedure. While applying PP test, it is not required that the distribution term be serially uncorrelated or homogeneous. Instead, the PP test allows the disturbances to be weakly dependent and heterogeneously distributed. Hence, it allows for an adjustment to account for heterogeneity in the error process.

Following the PP procedure, we have carried out the unit root tests and the results are reported in Table 1.

Table 1. PP Unit Root Tests

Variable	Equation Specification and Phillips-Perron t-statistics		Statistical Inference
	Constant but no trend	Constant and trend	
(1)	(2)	(3)	(4)
gps			
* Log Levels	-0.171	-3.126	Non-Stationary => I(1)
* First Difference	-6.646	-6.552	
ghs	-0.466	-3.767	
* Log Levels			Trend Stationary => I(0)
gcs			
* Log Levels	-1.746	-2.209	Non-Stationary => I(1)
* First Difference	-7.697	-7.655	
hfs			
* Log Levels	-3.626	-8.106	Trend Stationary => I(0)
nhs			
* Log Levels	-0.753	-4.906	Trend Stationary => I(0)
ncs			
* Log Levels	-1.957	-3.948	Trend Stationary => I(0)
lad			
* Log Levels	-1.557	-5.987	Trend Stationary => I(0)
agl			
* Log Levels	-0.017	-3.853	Trend Stationary => I(0)

Notes: 1. All the variables are measured in real terms using the implicit GDP deflator at 1993-94 prices.
2. All the variables are expressed in natural logarithms.
3. The 95 per cent critical value for the PP t-statistics is -2.9286 and -2.303 for the regression with constant but no trend and -3.5136 and -3.5162 for the regression with constant and trend for all the variables in their log levels and first differences respectively, except for *lad*. Since the *lad* contained a negative value in the year 1952-53, the stationarity test was conducted for 1953-54 to 1995-96. The 95 per cent critical value for the PP t-statistics is -2.9320 for the regression with constant but no trend and -3.5189 for the regression with constant and trend for the variable *lad*.
Source: *National Account Statistics*, CSO, Various Issues.
Flow of Funds Account, RBI, August 2000.

The PP unit root tests for stationarity show that different measures of saving and lending are of different order of integration. The gps and gcs are non-stationary with I(1) time series properties while all other saving and lending flow measures are stationary or I(0) variables. Since both the measures of lending as well as most of the saving measures are stationary, it is not possible to run the long-run tests for cointegration. In such cases, we need to employ short-run causality tests in the Granger-causality framework.

V.2 Causality Analysis

We employ Granger's Block Causality test in a bivariate vector autoregressive (VAR) framework under the null hypothesis of 'no block causality' between saving and lending flows. The multivariate generalisation of Granger causality test is called a 'block causality' test [Enders, 1996]. We compute the log-likelihood ratio statistic for testing the null hypothesis that the coefficients of a subset of jointly determined variables in the VAR are equal to zero. This statistic under the null is asymptotically distributed as the chi-square (CHSQ) variate. This test provides a statistical measure of the extent to which lagged values of a set of variables are important in predicting another set of variables once the lagged values of the latter are included in the model. It may be noted that the Granger non-causality test may give misleading results if the variables in the VAR contain unit roots. Therefore, we include the first differences of all those saving measures which are I(1). Before conducting the VAR exercise, the selection of the order of the VAR is important, since there is a size-power trade-off depending on the order of augmentation used to deal with the problem of residual serial correlation. For detecting the true order of augmentation, which is not known a priori, we have used appropriate model selection criteria of maximising the Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC). It may so happen that different model selection criteria lead to different models and there is a conflict between the two criteria. The SBC dominates the AIC since the SBC leads to a parsimonious model. Once we have obtained the optimal order of the VAR as one (1) on the basis of the SBC in all the cases, we proceed to test the null hypothesis of Granger non-causality of a particular variable for another variable, using this order of lags. The computed CHSQ test statistic for the null hypothesis of no causation running from saving and lending variables and vice versa is given in Table 2.

These results robustly fail to reject the null hypothesis of no causation running from different saving and lending flows and vice versa. Only in the case of *hfs* and *ncs* is there unidirectional Granger causality running from *hfs* to *lad* (weakly) and *agl*, and *ncs* to *agl*. It is expected that financial savings influence lending flows; for example, the corporate sector takes recourse to borrowings when the corporates find decline in retained savings. But since total private savings are not showing any causality, therefore, we may infer that lending flows are not directly dependent on saving flows, but central bank policy and the financial institutional structure may have influenced the lending flows, the former, in turn, being influenced by the macroeconomic environment.

Table 2. Test of Granger's Block Causality in a VAR Framework under the Null Hypothesis of 'No Block Causality'

Hypothesis X causes Y (X → Y) (1)	CHSQ Test Statistic (p) (2)	Reject/Do not Reject Null Hypothesis (3)	Statistical Inference (4)
Δ *gps* → *lad*	1.9228 (0.166)	Do Not Reject	No Causality
lad → Δ *gps*	0.22108 (0.638)	Do Not Reject	
Δ *gps* → *agl*	0.12385 (0.725)	Do Not Reject	No Causality
agl → Δ *gps*	0.13640 (0.907)	Do Not Reject	
ghs → *lad*	0.68347 (0.408)	Do Not Reject	No Causality
lad → *ghs*	0.69924 (0.403)	Do Not Reject	
ghs → *agl*	0.95506 (0.328)	Do Not Reject	No Causality
agl → *ghs*	0.45515 (0.500)	Do Not Reject	
Δ *gcs* → *lad*	1.7259 (0.189)	Do Not Reject	No Causality
lad → Δ *gcs*	0.24948 (0.617)	Do Not Reject	
Δ *gcs* → *agl*	1.4062 (0. 236)	Do Not Reject	No Causality
agl → Δ *gcs*	0.31192 (0.577)	Do Not Reject	
hfs → *lad*	2.5845 (0.108)	Reject	*hfs* Granger causes *lad*
lad → *hfs*	0.036078 (0.849)	Do Not Reject	
hfs → *agl*	5.6160 (0.018)	Reject	*hfs* Granger causes *agl*
agl → *hfs*	0.11357 (0.736)	Do Not Reject	
nhs → *lad*	0.29305 (0.588)	Do Not Reject	No Causality
lad → *nhs*	0.86317 (0.353)	Do Not Reject	
nhs → *agl*	0.98677 (0.321)	Do Not Reject	No Causality
agl → *nhs*	0.97397 (0.324)	Do Not Reject	
ncs → *lad*	0.073962 (0.786)	Do Not Reject	No Causality
lad → *ncs*	1.8254 (0.177)	Do Not Reject	
ncs → *agl*	5.6161 (0.018)	Reject	*ncs* Granger causes *agl*
agl → *ncs*	0.11357 (0.736)	Do Not Reject	

Notes: 1. All the variables are in real terms, deflated by the implicit GDP deflator at 1993-94 prices.
2. All the variables are in natural logarithms.
3. The figures in the parenthesis are probability values.
4. The estimation is based on 43 observations from 1953-54 to 1995-96 except for Δ *gps* and Δ *gcs* for which the estimation is based on 42 observations from 1954-55 to 1995-96.
5. In the construction of VAR, the deterministic component contained an intercept and trend for all the variables taken in log levels except for the first difference variables in which case the deterministic component contained an intercept only.
Source: Same as Table 1.

VI. LENDING, SAVINGS AND INTEREST RATES

Following the general to specific modelling approach, we formulate a fairly unrestricted dynamic model in an autoregressive distributed lag (ADL) form, which is subsequently tested, transformed through testing of various linear and nonlinear restrictions and reduced in size by imposing a number of test restrictions that the data allows and that also would be consistent with an economic-theoretic interpretation [Charemza and Deadman, 1992; Hendry, 1995]. The ADL model has a number of advantages over the traditional models. It minimises the possibility of estimating spurious relations while retaining long run information [Hendry, 1995]. Moreover, it provides for estimating lagged effects without arbitrarily constraining the lag structure a priori. In the present exercise, Δ *ir* level is regressed upon its own lags, *ls* ratio, Δ *gdp*, Δ *inf* and *fl* which is written as follows:

$$\Delta ir = \alpha_1 + \sum_{i=0}^{n} \psi \Delta ir_{t-i} + \sum_{i=0}^{n} \theta ls_{t-i} + \sum_{i=0}^{n} \phi \Delta gdp_{t-i} + \sum_{i=0}^{n} \varphi \Delta inf_{t-i} + \sum_{i=0}^{n} \eta fl_{t-i}$$

As pointed out earlier, for detecting the true order of augmentation, which is not known a priori, we have used the appropriate lag length specific to each variable is selected using the SBC criterion since the SBC criterion leads to a parsimonious model. A parsimonious equation is further obtained by progressively removing explanatory variables with insignificant coefficients. As expected, the *fl* variable was found to be totally insignificant in all the estimated equations and

hence it is dropped in the final estimation. We have also tried to measure the broad effects of structural change in financial markets on the saving, lending and interest rates relationship by introducing dummies, one for the seventies and the other for the late eighties, but both the dummies turned out to be insignificant. The final parsimonious estimated equations, together with a set of commonly used diagnostic statistics are reported in Tables 3 to 14. The long-run elasticities relating to the key explanatory variables computed from the estimated equations are also given. As reported, these equations pass all diagnostic tests[5] confirming that all the regression estimations follow the classical normality assumptions and hence the results are free from bias.

Table 3. Influence of *ls* Ratio on *ir* Levels

Autoregressive Distributed Lag Estimates
Dependent Variable is Δ *ir*
42 Observations used for estimation from 1954-55 to 1995-96

Explanatory Variables (1)	Coefficient (2)	t-Ratio (Probability) (3)
Δ *ir*(-1)	0.185	1.319 (0.20)
Δ *ir*(-2)	-0.637	-4.883 (0.00)
Δ *ir*(-3)	-0.335	-1.943 (0.06)
ls (*lad/gps*)	-0.061	-1.913 (0.06)
Δ *gdp*	0.072	0.787 (0.44)
Δ *gdp*(-1)	0.347	3.490 (0.00)
inf	0.200	3.161 (0.00)

$R^2 = 0.65$, $\bar{R}^2 = 0.57$, S.E. = 1.64, F(7,34) = 8.89, mDW-Statistic = 2.11 LM(Residual Serial Correlation) - F(1,33) = 0.49, RESET- F (1, 33) = 0.127(0.72), JBN- χ^2 (2) = 0.009(0.99), LM(Heteroscedasticity)-F(1,40) = 0.791(0.38)
Estimated Long Run Coefficients
Dependent Variable is Δ *ir*

Explanatory Variables	Coefficient	t-Ratio (Probability)
ls (*lad/gps*)	-0.034	-1.903 (0.066)
Δ*gdp*	0.234	2.297 (0.028)
inf	0.111	2.859 (0.007)

Notes: 1. Residual serial correlation is based on the Lagrange multiplier test.
2. RESET test is the Ramsey test for functional form misspecification, which uses the square of the fitted values.
3. JBN - Jarque-Bera test for the normality of residuals is based on a test of skewness and kurtosis of residuals.
4. LM test for heteroscedasticity is based on the regression of squared residuals on squared fitted values.
5. The rate of inflation is computed from the GDP implicit deflator, as mentioned in the text.
6. The interest rate is weighted average of call money rate in percentage.
Source: Same as Table 1

Table 4. Influence of *ls* Ratio on *ir* Levels

Autoregressive Distributed Lag Estimates
Dependent Variable is Δ *ir*
42 Observations used for estimation from 1954-55 to 1995-96

Explanatory Variables (1)	Coefficient (2)	t-Ratio (Probability) (3)
Δ *ir*(-1)	0.189	1.339 (0.19)
Δ *ir*(-2)	-0.642	-4.857 (0.00)
Δ *ir*(-3)	-0.391	-2.200 (0.03)
ls (*lad/hfs*)	-0.022	-1.784 (0.08)
Δ *gdp*	0.031	0.367 (0.72)
Δ *gdp*(-1)	0.316	3.364 (0.00)
inf	0.177	3.021 (0.00)

$R^2 = 0.64$, $\bar{R}^2 = 0.57$, S.E. = 1.65, F(7,34) = 8.72, DW-Statistic = 2.01 LM(Residual Serial Correlation) - F(1,33) = 0.009(0.92), RESET- F (1, 33) = 0.102(0.75), JBN- χ^2 (2) = 0.225(0.88), LM(Heteroscedasticity)-F(1,40) = 0.716(0.40)
Estimated Long Run Coefficients
Dependent Variable is Δ *ir*

Explanatory Variables	Coefficient	t-Ratio (Probability)
ls (*lad/hfs*)	-0.012	-1.838 (0.08)
Δ*gdp*	0.188	2.123 (0.04)
inf	0.096	2.785 (0.01)

Notes: The same as Table 3
Source: The same as Table 1

Table 5. Influence of *ls* Ratio on *ir* Levels

Autoregressive Distributed Lag Estimates
Dependent Variable is Δ*ir*
42 Observations used for estimation from 1954-55 to 1995-96

Explanatory Variables (1)	Coefficient (2)	t-Ratio (Probability) (3)
Δ *ir*(-1)	0.388	3.116 (0.00)
Δ *ir*(-2)	-0.758	-5.798 (0.00)
ls (*agl/gps*)	-0.048	-2.174 (0.04)
Δ *gdp*	0.067	0.755 (0.46)
Δ *gdp*(-1)	0.329	3.569 (0.00)
inf	0.162	2.902 (0.00)

$R^2 = 0.62$, $\bar{R}^2 = 0.56$, S.E. = 1.67, F(6,35) = 9.65, DW-Statistic = 2.08 LM(Residual Serial Correlation) - F(1, 34) = 0.205(0.65), RESET - F (1, 34) = 0.122(0.73), JBN - χ^2 (2) = 2.389(0.30), LM(Heteroscedasticity)-F(1,40) = 0.803(0.37)

Estimated Long Run Coefficients
Dependent Variable is Δ *ir*

Explanatory Variables	Coefficient	t-Ratio (Probability)
ls (agl/gps)	-0.035	-2.145 (0.04)
Δ*gdp*	0.288	2.367 (0.02)
inf	0.119	2.609 (0.01)

Notes: The same as Table 3
Source: The same as Table 1

Table 6. Influence of *ls* Ratio on *ir* Levels

Autoregressive Distributed Lag Estimates
Dependent Variable is Δ *ir*
42 Observations used for estimation from 1954-55 to 1995-96

Explanatory Variables (1)	Coefficient (2)	t-Ratio (Probability) (3)
Δ *ir*(-1)	0.259	1.796 (0.08)
Δ *ir*(-2)	-0.720	-4.951 (0.00)
Δ *ir*(-3)	-0.381	-2.132 (0.04)
ls (agl/hfs)	-0.001	-2.125 (0.04)
ls(-1) *(agl/hfs)*	-0.001	-0.145 (0.89)
ls(-2) *(agl/hfs)*	0.226	2.552 (0.02)
Δ *gdp*	0.025	0.297 (0.77)
Δ *gdp*(-1)	0.223	2.576 (0.01)
inf	0.150	2.941 (0.01)

$R^2 = 0.70$, $\bar{R}^2 = 0.62$, S.E. = 1.56, F(9, 32) = 7.50, DW-Statistic = 1.75 LM(Residual Serial Correlation) - F(1, 31) = 1.212(0.28), RESET - F (1, 31) = 0.246 (0.88), JBN - χ^2 (2) = 0.850(0.65), LM (Heteroscedasticity) - F(1,40) = 0.282 (0.60)
Estimated Long Run Coefficients
Dependent Variable is Δ *ir*

Explanatory Variables	Coefficient	t-Ratio (Probability)
ls (agl/hfs)	0.0003	0.041 (0.97)
Δ *gdp*	0.135	1.674 (0.10)
inf	0.081	2.649 (0.01)

Notes: The same as Table 3
Source: The same as Table 1

We report above equations using selected saving and lending measures (refer to Section IV for the construction of and motivation for these measures); though equations using all constructed saving and lending measures were estimated.[6]

Almost all the estimated equations using different saving and lending measures, except for *agl/ncs* and *agl/nfs (not reported)*, robustly show that the *ls* ratio exerts downward pressure on the interest rate. That is to say, the increase in lending flows relative to saving flows does not influence the interest rate positively. In some of the estimated equations, though the *ls* ratios have statistically significant and positive influence, their magnitude is small implying that they have only a small influence on interest rate movements even when they have a positive influence on it. The *ghs* and *nhs* (for which equations are not reported here) and *hfs* have similar explanatory power as *gps* as they are the major components of it whereas the equations with *gcs* and *ncs (not shown)* do not explain much of the interest rate movement. Rather, the changes in the macroeconomic environment, accounting for the phase in the business cycle and inflationary expectations, significantly and substantially explain the interest rate movements. The income variable, lagged Δ *gdp*, turned out to be the major variable in all the estimated equations. As firms expect an increase in demand in the near future, they will demand higher credit to carry out their investment activities. Interest rates are pushed up since it takes time for the investment multiplier to fructify and, given the marginal propensity to consume, savings to accumulate. So also *inf* is found to be a significant and a positive influence on interest rate movements. Surplus units, lenders, take inflationary expectations into account in fixing the price of credit, the interest rate. It is also observed that the lagged interest rate, mostly the second and third lags, exerts substantial negative influence on its own movement. The significance of self-lags explaining the trajectory of a variable is the interest rigidity in the system. This is not surprising since our exercise is confined mostly to a prolonged period of an administered and highly controlled financial regime. For the most part of the sixties, seventies and till the early eighties, the captive financial market was shallow and underdeveloped both in terms of the volume of transactions and the number of financial market participants, and the lack of financial institutions and instruments, the presence of which would

have ensured both the quantity and flow of credit. Moreover, though the estimation process qualified parameter stability tests, it must be recognised that the empirical exercise spans a long time period over which Indian economy has been subjected to many structural changes as well as policy shocks such as plan holidays, oil shocks, foreign exchange crises and commencement of economic reforms in the recent years. This may possibly account for the very low power while conducting the t-tests. The question that will be asked is: Since the above empirical exercise mainly covered primarily the pre-reform administered regime, how can the statistical exercise be justified as a reflection of the equilibrium functional relationship between saving, lending and the interest rate? In such an environment, it is a complex task to establish that the regulated regime is not inconsistent with market signals. Therefore, to make the results robust, it would be useful to extend the empirical exercise explicitly to the reform period, notwithstanding the limitation of a short period of time, data lags and unavailability and the gradual introduction of market-oriented policy measures.

VI.1 Sub-Period Analysis

The Indian financial sector has been subjected to considerable liberalisation since the late eighties with the introduction of new financial instruments and institutions. The money market developed structurally since 1989, subsequent to the broadening of the participation of entities and with the introduction of more liquid instruments, such as CDs (in 1989) and CPs (in 1990). The government securities market developed to activate the Treasury bills market with the introduction of new instruments of 364-day Treasury bills and 91-day Treasury bills in April 1992 and January 1993, respectively. Since 1992-93 the market borrowing programme for the central government in dated securities has been put through an auction process. Repos for short-term liquidity management were introduced in December 1992. India moved to a market-based exchange rate system in March 1993. As outlined earlier, banks and *ofi* were granted considerable scope for portfolio management. Given these developments, we conduct our empirical test on the observable relationship between saving, lending and the interest rate for the period April 1993 to March 2001. The data on the concerned variables is available in a consistent format since April 1993. Since it is too short a period to conduct time series analysis using annual data, we resort to high frequency monthly data.

Due to the paucity of high frequency data on *gps*, we have to settle on a proxy. We could derive two alternative financial forms of savings that measure the total saving channelled via financial assets. Financial saving as a flow is measured by the change in the stock of monetary assets, where monetary assets include short- term banking instruments such as Treasury bills and other government bonds and commercial paper and deposits, long-term banking instruments and government bonds. It also includes currency with the public and demand and time deposits. For empirical purposes, we derive a financial saving (*fs*) measure using a new aggregate liquidity measure L_2 instead of the traditional M_3 money stock, which is more comprehensive in capturing financial flows. However, following Warman and Thirlwall [1994, Pp. 629-49], we net out currency with the public and demand deposits since it is not expected either that these add to the ability to create credit or that the demand for non-interest bearing assets is much sensitive to the rate of interest. The second financial saving measure is the monthly accretion (variation) to the banks' aggregated deposits (*bd*). In the absence of any good measure for lending flows, we choose monthly variation in bank credit (*bc*) as our measure of lending flows. As pointed out earlier,

bank credit is often considered a useful indicator of real sector activity in agriculture and industry. The data on the concerned variables is sourced from the *Handbook of Statistics on the Indian Economy,* Reserve Bank of India, 2001.

VI.2 Unit Root Tests

First we conduct the PP unit roots test for checking the order of integration of the data series, as shown in Table 15. Since we are working with monthly data we check for unit roots with seasonal adjustment as well. To net out monthly seasonal effect, we have incorporated seasonal dummies in the estimation, wherein each seasonal dummy has the value of unity in the month under consideration and zeros elsewhere, for ex Dummy 1 = 1 for January and zero for other months etc.

Table 7. PP-Unit Root Tests (Monthly Series for 1993:04 to 2001:03)

Variable Annual Flows	Equation Specification and Phillips-Perron t-statistics		Statistical Inference
	Constant but no Trend	Constant and Trend	
(1)	(2)	(3)	(4)
Fs	-8.717	-10.533	Stationary =>
* Levels	-10.940	-12.693	I(0)
* Seasonally Adjusted			
Bd	-10.565	-12.134	Stationary =>
* Levels	-10.940	-12.693	I(0)
* Seasonally Adjusted			
Bc	-10.491	-11.121	Stationary =>
* Log Levels	-11.729	-12.707	I(0)
* Seasonally Adjusted			

Notes: 1. All variables are in their real terms deflated by the WPI inflation rate at 1993-94 prices.
2. We have used the additive seasonal adjustment method since the some of the monthly variations contained negative values.
Source: *Handbook of Statistics on the Indian Economy,* Reserve Bank of India, 2001.

The PP unit root test results show that all the three saving and lending variables are stationary I(0) series both when seasonally unadjusted and adjusted. Therefore, we explore short-run Granger causality.

VI.3 Causality Tests

We again employ the Granger's Block Causality test in a bivariate (VAR) framework under the null hypothesis of 'no block causality' between saving and lending flows. The optimal order of the VAR obtained was one month for *bc* and *bd* and six months for *bc* and *fs*. We proceed to test the null hypothesis of 'no Granger block causality' between saving and lending measures.

Table 8. Test of Granger's Block Causality in a VAR Framework under the Null Hypothesis of 'No Block Causality'

Hypothesis X causes Y (X →Y)	CHSQ Test Statistic χ^2(p)	Reject/Do not Reject Null Hypothesis	Statistical Inference
(1)	(2)	(3)	(4)
bd →*bc*	0.377 (0.539)	Do Not Reject	*bc* Granger causes *bd*
bc →*bd*	3.051 (0.081)	Reject	
fs →*bc*	7.588 (0.270)	Do Not Reject	*bc* Granger causes *fs*
bc →*fs*	12.247 (0.057)	Reject	

Notes: 1. The figures in the parenthesis are probability values
2. The optimal lag length chosen as per the SBC criterion for BD and BC is 1 and for FS and BC is 6.
3. In the construction of VAR the deterministic component included an intercept and seasonal dummies for netting out seasonal influences.
Source: Same as Table 7.

The causality test shows that rather than saving determining lending flows, lending flows as proxied by bank credit Granger-cause both bank deposits and financial savings. This finding is consistent with the "credit endogenity"; reflecting Schumpeterian view of supply of credit highly elastic to credit demand at given interest rate. Loans create deposits when banks accommodate a higher demand for credit.

VII. LENDING, SAVINGS AND INTEREST RATES

In order to see the influence of the *ls* ratio on interest levels, we use the inter-bank call money rate as the representative short-term interest rate (*ir*). To explore the effects of variations in lending relative to the saving flows on interest rate levels, two ls ratios are constructed: (i) bank credit to bank deposits (*bc/bd*) and (ii) bank credit to financial saving proxied by new liquidity measure L_2 (*bc/fs*). The rate of change in industrial production (Δiip) is used as a proxy to control for the business cycle in order to examine the independent effect of the ls ratio on the interest levels after disentangling the business cycle effects. The inflation rate (Δcpi), the rate of change in the consumer price index for industrial workers (*cpi-iw*), is used as another control variable to isolate the effect of inflation. We do not have reported data on foreign lending with monthly frequency. Therefore, we use the change in net international reserves (net foreign exchange assets) of the banking sector as a proxy for foreign lending and this has been included in the estimation process as a ratio of foreign lending to total bank credit (*fl*). We also include the rate of change in the exchange rate (Δer), that is, in the nominal effective exchange rate (neer) of the Indian rupee, which is the index of the average with trade-based weights, of the 36-country bilateral exchange rates of the Indian rupee as an explanatory variable. It is expected that the market-determined exchange rate would influence the interest rate in the opposite direction. We have also created 11 seasonal dummies, where each seasonal dummy has the value of unity in the month under consideration and zeros elsewhere, to net out the monthly seasonal effect. Besides, we have introduced appropriate intercept dummies, 1994 M12 and 1995 M10 for *ls* (*bc/bd*) ratio and 1999 M1 for *ls (bc/fs)* ratio since these ratios displayed unusually high movements at these time points. We have accessed the data from the *Handbook of Statistics on the Indian Economy,* Reserve Bank of India, 2001. The ADL form could be represented as follows:

$$\Delta ir = \alpha_1 + \sum_{i=0}^{n} \psi \Delta ir_{t-i} + \sum_{i=0}^{n} \theta ls_{t-i} + \sum_{i=0}^{n} \phi \Delta iip_{t-i} + \sum_{i=0}^{n} \varphi \Delta cpi_{t-i} + \sum_{i=0}^{n} \eta fl_{t-i} + \sum_{i=0}^{n} \xi \Delta er_{t-i}$$

In addition, we have also added seasonal dummies and intercept dummies that were found to be significant in the estimation. The results are given in Tables 17 and 18.

Table 9. Influence of *ls* Ratio on *ir* levels

Autoregressive Distributed Lag Estimates
Dependent variable is Δir
90 observations used for estimation from 1993 M10 to 2001 M3

Explanatory Variables (1)	Coefficient (2)	t-Ratio (Probability) (3)
$\Delta ir(-1)$	-0.565	-7.030 (0.00)
$\Delta ir(-2)$	-0.376	-4.348 (0.00)
$\Delta ir(-3)$	-0.277	-3.106 (0.00)
ls (bc/bd)	0.005	2.540 (0.01)
Δiip	0.143	1.716 (0.09)
Δcpi	0.363	0.833 (0.41)
fl	-0.002	-1.414 (0.16]
fl(-1)	0.001	0.661 (0.51)
fl(-2)	-0.001	-0.686 (0.50)
fl(-3)	-0.001	-1.178 (0.24)
fl(-4)	-0.0003	-0.254 (0.80)
fl(-5)	-0.005	-4.507 (0.00)
Δer	0.680	2.432 (0.02)
$\Delta er(-1)$	-0.952	-3.448 (0.00)
Seasonal Dummy 7	-3.725	-3.131 (0.00)
Seasonal Dummy 9	3.536	3.258 (0.00)
Dummy 1994 M12	-330.517	-2.534 (0.01)
Dummy 1995 M10	21.131	3.496 (0.00)

$R^2=0.66, \bar{R}^2=0.57$, S.E. = 3.31, F(18, 71) = 7.65, DW-Statistic = 1.90 LM(Residual Serial Correlation) - F(12, 59) = 0.390(0.96), RESET - F(1, 70) = 1.165 (0.28), JBN-χ^2(2)=2.925(0.23), LM (Heteroscedasticity) - F(1,88)=1.756(0.24)

Estimated Long Run Coefficients
Dependent Variable is Δir

Explanatory Variables	Coefficient	t-Ratio (Probability)
ls (bc/bd)	0.002	2.436 (0.02)
Δiip	0.065	1.684 (0.10)
Δcpi	0.164	0.819 (0.41)
fl	-0.004	-2.397 (0.02)
Δer	-0.122	-0.682 (0.50)
Seasonal Dummy 7	-1.680	-3.099 (0.00)
Seasonal Dummy 9	1.594	3.102 (0.00)
Dummy 1994 M12	-149.050	-2.430 (0.02)
Dummy 1995 M10	9.529	3.258 (0.00)

Notes: The same as Table 3.
Source: The same as Table 15

Table 10. Influence of ls Ratio on *ir* Levels
Autoregressive Distributed Lag Estimates
Dependent variable is Δir
90 observations used for estimation from
1993 M10 to 2001 M3

Explanatory Variables (1)	Coefficient (2)	t-Ratio (Probability) (3)
$\Delta ir(-1)$	-0.579	-7.140 (0.00)
$\Delta ir(-2)$	-0.376	-4.349 (0.00)
$\Delta ir(-3)$	-0.310	-3.586 (0.00)
ls (bc/bd)	0.003	2.092 (0.04)
Δiip	0.110	1.306 (0.20)
Δcpi	0.465	1.073 (0.29)
fl	-0.002	-1.579 (0.12)
fl(-1)	0.002	0.131 (0.90)
fl(-2)	-0.001	-0.860 (0.39)
fl(-3)	-0.002	-1.576 (0.12)
fl(-4)	-0.003	-0.237 (0.81)
fl(-5)	-0.006	-5.105 (0.00)
Δer	0.641	2.316 (0.02)
$\Delta er(-1)$	-0.893	-3.201 (0.00)
Intercept	-0.701	-1.501 (0.14)
Seasonal Dummy 7	-4.104	-3.459 (0.00)
Seasonal Dummy 9	3.259	3.019 (0.00)
Dummy 1999 M1	9.309	2.412 (0.02)

$R^2 = 0.65$, $\bar{R}^2 = 0.57$, S.E. = 3.34, F(17, 72) = 7.870(0.00), DW-Statistic = 1.82 LM(Residual Serial Correlation) - F(12, 60) = 0.333(0.98), RESET - F(1, 71) = 1.155 (0.20), JBN-χ^2 (2) = 2.5203(0.28), LM (Heteroscedasticity) - F(1,88) = 1.645(0.19)

Estimated Long Run Coefficients
Dependent Variable is Δir

Explanatory Variables	Coefficient	t-Ratio (Probability)
ls (bc/bd)	0.002	2.064 (0.04)
Δiip	0.049	1.291 (0.20)
Δcpi	0.205	1.051 (0.30)
fl	-0.005	-2.929 (0.00)
Δer	-0.112	-0.638 (0.53)
Intercept	-0.310	-1.372 (0.17)
Seasonal Dummy 7	-1.812	-3.408 (0.00)
Seasonal Dummy 9	1.439	2.891 (0.01)
Dummy 1999 M1	4.110	2.342 (0.02)

Notes: The same as Table 3.
Source: The same as Table 7.

The empirical results suggests that in the deregulated regime though the variations in lending relative to the saving flows are seen to exert an upward pressure on interest rate levels both in the short-run as well as in the long-run, but the magnitude of the upward pressure is small. What is glaringly obvious is that even in the deregulated regime, the interest rate movement is negatively and substantially influenced by its own lags, suggesting interest rate rigidity in the system or financial inefficiency. Even more interesting is that the change in the domestic macroeconomic environment in the form of the business cycle and inflation do not have statistically significant positive influence on interest rate movements. The Δiip, though having a positive coefficient, weakly explains the change in interest rate both in the short- and long-run whereas it is statistically insignificant for *bc/fs* both in the short- and long-run in explaining the interest rate movement. The Δcpi was found to be, rather surprisingly, statistically insignificant though it contains a substantial positive coefficient in explaining interest rate movements both in the short- and the long-run in both the equations. In both the estimated equations, *fl* as well as Δer turn out to be the major behavioural variables explaining interest rate movements. For *fl* mostly the first and fifth lags are statistically significant with a negative coefficient in the short-run and, in turn, also significant in the long-run. The Δer substantially and statistically significantly explains the interest rate movements, but with an overall negative effect in the long-run. It has an instantaneous positive effect on the interest rate, which is more than countered by a subsequent negative effect thus resulting in an overall negative effect in the long-run. However, the effect turns out to be statistically insignificant in the long-run. How can such a result be rationalised? A combination of many factors may account for such findings.

Underlying the operation of some new monetary transmission channels, the evidence reflects the growing importance of the external factors in influencing domestic macroeconomic parameters in the short-run in the era of financial globalisation (external financial liberalisation). Due to the change in the use of monetary policy instruments from direct to indirect instruments, the monetary authority has lesser control over the interest rate and exchange rate variables, albeit with substantial quasi-fiscal costs, for instance, in sterilisation operations. Indeed, for the most part of the post-reform phase the central bank's monetary policy (interest rate policy) has been largely

influenced by the magnitude of capital flows and consequent exchange rate movement [Pattnaik and Mitra, 2001]. Nominal interest rates have been kept high in view of higher inflation rates in order to attract capital flows [Rao, 2001]. Recourse had to be had to sterilisation through open market operations (OMO), which resulted in gradual accretion of capital inflows into reserves without being absorbed in the domestic economy. Rao [2001] and Mishra [2000] describe the compelling but complex dynamics of central bank monetary management in the event of foreign exchange turbulence *vis-à-vis* domestic macroeconomic management. Using OMO for sterilisation has restrained domestic credit expansion. Further, an excessive focus on short-term monetary management to target the interest rate, coupled with prudential regulatory norms, contributed to a fall in the growth of credit.

Further, competition, opening up and an economic slowdown have driven down inflation (prices) boosting real returns on capital. But interest rates have remained high due to (i) the higher levels of market borrowing for financing the higher levels of the fiscal deficit [Mohan, 2000; Jha, 2002] due to the change in the fiscal stance from money financing to bond/debt financing, (ii) the consequence of increased government borrowing because of which banks, being loaded with NPAs, resort to risk-free government securities that offer market-determined interest rates [Bhattacharya and Sivasubramanian, 2001], because the central bank has imposed prudential regulatory norms with an emphasis on capital adequacy [Rao, 2001], without adequate structural reforms, especially legal ones, such as reforms of the laws relating to contract enforcement, bankruptcy and foreclosure, especially in the absence of speedy loan recovery mechanism, and (iii) the prevalence of high returns on contractual forms of savings, compulsory deposits, provident funds and small savings, which act as a floor, making the interest rates rigid downward [Lal, Bhide and Vasudevan, 2001].

Also, implicitly then, reduction of inflation is not going to reduce nominal interest rates but the removal of structural rigidities, management of capital flows, accommodative monetary policy and change in the fiscal stance are the required policies.

In spite of this, perhaps, the inflow of foreign funds, *by itself*, is still seen to lower interest rates or keep them from rising because of the increase in liquidity, resulting from incomplete sterilisation of the inflows.

In addition to the above considerations, there is the technical issue of the choice of variables such as representative interest rate and industrial production. In the absence of any other market determined interest rate for the longer period, call rate has been chosen as the representative interest rate. However, since the call rate represents the short-end of the market, it is too sensitive to changes in the exchange rates, and hence tends to be volatile in nature. Thus, unlike risk-less government securities, call rates carrying underlying riskiness of financial assets, are more influenced by external movements than domestic developments. As has been seen in our empirical results, exchange rate movements have an overweighing negative effect, though the overall long-term effect is statistically not significant.

Secondly, in the post-reform phase, economic growth has been led by rapid service sector growth, which now constitutes more than 54 per cent of the GDP. The industrial sector has not only declined as a component of GDP from around 24 to 21 per cent from 1990-91 to 2000-01, but also has stagnated since the mid nineties in the period under study, after attaining a double-digit growth during 1994-95 and 1995-96. In the absence of monthly data on either the service sector or agricultural sector growth, industrial growth becomes a poor proxy for capturing business cycle phases. It may have been possible to obtain a significant positive influence of income growth on interest rate movement in the post-reform phase had there been comprehensive monthly

data on services or agricultural sector growth. These developments might be regarded as an explanation for the counter-intuitive findings that bring out the lesser relevance of domestic macroeconomic aggregates like industrial growth and the rate of inflation in explaining movements in interest rate levels. Notwithstanding these limitations, the proposition, implied by our causality tests, is that neither domestic saving nor capital flows necessarily translate into higher lending flows.

The case for keeping nominal interest rates high has made borrowing abroad cheaper and more attractive. At the same time, large foreign capital inflows appreciate the real exchange rate and may squeeze industry and agriculture profits leading to defaults and a rise in bad debts. Further, freeing up interest rates and the relaxation of controls on credit allocation does not necessarily encourage intermediation except for increased activity in the market for short-term maturities. The growth of mutual funds, including the various debt funds, a consequence of these reforms, accompanied by the development of and exhilaration in the stock market is a case in point. The following well-known impossibility trilemma is involved. A country can maintain no more than two out of the three interconnected conditions: the exchange rate level (the exchange rate regime with a managed float), the interest rate level (below or above world market), and the rate of inflation. Of the exchange rate, interest rate or inflation something has to be given up in an open-economy regime. In other words, it is difficult to design a national policy capable of achieving domestic objectives, using traditional policy instruments such as interest rates, government expenditure and exchange rates, reconciling with trade and financial flows. Indeed, our empirical results have shown that interest rate movements have been influenced by exchange rate fluctuations rather than domestic macroeconomic developments such as, industrial growth and inflationary expectation. In defending exchange rates from short-term volatility, the monetary authority has to take recourse to sterilisation, which has immediately led to higher nominal interest rates, but has eventually reversed this movement due to the effect of increased liquidity, which appears not to be completely mopped up even after the sterilisation of capital inflows undertaken by the monetary authority.

VIII. CONCLUSION

The empirical inter-relationships among saving, investment and interest rates in India have been explored. First, irrespective of the chosen measure of saving and lending, our causality tests show that there is no support to the view that saving flows determine or cause lending flows, whereas the analysis of financially deregulated post-reform India clearly shows that the causality, in fact, runs from lending to saving flows. Second, the deviations of lending flows from savings flows are not exerting significant upward pressure on interest rate; rather, the interest rate movement is explained by domestic macroeconomic changes such as growth in GDP and inflationary expectation (as in the pre-reform period) or by external developments (as in the post-reform period). Third, the existence of interest rate rigidity even in a deregulated regime, which can be interpreted as a sign of financial inefficiency, suggests that financial markets are yet to become sufficiently mature.

It appears from our results of Section VI that the hypothesis as elaborated in Section III about an increase in the lending to saving ratio *lowering* interest rates through the advantages of financial intermediation such as pooling of risks, economies of scale, and asset transmutation is the one which is supported by the equations with annual data covering over four decades reported there. Such an analysis of the data over a long period can be expected to exhibit the effect of the process of financial development taking place over a long period. On the other hand, the result, presented in

section VII, based on monthly data over a relatively much shorter period of only a decade of experience with the de-regulated interest rate regime and concentrating only on the banking sector, has brought out the effect of stretching the credit deposit ratio of the banks on raising the interest rates.

The interpretation of our empirical analysis needs two qualifications. First, our analysis is based on long-term equilibrium relationship among these macroeconomic aggregates, saving, lending and the interest rate, during which there has been structural change in the macro economy. Therefore, it must be recognised that since, the pre-reform analysis covers over more than four decades, subjected to many structural changes as well as policy shocks; these might have possibly influenced the long-term relationship among the macroeconomic variables. Second, our use of call rate as a representative interest rate, which reflects the short-end of the market with excessive sensitivity and volatility, is based on the well-grounded supposition that they do reflect the movements in marginal borrowing costs of the private sector.

These findings support the Post Keynesian case of indirect and weak links between saving and lending flows, and modern financial markets able to, within wide limits, accommodate credit demand. In other words, as Earley [1994] argued, the conclusion is not that there is no relationship between saving and lending. Rather, past savings determine the extent of lending flows, but the channels of influence are indirect - the central bank's policy, the liquidity preference of intermediaries, and the non-bank public determine the relationship between saving and the provision of credit. That is to say, it is finance, not saving, that can constrain investment activities.

As seen from the post-reform Indian experience, since the monetary authority has its hands full managing the domestic economy, reconciling long-term credit management with short-term liquidity adjustment, and undertaking sterilisation to counter the volatile capital flows, a policy conclusion could be that monetary policy should be concerned not so much with inter-temporal price effects but with credit flow effects. Interest rates are not completely determined by the fundamentals of productivity and thrift, independent of monetary variables since translation of financial savings into lending flows depends on financial market behaviour, which is significantly influenced by monetary policy. The existence of interest rate rigidity suggests that financial sector reforms need to be broad based, inclusive of structural reforms. Till then, the ability of high interest rates to mobilise higher rates of savings may be found to be wanting.

NOTES

1. I am grateful to the anonymous referee for pointing out this important line of enquiry.

2. The interest rate may also be affected by public saving and public borrowing. However, in this study, we are looking at the behaviour of private saving and private borrowing for given public saving and public borrowing. To be sure, this implies using these two variables appropriately as additional variables in our equations as control variables. Perhaps, one could use an additional variable such as the ratio of aggregate borrowing of the government sector (from the uses side of the Flow of Funds Table) or aggregate saving of the government sector a (from the National Accounts) as an additional control variable. However, we have found it difficult to obtain consistent data on these variables over a long period. Indeed, it may be useful in future to link this study with the dynamics of public saving and public borrowing. Not doing this at present is a limitation of the specifications used for conducting the statistical tests in the present paper.

3. While it would make a better sense to use a relatively long-term rate, the difficulty in using long-term rates is that they were heavily regulated.

4. Though there was an upper ceiling of 10 per cent on call rates for some period, they are the most deregulated ones for most of the period and are therefore appropriate to understand private saving and lending behaviour, given that the changes in the call rates would eventually be reflected in the long-term rates provided the latter were not directly

regulated. Also it is observed that the call rates remained within the range of 10 per cent except for a year during this period.

5. Also, the estimation process qualified for the cumulative sum of squares test on the recursive residuals (CUSUM) and the CUSUMSQ test, confirming parameter stability over the estimation period.

6. Other estimated equations can be made available by the author, on request.

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APPENDIX I

(1)	*gps* in Crores (2)	*ghs* in Crores (3)	*gcs* in Crores (4)	*nhs* in Crores (5)	*ncs* in Crores (6)	*hfs* in Crores (7)	*Lad* in Crores (8)	*agl* in Crores (9)	*Call rate* (10)	*GDP* at Current Prices (11)	*GDP* at Constant Prices (1993-94) (12)
1951-52	719	583	136	336	80	14	79	215	1.73	10566	152979
1952-53	701	637	64	296	5	72	-9	113	1.88	10366	156960
1953-54	745	655	90	388	30	142	48	90	1.88	11282	166625
1954-55	837	719	118	435	50	282	91	240	1.88	10678	174745
1955-56	1180	1046	134	757	58	429	191	409	2.75	10873	180530
1956-57	1333	1178	155	810	71	333	210	507	3.22	12951	190578
1957-58	1118	997	121	578	28	291	156	450	3.07	13349	189960
1958-59	1156	1016	140	532	36	362	116	456	2.81	14874	203958
1959-60	1486	1301	185	807	66	433	221	571	2.86	15675	209408
1960-61	1535	1254	281	1774	140	456	369	372	4.24	17167	220560
1961-62	1601	1281	320	655	143	489	302	455	4.24	18196	228921
1962-63	1877	1533	344	904	140	499	356	537	4.16	19566	235834
1963-64	2012	1618	394	1013	143	743	520	712	3.87	22482	250208
1964-65	2264	1875	389	1170	96	714	505	674	4.01	26220	268821
1965-66	3007	2602	405	1726	94	1072	668	945	6.26	27668	262029
1966-67	3647	3223	424	2412	69	864	597	655	5.16	31305	261586
1967-68	3620	3210	410	2281	34	865	747	646	4.95	36649	281971
1968-69	3788	3349	439	2170	37	795	1053	663	3.75	38823	291759
1969-70	4989	4440	549	3075	127	919	907	623	4.30	42750	310847
1970-71	5306	4634	672	3388	200	1371	1466	988	6.38	45677	326925
1971-72	5988	5219	769	3856	256	1555	1476	1190	5.16	48932	332516
1972-73	6430	5624	806	3909	229	2128	1141	1565	4.15	53947	330594
1973-74	9068	7985	1083	6512	414	3612	2371	1877	7.83	65613	341050
1974-75	9545	8080	1465	6035	574	2374	2698	2934	12.82	77479	345101
1975-76	10826	9743	1083	7623	16	3918	3522	3292	10.55	83269	376731
1976-77	13030	11849	1181	9585	92	4852	4568	2102	10.84	89739	383163
1977-78	15767	14354	1413	11365	304	5853	3864	7598	9.28	101597	410873
1978-79	18667	17015	1652	13914	421	6658	6166	3274	7.57	110133	434437
1979-80	19088	16690	2398	12713	910	6081	8624	7636	8.47	120841	411663
1980-81	22207	19868	2339	16356	584	8610	7884	8474	7.12	143762	439201
1981-82	23785	21225	2560	15247	495	9614	9953	11576	8.96	168600	467139
1982-83	26196	23216	2980	15478	568	12739	13068	20833	8.78	188262	484217
1983-84	31419	28165	3254	20950	390	13294	12221	10911	8.63	219496	518491
1984-85	39107	35067	4040	22218	751	17879	13947	18407	9.95	245515	539874
1985-86	45221	39795	5426	27240	1387	18538	14466	20469	10.00	277991	570267
1986-87	50408	45072	5336	31728	593	23336	16893	22191	9.99	311177	597850
1987-88	65089	59157	5932	45278	798	26820	21094	25353	9.88	354343	623371
1988-89	79143	70657	8486	54509	2687	27183	33948	43339	9.77	421567	684832
1989-90	98800	86955	11845	74801	4653	37998	35761	45677	11.49	486179	728952
1990-91	125061	109897	15164	85669	5681	49640	37436	50579	15.85	568674	771295
1991-92	131040	110736	20304	98661	5781	62101	40332	49940	19.57	653117	778289
1992-93	151041	131073	19968	105439	9642	65367	49999	61988	14.42	748367	819318
1993-94	188176	158310	29866	129369	12838	94738	64680	85001	6.99	859220	859220
1994-95	234618	199358	35260	166372	14131	120733	115863	101878	9.70	1012770	924456
1995-96	274130	215588	58542	177296	31826	105166	144115	192401	17.73	1188012	995450

APPENDIX II

Month (1)	Aggregate Deposits in Crores (2)	Bank Credit in Crores (3)	IIP (4)	Inflation Rate (CPI) (5)	Call Rate (6)	NEER (7)	NFEA (8)	L_2 in Crores (9)
Apr-93	275502	155819	94.9	0.82	13.43	43.93	26425	391507
May-93	277019	155711	95.2	0.42	9.13	43.89	25235	394419
Jun-93	278389	154685	96.5	0.41	8.01	44.09	24503	395549
Jul-93	280023	154938	98.8	0.82	6.47	44.77	25757	398485
Aug-93	285331	151196	101.4	0.41	5.71	44.63	27349	401436
Sep-93	286408	151984	102.6	1.63	5.00	44.18	28673	405224
Oct-93	292456	156230	102.3	1.20	5.66	44.54	29683	409959
Nov-93	294020	156608	105.4	1.19	6.35	45.06	30742	416169
Dec-93	300619	158507	117.0	1.17	5.36	45.20	34308	421460
Jan-94	307393	162385	115.3	1.16	5.71	45.67	37025	429400
Feb-94	310859	162008	111.2	1.15	5.20	45.36	42974	435879
Mar-94	315132	164418	128.2	-0.38	4.30	44.99	54612	442828
Apr-94	326482	166892	123.0	-0.38	4.90	44.97	58006	458043
May-94	326220	165928	102.8	0.76	5.84	44.57	59529	462647
Jun-94	327686	164714	101.6	0.76	6.70	44.20	62698	464666
Jul-94	331398	167681	103.4	0.75	5.98	43.45	66533	471202
Aug-94	335357	166910	103.8	1.12	5.75	43.48	67549	472305
Sep-94	352653	177808	103.6	1.84	15.27	43.19	71435	484756
Oct-94	356789	180794	104.9	1.44	7.89	42.78	74040	493556
Nov-94	358738	183684	109.6	1.07	8.37	42.92	74529	497206
Dec-94	358745	187965	118.2	1.41	9.71	43.41	72786	501003
Jan-95	359222	194016	120.6	0.35	15.32	43.15	73334	503176
Feb-95	363364	197100	115.2	0.69	13.27	42.91	73392	509096
Mar-95	386859	211560	127.0	0.69	13.74	41.44	79032	536567
Apr-95	375739	208638	115.3	0.68	10.91	40.98	78082	533042
May-95	375833	208476	114.9	1.70	13.39	41.30	77672	537551
Jun-95	376144	208688	113.0	2.00	14.43	41.20	75271	538789
Jul-95	380602	211578	116.6	2.29	11.28	41.28	75945	540545
Aug-95	384619	212523	116.7	0.64	10.11	41.91	75951	545459
Sep-95	398599	221789	120.0	0.64	12.09	40.33	75333	557382
Oct-95	398401	225940	116.9	0.63	20.70	38.49	78727	563720
Nov-95	400245	229574	123.1	0.63	34.83	38.41	78093	562960
Dec-95	402908	232752	132.5	-1.25	16.77	38.44	78531	566628
Jan-96	407661	241050	135.1	-0.63	14.53	37.93	78171	574217
Feb-96	412861	244355	131.8	0.32	17.05	37.06	78470	578863
Mar-96	433819	254015	144.2	0.95	28.75	39.44	82141	601738
Apr-96	434514	252149	128.4	1.57	11.38	39.94	83181	611533
May-96	435429	250412	129.8	1.24	10.88	39.21	82611	613030
Jun-96	440450	249025	124.3	1.52	10.87	39.24	82103	620413
Jul-96	445907	251276	125.0	1.80	3.59	38.52	84764	623344
Aug-96	454846	248734	126.9	1.18	6.07	38.15	85914	625345
Sep-96	464418	252108	124.7	0.29	8.36	38.32	92140	637951
Oct-96	462827	255354	127.1	0.58	9.58	38.63	93967	641067
Nov-96	465449	256883	125.8	0.87	6.26	38.23	95791	648049
Dec-96	471018	259696	137.6	0.29	8.07	38.48	96059	652313
Jan-97	485742	267354	137.1	0.00	4.84	39.03	96570	667596
Feb-97	490738	268237	134.8	0.00	5.08	39.85	95643	673131
Mar-97	505599	278401	148.5	0.29	4.35	40.09	105496	692872
Apr-97	505019	276371	133.8	0.86	1.22	40.34	106212	704022
May-97	507753	276846	134.8	-0.57	5.90	39.99	110077	710820

(Contd.)

APPENDIX II *(Concld.)*

Month (1)	Aggregate Deposits in Crores (2)	Bank Credit in Crores (3)	IIP (4)	Inflation Rate (CPI) (5)	Call Rate (6)	NEER (7)	NFEA (8)	L_2 in Crores (9)
Jun-97	512676	275669	132.4	0.85	5.16	39.92	108256	709386
Jul-97	514875	277322	135.2	0.85	3.77	40.51	110287	721025
Aug-97	524196	277099	133.7	0.28	5.86	41.13	114245	724728
Sep-97	540148	279734	135.4	0.56	6.71	40.63	114216	739915
Oct-97	542531	285078	136.0	1.11	6.25	40.79	116252	749589
Nov-97	547057	286317	139.1	0.27	6.13	39.85	115366	760156
Dec-97	551760	289504	147.4	1.64	8.21	38.82	124684	764809
Jan-98	561356	307061	148.0	3.27	28.70	39.60	126227	773250
Feb-98	573417	313456	144.3	-0.52	9.70	39.55	126012	786664
Mar-98	598485	324079	154.2	-0.52	8.75	38.97	138095	815957
Apr-98	604336	321577	140.4	-0.79	6.73	38.79	138410	831195
May-98	606306	320390	140.6	1.57	6.75	38.25	138569	836137
Jun-98	612687	318831	139.6	2.57	6.42	37.07	141918	847150
Jul-98	626646	323050	140.3	3.01	6.02	36.92	141347	850118
Aug-98	645866	323597	140.0	0.49	7.59	36.92	143841	855003
Sep-98	661659	330690	139.7	1.70	8.41	36.06	153965	870412
Oct-98	667753	337819	136.0	3.10	8.42	35.14	155387	883340
Nov-98	670930	336465	146.4	1.16	8.00	35.32	155340	891218
Dec-98	671912	338168	153.7	-2.06	8.33	34.96	165782	900224
Jan-99	684788	349271	155.6	-2.10	10.04	35.02	168717	909078
Feb-99	689415	353469	149.4	-1.19	8.86	35.56	170074	916267
Mar-99	714025	368837	161.2	-0.24	8.49	36.07	177853	957741
Apr-99	717695	367733	147.0	0.24	8.02	35.95	179056	974804
May-99	720094	367186	151.0	0.96	8.76	36.01	182872	984050
Jun-99	722542	363595	146.3	0.24	8.10	35.89	184367	990003
Jul-99	743347	372052	149.0	0.95	8.21	35.92	184367	1006259
Aug-99	752023	374766	150.2	0.47	9.38	35.18	184407	1017177
Sep-99	765704	380657	149.9	0.70	9.67	34.99	178436	1033970
Oct-99	772024	392452	147.4	1.87	10.95	34.66	178510	1046118
Nov-99	771610	394552	152.0	0.23	8.07	35.12	182553	1054880
Dec-99	791505	415177	166.1	-1.60	7.74	35.16	188328	1078536
Jan-00	792747	415288	163.2	0.00	7.87	35.13	188430	1078678
Feb-00	807888	424584	161.6	-0.23	10.31	35.67	191694	1095239
Mar-00	813345	435958	174.5	0.93	9.39	35.83	205648	1110226
Apr-00	833714	444140	156.5	0.92	6.79	36.01	206510	1134603
May-00	836505	442503	160.0	0.46	7.48	36.53	204186	1146465
Jun-00	853906	459934	154.9	0.46	11.08	35.40	206575	1163184
Jul-00	855778	457557	156.5	0.68	7.77	35.57	204889	1164074
Aug-00	863256	462266	157.7	-0.45	13.06	35.23	205605	1173820
Sep-00	875942	467451	158.7	0.23	10.32	35.56	209988	1186953
Oct-00	890504	478126	157.4	1.13	9.07	35.64	208559	1207810
Nov-00	914619	480697	163.3	0.22	9.28	35.46	220739	1215096
Dec-00	933169	497703	172.1	-0.89	8.76	34.97	234635	1234588
Jan-01	936045	500283	170.6	-0.22	9.89	34.95	237773	1240036
Feb-01	947307	504722	166.4	-0.45	8.51	35.23	242107	1252371
Mar-01	962618	511434	178.6	0.45	7.78	35.66	249820	1273838

DOCUMENTATION

The purpose of this section is to make available to the readers official documents such as reports of committees, commissions, working groups, task forces, etc., appointed by various ministries, departments, agencies of central and state governments and international organisations, which are not readily accessible either because they are old, or because of the usual problems of acquiring governmental publications, or because they were printed but not published, or because they were not printed and remained in mimeographed form. We also present in this section, official documents compiled from scattered electronic and/or other sources for ready reference of the readers. It will be difficult and probably not worthwhile to publish the documents entirely. We shall publish only such parts of them as we think will interest our readers. The readers are requested to send their suggestions regarding official documents or parts thereof for inclusion in this section.

In the present section, we publish the Reports of two Committees on Consumer Price Index Numbers, appointed by the Government of India, and other material related to the theory and practice of construction of Consumer Price Index Numbers.

1. *Report of The Committee on Consumer Price Index Numbers,* (Chairman: N. Rath), Government of India, Ministry of Labour, February 1978. Chapters I, II, III, IV, V, VI, VII, VIII and Appendix Tables IX, X and XI.

2. *Report of The Committee on Consumer Price Index Numbers,* (Chairman: K.C. Seal), Government of India, Ministry of Labour, August 1981. Chapter IV.

3. *New Series of Consumer Price Index Numbers for Industrial Workers on Base 2001=100,* Labour Bureau, Government of India.

4. *Consumer Price Index Manual: Theory and Practice,* Geneva, International Labour Office, 2004. Chapters 1, 10, Appendix 3.1, annex 3, 4 and Bibliography.

5. Statistical Supplement

REPORT OF THE COMMITTEE ON CONSUMER PRICE INDEX NUMBERS, AUGUST 1981

CHAPTER IV. COMPILATION OF THE NEW SERIES OF CONSUMER PRICE INDEX NUMBERS

The 1960 series of the Consumer Price Index Numbers have been criticised in the past on several grounds. Criticisms relate to alleged deficiencies in the Family Living Survey of 1958-59, the methodology followed in deriving the weighting diagram of the centre and the all India Index Numbers and the price collection system. The Committee felt that as far as possible the new series of the Consumer Price Index Numbers with 1981-82 as the base year, should rectify the deficiencies. The Committee also examined the related recommendations of the Rath Committee. A set of issues having important bearing on the compilation of the consumer price index was identified by the Committee for detailed consideration. These issues have been discussed in the following paragraphs.

Price index for cereals in the modified rationing area

4.2 Public distribution system is meant for making available cereals and other essential commodities at fair price shops throughout the country at reasonable prices fixed by the Government. In most centres included in the new series of Consumer Price Index number, fair price shops have been set up for selling items such as rice, wheat, sugar, etc. to the consumers at fixed prices. A system of rationing is also in operation in these areas. All these items available under rationing are also sold freely in the open market. These areas are therefore termed as modified rationing areas. In certain centres of West Bengal, however, there is statutory rationing for rice and wheat as open market sale of rice and wheat is not legally allowed. In the modified rationing area prices of the specific items differ at the Fair Price Shop and in the open market. Often there was significant difference in the quality of foodgrains sold in the fair price shops and in the open market. Foodgrains sold in the open market shops are generally superior in quality compared with the food-grains sold in: the fair price shops. This raises the important issue of the treatment of the two sets of prices in the compilation of the index.

4.3 In the 1960 series both sets of price, i.e., prices at the fair price shops and the open market are taken into account in the compilation of the Consumer Price Index Numbers. For every centre the respective weights for averaging the price in the fair price shop and in the open market are determined on the basis of the quantity of the cereal admissible to the ration card holder. In other words the admissible quantity out of the total quantity of consumption per capita in the base year (estimated on the basis of the family living survey in 1958-59) forms the weight for the price in the fair price shop. This procedure has been criticised by the users particularly the representatives of the working class. According to them, this method of weighting does not correctly reflect the actual prices paid. It is argued that often the rationed items are not available in admissible quantity from the ration shop. It is also felt that the quality of the commodities supplied through the shops is inferior. Thus, the actual off fake of the rationed items from the fair price shops is often less than the amount admissible. The remaining amount is bought by the workers in the open market. The open market purchases tend to increase whenever the difference between the price, in the fair price shop and the open market has not been very significant and the quality available in the open marker compensated for the' higher price charged in the open market. Therefore, it will be appropriate to weight the price in the fail-price shop on the basis of the actual off-take instead of the admissible quantity.

4.4 This view has been opposed by some others on the ground that Government have started the Fair Price Shops for the benefit of consumers who are expected to avail of this facility to the fullest extent. According to them, therefore, the weight

for the price in the Fair Price shops should be based on the admissible quantity and not on the-actual off-take.

4.5 The issue was also put to the experts in the field. It was generally felt that on technical grounds it is necessary to take the actual quantities bought from the fair price shops and balance from the open market to form respective weights for determining the required average price.

4.6 The Committee recommends that off-take rather than admissible quantity should form the basis of weighting the price in the fair price shops.

4.7 There are various methods of measuring the actual off-take. The Committee considered the proposal made by the Rath Committee for ascertaining the average off-take from the fair price shops. The Rath Committee recommendation was based on the assumption that the Labour Bureau would be able to collect every month following detailed information on the off-take from fair price shops which ate predominantly patronised by the working class families:-(i) The number of ration card holders registered with the fair price shop; (ii) Number of units; (iii) Admissible quantify per unit; (iv) Opening balance; (v) Quantity received during the month; (vi) Quantity sold during the month; (vii) Closing balance: during the inspection of price collection work in different centres the members of the Committee noticed that a large number of fair price shops selected by the Labour Bureau for price collection were catering to the needs of not only some industrial workers' families but also a significant number of non-industrial workers' families. The Committee felt that this method will not give an unbiased estimate of the off-take and thus will not correctly indicate the average off-take of working class families.

4.8 One member of the Committee (Dr. Mahfooz Ahmed) felf that while monthly off-take survey of selected labour households from the Family Income and Expenditure Survey is theoretically the right method, such a survey is fraught with many conceptual and practical problems. Such a survey if conducted every month at 70 centres throughout the country would involve substantial manpower and financial resources. Moreover, it may also delay the compilation of the Consumer Price Index, which already has a time lag of 5-6 weeks. He felt that for Industrial workers actual off-take from the fair price shops is unlikely to be much different from the amount actually available from these shops. Hence, actual amount available from fair price shops will be a good approximation of the actual off-take. He felt that it is easy to collect the relevant information from the civil supplies authorities at the Centre. The information requited to be collected from the Civil Supplies authorities once a month will be:

(i) number of card holders at the centre;
(ii) number of total units at the centre; and
(iii) total amount of a commodity made available to all fair price shops in a centre during the month.

With the help of this information it will be possible to estimate the average quality of a commodity available through fair price shops in a month. He recommended that this average quantity available per unit as proxy of actual off-take should form the weight for the price in the fair price shop. The Committee was informed that this type of Information from the Civil Supplies authorities is already being collected by the Labour Bureau.

4.9 The other four members of the Committee felt that in view, of the differences in price and quality in the fair price shops and the open market, it would not be realistic to assume that in the case

of industrial workers off-take from fair price shops was likely to be the same as the quantity actually available. They felt that instead of relying on such as a priori assumption it would be appropriate to collect the actual off-take data from the working class families with due probing. The Labour Bureau at present conducts every month half-yearly house rent surveys of staggered sub-samples of families. The Bureau should, without any significant addition to expenditure, be able to collect the off-take of rationed commodities each month from the same staggered sub-samples. The Committee was informed that such a procedure is currently adopted in the case of consumer price index for urban non-manual employees with the approval of the TACSPCL.

4.10 The Committee further recommends that till a final view is taken on the feasibility of the two approaches, or for any reason if the measurement of average monthly off-take on the lines suggested above is not possible, the existing procedure based on the quantity admissible to the ration card holders may be continued. Price Index far Cereal in the Statutory Rationing Area.

4.11 At present in certain centres selected in West Bengal, there is statutory rationing for rice and wheat. Any sale of rice and wheat in the open market in the State is not legal. Till the end of 1973 the Labour Bureau was assigning the entire weight for the price of rice in the CPI numbers for these centres' to the ration price. From 1974, the Labour Bureau after consulting the TACSPCL changed this practice and started following what it calls the "corrective action". Under this practice if the admissible quantity in the ration shop falls short by more than 15 per cent of the quantity of consumption in the base year, the weight accruing to the short fall is distributed pro-rata over the rest of the items in the food Group and the index for the Food Group as a whole except rice is taken as the index for the short fan quantity. For the admissible quantity of rice, the price index is compiled on the basis of the current ration price and the base period price of rice. The index for the Food Group as a whole is arrived at as the weighted average of the two indices calculated as above. If the short fall is less than 15 per cent, the entire weight is assigned to the ration price.

4.12 The Government of West Bengal have stated that In statutory rationing area, the prices of rationed commodities only should be used in compilation of Consumer Price Index Numbers. It has been suggested that weight corresponding to the short-fall may be distributed pro-rata over the rest of the items of the cereals sub-group instead of considering the broad group of Food. For example, the weight corresponding to the short-fall of rice may be distributed among the items under 'Cereal'.

4.13 As regards the suggestion of using black market prices, the Committee is of opinion that apart from the legal objection, there would be practical difficulties in collecting black market prices. Firstly it is not certain that the selected shops would continue to be located at the same place or doing the business for a continuous period at any place. Price collection from shops which may be changing places would be difficult and continuity of price collection can not be maintained in such cases. Secondly as no records regarding such sales would be available, supervision of price collection would be almost impossible. The Committee therefore, does not favour utilisation of the so called black market prices in the statutory rationing areas for the compilation of the Index.

4.14 As regards the suggestion that the price of close substitutes like Chiramoori should be utilised, the Committee feels that Chiramoori and similar products are only supplementary food

items and cannot correctly represent the staple food like rice. Hence it would not be appropriate to take the prices of such items for pricing. The Committee therefore suggests that the existing practice of taking "corrective action" should continue except that for measuring the short fall from the quantity of consumption in the base year, the off-take from the ration shop may be estimated on the lines suggested in paragraphs 4.8 to 4.10.

Price Index for Sugar

4.15 Sugar is sold in the Fair Price Shops at controlled price to ration card holders. It is also freely sold in the open market. In the past availability of sugar in the Fair Price Shops and in the open market has fluctuated widely. However, as regards actual off-take from the Fair Price Shops the situation regarding sugar is different from that of cereals in the modified rationing area. Because of the wide difference between the levy and open market price, the actual off-take of sugar from the Fair Price Shop is equal to the admissible quantity. Hence the weight to be assigned to the ration price of sugar should be based on the admissible quantity. For the shortfall if any, between admissible quantity and base year per unit consumption the open market price should be used. However, if in future actual off-take in a month is less than the admissible quantity the weight assign to the ration price should be based on the actual off-take or availability.

4.16 In the tea gardens of Assam, there are no Fair Price Shops. If the plantation owners make arrangements for the distribution of levy sugar to the workers, quantity sold through such arrangements should be taken for assigning weight to the controlled price. If no such arrangements exist, the open market price should be used.

4.17 If the admissible quantity were higher than the base year consumption, the entire weight for sugar in the CPI Numbers would be assigned to the quantity admissible in the fair price shop.

House Rent Index

4.18 Prior to the compilation of 1960 series the rent index for factory centres was kept constant at 100. Since the introduction of the 1960 series this practice has been given up. In the 1960 series due account is taken of changes in house rent. For this purpose, the house rent index is being revised once in every six months. The revision is made on the basis of data of house rent collected twice in a year in respect of selected dwellings, the-sample of dwellings being staggered uniformly over each half of the year. The sample dwellings in each round are selected in such a manner that the interval of approximately six months is kept between the two successive visits to the same dwelling. The dwellings selected are from those occupied by a sub-sample of workers covered in the main family living survey. The index for house rent thus, calculated every six months is kept constant for a period of six months. The house rent index is calculated on a chain base method. Half yearly revision in the index is made on the basis of changes in rent during the previous 6 months.

4.19 For plantation and mining centres the house rent index is kept at 100 because while in plantation centres it is obligatory to provide rent-free house to eligible workers, it is presumed that rent free houses are made available to the mining workers. There are 8 plantation and 7 Baiting centres in the 1960 series, and the weights of these centres house rent index are 0.59 and 0.47 respectively out of the total weight for rent of 6.26 in the All India index.

4.20 The present, method of calculating the house rent index for factory workers is an improvement over the earlier practice of keeping it constant at 100. However, it has been criticised on the ground that it does not take into account the rent paid by those workers who occupy new houses constructed after the base year. If the rents paid by the workers occupying new houses constructed after the base year are taken into account, it is argued the house rent index may show a higher increase than at present. It is also argued that in the plantation and mining centres all the workers are not provided with rent-free accommodation. The Committee was informed by the Ministry of Labour that at present out of 10.68 lakh plantation workers 5.36 lakh are eligible for rent-free accommodation, but only 3.72 lakh workers have been provided with rent-free accommodation. Similarly, for nearly six lakh workers in coal mines, 1.88 lakh houses have been constructed by the employer.

4.21 As mentioned earlier, the scope of the 1981-82 FIES and the new CPI series has been significantly expanded to include four more categories of workers, besides factory, plantation and mining workers. The Committee recognises the existence of rent-free, rented and owner-occupied houses in some centres, although their relative importance may differ from centre to centre. The Committee, therefore, recommends that in regard to rent index no distinction need be made and uniform practice of calculating rent index be followed for all centres included in the new series.

4.22 The Committee recommends the consistent with the new procedure as elaborated in Chapter II, the rent for rent-free houses be treated as Zero. In the calculation of the overall average rent index for the centre, the zero rent for rent-free houses should be weighted by the proportion of the index population residing in rent-free houses.

4.23 The Committee recommends that for rented houses the present practice of conducting a six monthly staggered survey of selected sample households should continue to be followed in all the centres. The component of the rent index in respect of the rented houses for the overall rent index for the centre should be derived by using the proportion of index population residing in rented houses as weights.

4.24 The Committee recommends that for owner occupied houses in each centre the rent index should be based on the rent paid for similar rented accommodation in the same building or nearby locality. If, however, it is not possible to get comparable rent in respect of such owner-occupied houses, the Committee recommends that the house rent index for owner-occupied houses may be taken to be the same as that of the rented houses.

4.25 The Committee recommends that adjustments for differences in rent paid should be made every six months and the data on proportions of index population residing in rent-free, rented and owner-occupied houses should be collected every six months by undertaking a special survey of the working class families covered under the FIES, 1981-82 for making adjustments in the rent index.

4.26 As regards new houses, no adjustment is being made in 1960 CPI series. There is a view which does not favour inclusion of the new houses occupied after the base year period. It is argued that once the sub-sample house is selected in the base period it would not be proper to change it during the currency of the index as such a step would be contrary to the fixed basket theory of CPI Numbers. Those who favour the existing method also argue that house rents do not change in the short period and addition of new tenants to the labour force are only marginal during a short

period. Therefore, it is not necessary to carry out a revision of the house rent index from year to year. Such a revision if necessary may be considered after say 5 years by means of a small survey. Another view is that it is desirable to take account of new houses occupied by workers in the compilation of the rent index but there are certain difficulties in doing so. According to them, the sub-sample adopted for the compilation of the House Rent Index, is so small, that changes in the rent of new houses are not likely to create any significant impact on the House Rent Index.

4.27 One member of the Committee (Dr. Mahfooz Ahmed) felt that inclusion of new houses in the computation of CPI is tantamount to changing the base year consumption pattern and thus will violate the fixed basket principle of constructing CPI. The solution to the problem of new houses, like many other items included in the consumption basket where similar situation arises, lies in revising the base of the index at short intervals. He therefore, recommended that no account should be taken of new houses in the estimation of the average house rent index for the centre.

4.28 The other members feel that the fixed basket theory does not hold good for calculation of change in the average house rent as the quality of existing houses changes with age, even if repairs and maintenance are undertaken at regular intervals. It would be appropriate in such a situation to compare the average rent being paid by an average family belonging to the chosen population segment during the base period and the current period for working out the house rent index. The present methodology of carrying out house rent surveys every six months to determine the changes in average house rent would be adequate for those centres where proportion of families residing in new houses is negligible. On the other hand, it is often noticed that in most of the centres, particularly in the industrial centres, some new colonies come up where a large number of families belonging to the chosen population segment might start residing. In view of the fact that it generally takes some time for such new colonies to come up in the various industrial centres they suggest that some field staff should be earmarked by the Labour Bureau for conducting special house rent surveys every year in certain selected centres where new residential colonies are reported to have come up in large numbers, to find out the average rent paid by a section of the index population residing in the newly constructed colonies. This average rent for new houses should be combined with average rent of old houses to determine the overall average house rent to be used in the construction of the house rent index. The weights to be used for this purpose should be the relative proportion of index population residing in the new and old houses of the industrial centre. It is, therefore, suggested that all the industrial centres may be covers in batches in the course of next five years through Annual special house rent surveys to determine the average house' rent prevailing in newly constructed houses. In the annual special house rent survey besides details on current house rent, information on (i) relative proportion of index population residing in old and new houses, (ii) proportion living in owner occupied, rented or rent-free houses may be collected. The half yearly house rent survey may be continued as before in order to determine the average rent of old houses.

House Rent Index for Houses/Flats covered under Rent Control Act

4.29 In some centres like Bombay, Rent Control Act is in operation and a certain proportion-of workers may be residing in the houses covered under the Rent Control Act. In such cases a situation may arise where the tenant not only pays the rent admissible under the Act

but also incurres some expenditure on current repairs and maintenance of the house because the owner does not spend on repairs and maintenance due to low rents received by him. The Committee recommends that the rent for such houses should include both the rent paid under the Act as well as the additional amount actually spent by the worker on current repairs and maintenance.

Adjusting the Index for quality changes

4.30 It is observed that the quality of cereals sold in the fair price shops changes frequently and over a period the quality and specifications available in the fair price shops differ from the quality and specifications for which the base year price had been collected. At present such changes in the quality are ignored by the Labour Bureau. There is a view that adjustment should be made for quality changes not only in respect of foodgrains but also for other items. This may be done by adopting hedonistic price numbers. In brief this method consists of observing effects of certain characteristics of a commodity upon its price and isolate the implicit price of such characteristics to arrive at price change that has actually occurred. It has been suggested that in the Indian context this methodology can be adopted for working out indices of rationed commodities, clothing items and also other commodities whose varieties are frequently replaced. This method assumes that difference in the quality of a commodity is reflected in the difference in the respective prices. However, in the case of rationed items, as commodities (say wheat, rice, etc.) of different quality are sold at the same price, quality differences are not very relevant. It is also possible that varieties sold through fair price shops may not necessarily be available in the open market and hence the requisite price difference due to quality cannot be isolated even on the basis of the open market prices. It may not, therefore, be possible to construct hedonistic price indices nor will it be possible to take into account quality difference by the method of splicing particularly in the case of food products. The Committee recommends that the present practice of constructing the index for rationed commodities, i.e., without taking into account the quality differences play be continued.

4.31 The Committee considered the adoption of splicing for other items such as clothing where changes in the characteristics are even more frequent. Any quality changes in clothing occurs in counts of yarn, mix of synthetic fibre, borders, colours, prints, etc., and it would be very difficult to isolate the price impact of each of these changes. Often the required information is not available from the retail shops while reference to the textile mills may take a long time. Moreover, price change may also result due to other factors, e.g., sales promotion and advertisement, rather than only due to quality changes. In view of these difficulties, the suggested method does not seem feasible for the compilation of the CPT. However, the Committee feels that when an item is completely changed qualitatively or in terms of major characteristics, the new items should be introduced in the index after spacing its price Alternatively the weight of such items may be distributed, over the other constituents included in the item basket.

Clothing

4.32 It is reported that the pricing; of clothing items presents difficulties to the price collectors; and price supervisor's due to frequent change in their varieties. According, to the present practice, whenever a variety of a clothing item included in the price schedule disappears from the market and another variety takes its place in the sate counter, the price collectors have been instructed to indicate whether the substitute is comparable

to the variety that has disappeared from the market. The price collectors are required to compare its price with the price of the variety that has disappeared along with the characteristics and report the matter to the Labour Bureau. After receiving the particulars the Labour Bureau scrutinises them. Where particulars of the, new items, are comparable with the old item that has disappeared from the market, the new item is treated as a comparable item and its price is taken as a substitute for the price of the old item that has disappeared. When the new variety is not considered comparable with the old variety the new variety is utilised only after splicing.

4.33 During its visit the Committee noticed that it was difficult for the price collectors to study the characteristics of different varieties of clothing items available in the shops and to exercise the correct judgement ss to which of the variety is comparable. The tendency of the price collector often is to select a substitute which is nearer in price of the substitute item after consulting the shop keeper. In the centres where well known Textile Mills have opened their retail shops price are taken from such shops only and the price changes of the items sold in these shops are taken as a representative price change of the clothing group as a whole.

4.34 It was suggested to the Committee that in order simplify the procedure for pricing of clothing item, wherever well known Textile Mills have opened their retail shops prices prevailing in those shops may be taken for the compilation of CPI Numbers. These retail shops sell most of the clothing items consumed by the working class people. The information on prices and substitutes is readily available in these shops. These shops are also ready to cooperate with price collector in filling in the price schedules. Under the circumstances, the committee agrees that in centres where well known Mills have opened their shops, the price index for clothing may be compiled on the basis of prices collected from these retail shops. Labour Bureau should continue to process the price information relating to these shops according to the usual procedure and utilise it for the compilation of the CPI Numbers.

4.35 However, certain items like Handloom Saries, Lungies, Chaddars, etc., may not be sold in the Mills' retails shops and hence for pricing such items. Handloom Cooperatives and other shops where handloom products are sold may be selected for collecting price information.

4.36 The Committee feels that price supervision have to play a more effective role then at present in pricing of clothing items. Whenever price collectors face difficulty in pricing of a clothing item, price supervisor may personally visit the shops for a study of the characteristics of the substitutes before sending a report to the Labour Bureau.

4.37 It is reported that similar difficulties are being faced la pricing of ready made garments. The Committee feels there are real difficulties in this respect and no easy method of measuring the price change for ready made Garments is possible. The Committee recommends that the weights for the ready made garments may be appropriately distributed to the respective items under clothing and stitching charges under the Miscellaneous group.

Tobacco and Liquor

4.38 The Consumer Price Index is composed of six main groups of which "Pan, Supari, Tobacco and intoxicants" is one. In the 1960 series, the weight for this group is 4.79 out of 100. It is sometimes Suggested that as the consumer price index is used to regulate the variable dearness allowance, it should not include items like tobacco and liquor which are not essential items and that the dearness allowance may compensate the rise in prices of essential items only. Another view is that the consumer Price index numbers should reflect change in prices of all goods and

services which are reported in consumption and no distinction should be made between the commodities as essential and non-essential. Tobacco and intoxicants sometime form a significant proportion of the overall monthly consumption expenditure of workers and therefore it would be only proper to include these items in the index numbers. In India some of the poorest people spend their income on tobacco and it will not be possible to pass a judgement on whether such items are essential or non-essential or luxuries for them. In fact, one extreme view is that even when there is prohibition in a State, the price of country liquor, which may be sold illegally should be taken into account for the index compilation.

4.39 The Committee felt that the Consumer Price Index Numbers should faithfully represent the consumption pattern of workers and it is not desirable to introduce normative considerations in the compilation of Consumer Price Index. The weighting diagram should continue to be based on the entire consumption basket as determined by the FEES. No distinction should be made between the essential and non-essential items for the compilation of Consumer Price Index numbers. If prohibition is introduced during the life time of the Consumer Price Index Series, after the base period, liquor should be excluded altogether from the index and price charged for any illegal sale should not be considered. The weight assigned to liquor should be pro-rata distributed to all the other items in the index. On the other hand, if prohibition is lifted, liquor might be reintroduced in the index basket. Some members, also felt that as Consumer Price Index is used for dearness allowance adjustment, users of the index may negotiate the question of what should constitute the item basket and the extent of compensation under the dearness allowance adjustment in respect of items included in the item basket.

Prepared Foods

4.40 In every centre, expenditure is reported on consumptions' of tea, coffee, snacks and Thali. Over a period of years while the prices of prepared food items have increased, their quality and quantity have decreased. It is therefore pointed out that the prices of the prepared food items during the current period are generally not comparable with the prices of the base period and the index needs to be corrected for qualitative and quantitative changes. Another alternative suggested is that instead off pricing the prepared food items their weights should be distributed to other food items in the Food Group. While commenting on this suggestion it has been observed that in metropolitan cities like Bombay and Calcutta nearly 30 to 35 per cent of the workers spend on prepared food every day and the price trend of these items may not be similar to price trend of the items in the Food Group as a large proportion of the cost of these items consists of labour charges.

4.41 The Committee feels that it would not be possible to make adjustments in the index for quality change, but in case the price is based on some quantitative measure, the index should take account of the change in the quantity. As far as possible, Labour Bureau should collect base year price according to quantitative measure. In cases in which price is not charged on the basis or quantity the weight for the item should be distributed to all the items in the Food Group or to the constituent items pro-rata. For example the weight of Thali should be, distributed to the entire Food Group. The weight of snacks should be distributed to their constituent items. Where price of tea or coffee is not fixed according to quantity their weight should be distributed over tea/coffee powder, milk, sugar. Fuel, etc.

Free Primary and Secondary Education:

4.42 Primary education and education upto secondary stage for certain sections of the pop-

ulation has; been made free in certain States. Even Text Books are distributed free to some sections of students in such States. One suggestion for treatment of free primary education in the index is that when items for primary education are universally made free, they should be deleted from the index compilation. Another view expressed is that although the consumer does not incur any cost on free primary education the public as a whole bears the cost through the public exchequer. Therefore, these items may not be deleted from the index, but their price index may be compiled on the basis of some imputed prices. It is further observed that primary education is imparted in Public Schools and in fact considerable expenditure has to be incurred on children sent to such Schools.

4.43 The Committee recommends that consistent with the basic approach suggested in Chapter II, the FIES should collect information from the selected families on the number of families obtaining free primary education and those who are paying for such education. In working out the base year index of primary education, the fees for free education should be treated as zero. The actual amount spent on primary education should be considered for those families who are spending on education. The average index for primary education for the centre should be calculated by using the proportion of families obtaining free education on the one hand and those who are spending on primary education on the other as weights.

4.44 It is noticed that in Schedule 'A' of the FIES School arid College fee and School and College books have been clubbed together for collecting expenditure data. The Committee recommends that separate information should be collected for primary and secondary school fee and primary and secondary books so that it should be possible to prepare separate price indices for primary and secondary education.

4.45 The Committee recommends that the weights to be assigned to primary and secondary education should be determined separately on the basis of the relative expenditure on primary and secondary education for an average family during the base period. Thereafter the popular specifications on which the expenditure is incurred need to be priced at regular intervals separately for primary and secondary education. The average price for selected specifications should be worked out by giving due weightage to the relevant proportions of the index population enjoying free education and those who are paying for it.

4.46 Similar procedure should be followed for secondary education also if it is available free. However, secondary education is generally not free. Therefore, average school fee charged will have to be ascertained in the base year and at regular intervals. The Committee felt that an interval of about 12 months appears appropriate for making adjustments in regard to the changes in the expenditure on primary and secondary education calculated in the manner proposed above. For this purpose a small sample survey of the selected working class families also has to be conducted.

4.47 In case new concessions in the field of education are announced at a later date, for universal application, it will be necessary to revise the weights foe primary and secondary education by carrying out a fresh survey.

Treatment of Concessional and 'Free' Items

4.48 In the plantation centres of Assam workers of the tea gardens receive foodgrains at concessional prices. Levy sugar is also distributed at the fair price. These provisions are supplied by engaging contractors called "Golas", who bring provisions at tea gardens for supply to workers. Under the wage agreements with the plantation workers, workers also receive free primary education and dispensary facilities. Besides, other

items, viz., blankets, rubber chappals and umbrellas are provided free once in a year or two years to the workers. In addition 5 Quintals of firewood is also supplied free and its cost estimated by one of the employers is Rs. 325 a year.

4.49 At present Labour Bureau is using concessional prices paid for cereals for the compilation of the index. According to the current practice the price index for firewood is kept constant at 100. The Labour Bureau imputes open market price to blankets, rubber chappals and umbrellas.

4.50 The Committee feels that if plantation workers are getting foodgrain at concessional prices, these prices should be properly reflected in the index compilation. Therefore, the concessional prices should be treated in the same manner as the prices in the fair price shops. Moreover if certain sections of the plantation workers are not entitled to supply of foodgrains at concessional prices and buying them in the open market, open market prices should also be taken in proper conjunction.

4.51 For the compilation of price index of fire wood a part of which is supplied free or at concessional rates by employers, the Committee recommends a method similar to the one suggested for deriving index for free education. The price charged for a specified amount of firewood which is supplied free should be zero. The average price paid for firewood should be calculated by taking the weighted average of prices of freely provided amount of firewood and the remaining quantity purchased from open market.

4.52 Treatment of other items like blankets, rubber chappals and umbrellas which are provided by certain employer at concessional prices should also be similar to that for firewood. Free Medicine and Health Facilities

4.53 The procedure recommended for index compilation for free primary/secondary education should be followed for the index compilation in respect of free medicine and health facilities.

Consumer Durables

4.54 In the earlier Family Living Surveys, the proportion of workers' expenditure on durable items was relatively insignificant. However, with the increase in the purchasing power of the working class, their expenditure on consumer durables like transistor, radio, bicycle and scooter etc. has increased. In fact in metropolitan cities where TVs have reached. Low priced T.V. sets are seen in the dwellings of working class families. One view about the treatment of this expenditure is that workers' expenditure on durable items is likely to be incurred once in a white and hence such items may be excluded from the index. The Committee does not agree with this view. We feel that no distinction should be made between the consumer durable and other items in the expenditure of the workers and if any expenditure is reported on consumer durables they should figure in the weighting diagram of the index. The weight to be assigned to each of the consumer durables should be based on actual average expenditure reported during the FIES. Where, durable goods are purchases on installment basis, expenditure incurred during the period of the survey only should be taken for assigning weight to the item.

4.55 With the possession of durable items like T.V. bicycles, scooters, the workers also incur expenditure on their maintenance. The data on such maintenance cost should be collected in the Family Income and Expenditure Survey and should be included in the CPI Numbers.

Expenditure on Doctor's Fee and Medicine

4.56 In several centres, which have been selected for the 1981-82 series, the E.S.I. Cor-

poration have set up either hospitals or dispensaries for workers. It is reported that a number of workers incur expenditure on private Doctor's fee and medicine in addition to their contribution to the Corporation. The question is whether such expenditure should be taken into account in the compilation of the Consumer Price Index. The Committee feels that expenditure actually incurred by the worker including contribution to the E.S.I, as well as private doctor's fee and medicine should be included under the head "medical care" in the Consumer Price Index. The relative weight of the two items should be determined on the basis of the actual expenditure reported during the family income and expenditure survey. The relative proportion of families incurring these expenditures should be ascertained by periodical surveys, say once in three years, and reused if necessary.

Suburban Train fares

4.57 In a city like Bombay, suburban train is the most popular, mode of transport for going for work and return home. The Committee suggests that fares for both long distances and short distances should be included for index compilation. For long distances, price of monthly season ticket for second class from Thana and Kalyan to the Victoria Terminus and Borivli to Churchgate may be taken. For taking the short distance fare. Suburban stations may be selected on the basis of the Family Income and Expenditure Survey for the Bombay centre. In addition to the Suburban railways, the fare for buses run by the SIDCO may also be taken for the Centre's index. Similar procedure should be followed for other metropolitan cities in which suburban trains are running between the places of residence and work.

Tram Fare in Calcutta

4.58 In the past there had been a controversy whether for consumer price index series for Calcutta, 1st class or 2nd class tram fare should be taken. We suggest that during the current survey, information on the class of tram traveled by the workers should be collected in addition to the total expenditure on trams fare and this information should be utilised for deciding which class of tram fare should be utilised for compilation of the index for Calcutta centre.

4.59 We also suggest that when the underground railway starts in Calcutta the underground railway fare should be taken into account in combination with tram fare for index compilation for Calcutta centre.

Cinema Ticket

4.60 Expenditure on cinema would no doubt figure in the Family Income and Expenditure Survey at each centre. In the past there were suggestions that while compiling the price index of cinema ticket the lowest class of ticket should not be taken but the next higher class be taken as more and more working class families are purchasing higher class tickets. This is also borne out by the fact that in the cinema theatres less seats are allocated for the lowest class and more seats to higher classes. We suggest that while collecting information on expenditure on cinema, the class of cinema ticket purchased by the workers should also be ascertained and this information should be utilised in deciding the class of cinema ticket to be selected for filling in the monthly price schedule for the new series of the Consumer Price Index numbers.

General Remarks

4.61 The Committee has attempted to give in considerable details, the methodology which needs to be adopted for the construction of the new Consumer Price Index. There could, however, be some situations which would have to be resolved taking into account various practical problems in measurement of prices and quantity consumed in different centres. Such problems may be referred to the TACSPCL.

NEW SERIES OF CONSUMER PRICE INDEX NUMBERS FOR INDUSTRIAL WORKERS ON BASE 2001=100

LABOUR BUREAU, GOVERNMENT OF INDIA

1. OBJECTIVE

... The CPI-IW purports to measure the temporal change in the retail prices of fixed basket of goods and services being consumed by the target group i.e. an average working class family and thus, is an important indicator of the retail price situation in the country. The CPI-IW is mainly used for the determination of dearness allowance being paid to millions of Central/State Government employees as also to the workers in the industrial sectors besides fixation and revision of minimum wages in scheduled employments. The main objective of the CPI-IW (new series) was to update the base year of the previous series of Consumer Price Index Numbers for industrial workers (Base 1982=100) to 2001=100.

2. MAIN CONSTITUENTS

Three most important constituents of the CPI-IW are the centre specific weighting diagrams, the retail price data and the house rent data.

A. Updation of weighting diagrams

(I) Conduct of Income & Expenditure Survey:

The field staff of the National Sample Survey Organisation (NSSO) through a detailed questionnaire collected the income and expenditure data in order to reflect the change in the consumption pattern of the working class population at all the 78 selected centres across the country during 1999-2000 under the overall guidance and supervision of the Labour Bureau. Detailed instructions were issued by the Labour Bureau for canvassing of schedules by the field staff in order to ensure uniformity in collection of data having emphasis on its accuracy. Besides, extensive training was imparted to the Officers/Officials of the NSSO at different places by the Labour Bureau before the launch of the actual work.

(II) Scrutiny of Schedules:

Two levels of scrutiny ensured the reliability and authenticity of data collected from the field. At the first level, the NSSO made elaborate arrangements for field scrutiny of canvassed schedules on the basis of field scrutiny manual circulated by the Labour Bureau. Thereafter, these schedules were again scrutinised in detail by the Labour Bureau to ensure consistency in the collected data. Discrepancies revealed during the course of the scrutiny were reconciled by referring the scrutiny points to the respective RO/SRO of the NSSO and also by making actual visits to the field.

(III) Tabulation of data:

...

(IV) Derivation of Weighting Diagrams:

The weighting diagrams for the purpose of compilation of index numbers had been derived on the basis of average monthly family expenditure. The average budget derived from a family budget enquiry consisted of all items of expenditure reported by the families surveyed. These items of expenditure can be broadly divided as;

(a) Consumption Expenditure;(b) Non-Consumption Expenditure; and (c) Capital Outlays.

Only consumption expenditure has been considered for the purpose of a weighting diagram for construction of consumer price index series as

is the usual practice followed everywhere. Non-Consumption expenditure and expenditure on Capital outlays like income tax and other direct taxes, charities and gifts, interest on debts, repayment of debts, litigation expenses, life insurance premium etc. have not been included in the index basket.

The consumption groups commonly adopted for working class consumer price index numbers are as follows:

IA - Food; IB - Pan, Supari, Tobacco & Intoxicants; II - Fuel and Light; III - Housing; IV - Clothing, Bedding and Footwear; V - Miscellaneous.

The Food Group and the Miscellaneous Group have been further divided into sub-groups as follows:

Food Group: (a) Cereals & Cereal Products; (b) Pulses and Pulse Products; (c) Oils and Fats; (d) Meat, Fish and Eggs; (e) Milk and Milk Products; (f) Condiments & Spices; (g) Vegetables & Fruits; (h) Other Food.

Miscellaneous Group: (a) Medical Care; (b) Education, Recreation & Amusement (c) Transport & Communication ; (d) Personal Care & Effects; (e) Others

B. Updation of retail price data

(I) Organisation of Price Collection Work:

Before the launch of the main survey, pilot surveys on scientific lines were conducted at all the 78 centres to demarcate the centre-boundaries with a reference to market selection; selection of markets & shops; testing and finalisation of price collection schedule along with fixation of specifications of the items to be priced; setting up of price collection machinery in consultation with State Government. by appointing Price Collectors/Supervisors and fixation of price collection day. With the setting up of price collection machinery, retail prices from 289 selected markets started flowing into the Labour Bureau. Initially, a very exhaustive price collection schedule was introduced in the field, which was pruned in the beginning of the year 2000 on the basis of actual expenditure reported in the first four sub-rounds of the main survey except for seasonal items. These schedules were again revised on the basis of actual weighting diagrams and would continue throughout the lifetime of the series.

(II) Study of the Run of Prices:

The retail prices are collected on a weekly/monthly basis by the Price Collectors through personal visits to the selected/reserved shops in the markets on the appointed price collection day every week/month. The work of the Price Collectors is also being supervised by the Price Supervisors. Both the Price Collectors as well as the Price Supervisors are employees of the respective State Governments who work on part-time basis in lieu of which some honorarium is paid to them by the Labour Bureau. There is a State Co-ordinator who is the overall in charge for the Price Collection work for the entire State. Besides, the officials of the different Regional Offices/Sub-Regional Office of the Labour Bureau undertake periodic price audit work at different centres on a regular basis. Prices for each commodity are collected from two selected shops of each of the selected markets. The prices collected from the field are subjected to detailed examination from the point of view of consistency on account of inter-shop, inter-market and inter-period variations. Discrepancies wherever found are referred to the field and prices are rectified accordingly before utilising the data for index

compilation. The seasonal pattern as reflected in the price movement has been specially looked into. The weekly/monthly quotations are first averaged at market level for a month and by pooling the market averages the Centre level average price for an item for a month is arrived at.

C. Conduct of Repeat House Rent Surveys

The change in rent and related charges, which constitute a single item under housing group, is captured through Repeat House Rent Surveys, which are conducted in the form of six-monthly rounds. The survey is conducted on a sub-sample of dwellings covered during the main income & expenditure survey in 1999-2000. The index for the housing group is revised twice in a year i.e. in January and July of every year. The index is calculated once in every six months and is kept constant for the entire six months on account of the tendency of house rent to remain more or less stable over short periods. Under the house rent survey, three types of dwellings viz. Rented, Rent free and Self-owned (Owner occupied) are covered uniformly across all the centres. This practice was also followed in the previous series of the CPI-IW (1982=100).

3. FINALISATION OF BASE YEAR

The well-known criteria used for the selection of base year are:

* The base year should preferably synchronise with the period of the income & expenditure survey and should not be very distant from the actual period of the survey.
* Reliable price data should be available for the chosen period.
* The base year should be a normal year i.e. a year in which there is no abnormalities in the price level and price variations.
* The base year of the constituent centres should be uniform so as to facilitate easy and quick compilation of the All-India Index.

Though the price data were being collected and dispatched to the Labour Bureau immediately after setting up of the Price Collection machinery from majority of the centres, yet, prices could be stabilised in strict sense from all the 78 centres only in the year 2001. Accordingly, calendar year 2001 has been taken as the base for all the centres under the new series. Apart from the reliability of price data, selection of calendar year 2001 as the base year also seemed to be justified keeping other factors into consideration. Going by the broad economic indicators the overall price behaviour across the country was more or less normal.

4. METHODOLOGY FOR COMPILATION OF INDICES

Index Formula:

The most preferred index formula used for compilation is the Laspeyre's base weighted formula because of its inherent practical advantages. The formula in its aggregative form is expressed as below;

$$In = \frac{\Sigma PnQo}{\Sigma PoQo} \times 100$$

The operational form of the formula is obtained by adjusting the numerator ΣPn Qo as Σ Qo Po x (Pn/Po) which is simply an alternative algebraic expression without changing its significance or value and is given as;

$$In = \frac{\Sigma QoPo \times (Pn/Po) \times 100}{\Sigma QoPo}$$

where Qo Po denotes the expenditure on an item in the base period and is termed as the weight and

(Pn/Po) X 100 is called Price Relative, which is the ratio of the current period price to base period price of an item.

5. CONSTRUCTION OF INDICES

i) Centre Specific indices

Centre specific indices in respect of all the 78 centres are being compiled on month to month basis by utilizing the expenditure on an item in the base period and the ratio of current period price to base period price of an item.

ii) Index for Housing Group

As a natural corollary tc the index, house rent data, is being collected for compilation of house rent indices through the Repeat House Rent Surveys on a six month round basis. So far, the fieldwork up to 8th rounds has been completed and the fieldwork for the 9th round is, currently, in progress.

iii) Construction of All India Index

The All India Index is the weighted average of the 78 centre level indices. The centre weights are being determined as the ratio of product of average consumption expenditure per family as per the main survey and the number of Working Class Families represented by a centre in a State to sum of such products over all the centres. In order to pre-empt over weighting to big cities in respect of their contribution to All India Index, each centre is assumed to represent an equal share of the number of working class families within the State. In case the actual working class population (as per the main survey) for a particular centre exceeds the proportionate share accruing to the centre, the actual population of the centre is taken to determine its share and the remainder of the working class population in the State as a whole is equally distributed amongst remaining centres in the State.

6. EXAMINATION AND APPROVAL OF TECHNICAL DETAILS

The Technical Advisory Committee on Statistics of Prices and Cost of Living (TAC on SPCL) got examined all the technical details pertaining to updation of the CPI-IW (1982=100) to a recent base by a Sub-group of the TAC. ... [T]he TAC accorded its approval to the methodology for compilation of indices under the CPI-IW (new series).

7. CONSULTATION WITH USERS

In line with the recommendations of various Committees regarding involvement of Users, i.e., representatives of the Employers, the Employees (Trade Unions) and the State authorities at different stages of the exercise for updation of the base to ensure wider participation and enhanced acceptance, Labour Bureau had a series of consultations with these bodies at various Centre and State levels during the setting up of the Price Collection Machinery at the 78 selected centres under the CPI-IW (New Series). The active involvement of these agencies besides the Planning/Labour Departments of the State Governments goes a long way in ensuring desired level of transparency in the compilation of these indices, which in turn provides credibility and wider acceptance. Since the CPI-IW is primarily used for determining the amount of dearness allowance to be paid to millions of industrial workers in Public/Private sectors and employees of Central/State Governments, it has therefore, been a continuous endeavour on the part of the Labour Bureau to involve users at various stages of updation processes of the index numbers.

8. MEETING WITH USERS PRIOR TO THE RELEASE OF THE INDEX

A two day National Level Index Users' Meeting was organized on 19th-20th May, 2005 at Shimla in connection with the release of the new series of the CPI-IW. The representatives of Central/State Ministries/Departments, Employers' Associations and Central Trade Unions participated in the deliberations in the Tripartite Meeting. The meeting was convened to seek the tripartite concurrence for the release of the CPI-IW (New Series) on base 2001=100, which was to replace the existing series of the CPI-IW (1982=100). All the technical issues relating to compilation of the CPI-IW 2001=100 series as well as the process for regular consultation with the Users, especially the Central Trade Unions and Employers' Organizations, were discussed. There was a broad consensus so far as the technical aspects of the exercise was concerned. Nonetheless it was decided to "address the issues pertaining to participation of the Central Trade Unions as well as the Employers' Organizations in the deliberations of the Technical Advisory Committee on Statistics on Prices & Cost of Living (TAC on SPCL) besides evolving a suitable mechanism for periodic involvement of the users during the conduct of the entire exercise, prospectively, for future revision of base", in a meeting to be chaired by the Hon'ble Labour & Employment Minister with the representatives of Central Trade Unions.

As a follow-up of the National Level Index Users' Meeting, a meeting with the representatives of Central Trade Unions was held on 9th September 2005 in the Ministry under the Chairmanship of the Secretary, Labour & Employment. The issues discussed pertained to the participation of the Central Trade Unions and the Employers' Organizations in the TAC on SPCL. It was decided that a meeting of the reconstituted TAC on SPCL having the members from the Central Trade Unions and Employers' Organizations would be held prior to the release of the new series of CPI-IW on base 2001=100.

The 45th meeting of the TAC on SPCL was, therefore, held on 17th February, 2006, wherein 3 representatives each of the Central Trade Unions and the Employers' Organisations participated in its deliberations on the release of the new series of CPI-IW on base 2001=100. After discussions the TAC on SPCL decided that in view of improvements made in the new series as also the urgent need for updated base, the CPI-IW (New Series) should be released. Accordingly, with the approval of Government of India, the Labour Bureau released the new series of the CPI-IW on base 2001=100 with effect from January 2006 index on 9th of March, 2006. The details of Centre-wise and All-India Index Numbers along with Linking Factors with previous series of CPI-IW on base 1982=100 may be seen in the Table Nos. A.1.1.1 and A1.1.2 of the issue of the Indian Labour Journal.

CONSUMER PRICE INDEX MANUAL: THEORY AND PRACTICE

CHAPTER 1. AN INTRODUCTION TO CONSUMER PRICE INDEX METHODOLOGY

...

1.3 Consumer price indices (CPIs) are index numbers that measure changes in the prices of goods and services purchased or otherwise acquired by households, which households use directly, or indirectly, to satisfy their own needs and wants. Consumer price indices can be intended to measure either the rate of price inflation as perceived by households, or changes in their cost of living (that is, changes in the amounts that the households need to spend in order to maintain their standard of living). There need be no conflict between these two objectives. In practice, most CPIs are calculated as weighted averages of the percentage price changes for a Specified set, or "basket", of consumer products, the weights rejecting their relative importance in household consumption in some period. Much depends on how appropriate and timely the weights are.

...

The origins and uses of consumer price indices

...

1.9 Traditionally, one of the main reasons for compiling a CPI was to compensate wage-earners for inflation by adjusting their wage rates in proportion to the percentage change in the CPI, a procedure known as indexation. For this reason, official CPIs tended to become the responsibility of ministries of labour, but most are now compiled by national statistical offices. A CPI that is specifically intended to be used to index wages is known as a compensation index.

1.11 As CPIs provide timely information about the rate of inflation, they have also come to be used for a wide variety of purposes in addition to indexing wages. For example:

* CPIs are widely used to index pensions and social security benefits.
* CPIs are also used to index other payments, such as interest payments or rents, or the prices of bonds.
* CPIs are also commonly used as a proxy for the general rate of inflation, even though they measure only consumer inflation. They are used by some governments or central banks to set inflation targets for purposes of monetary policy.
* The price data collected for CPI purposes can also be used to compile other indices, such as the price indices used to deflate household consumption expenditures in national accounts, or the purchasing power parities used to compare real levels of consumption in different countries.

1.12 These varied uses can create conflicts of interest. For example, using a CPI as an indicator of general inflation may create pressure to extend its coverage to include elements that are not goods and services consumed by households, thereby changing the nature and concept of the CPI. It should also be noted that because of the widespread use of CPIs to index a wide variety of payments - not just wages, but social security benefits, interest payments, private contracts, etc. - extremely large sums of money turn on their movements, enough to have a significant impact on the state of government finances. Thus, small differences in the movements of CPIs resulting from the use of slightly different formulae or methods can have considerable financial implications. CPI methodology is important in practice and not just in theory.

Choice of index number

1.13 ...Many different kinds of mathematical formulae have been proposed over the past two centuries. While there may be no single formula that would be preferred in all circumstances, most

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This volume is an expanded revision of *Consumer Price Indices: An ILO manual,* published in 1989. Through the machanism of the Intrersecretariat Working Group on Price Statistics (IWGPS), the revision has been undertaken under the joint responsibility of six international organisations: the International Labour Office (ILO); the International Monetary Fund (IMF); the Organisation for Economic Co-operation and Development (OECD); the statistical Office of the European Communities (Eurostat); the United Nations Economic Commission for Europe (UNECE); and the World Bank. It is also being published jointly by these organisations.

economists and compilers of CPIs seem to be agreed that, in principle, the index formula should belong to a small class of indices called superlative indices. A superlative index may be expected to provide an approximation to a cost of living index. A characteristic feature of a superlative index is that it treats the prices and quantities in both periods being compared symmetrically. ...

1.14 When a monthly or quarterly CPI is first published, however, it is invariably the case that there is not sufficient information on the quantities and expenditures in the current period to make it possible to calculate a symmetric, or superlative, index....

Price indices based on baskets of goods and services

1.16 ... The purpose of an index number is to decompose proportionate or percentage changes in value aggregates into their overall components of price and quantity change. A CPI is intended to measure the price component of the change in households' consumption expenditures. One way to do this is to measure the change in the value of an aggregate, holding the quantities constant.

Lowe indices

1.17 One very wide, and popular, class of price indices is obtained by defining the index as the percentage change, between the periods compared, in the total cost of purchasing a given set of quantities, generally described as a "basket". The meaning of such an index is easy to grasp and to explain to users. This class of index is called a Lowe index in this manual, after the index number pioneer who first proposed it in 1823 (see Chapter 15) (not included here). Most statistical offices make use of some kind of Lowe index in practice.

1.18 Let there be n products in the basket with prices p_i and quantities q_i, and let the two periods compared be 0 and t. The Lowe index, P_{Lo}, is defined as follows:

$$P_{(Lo)} \equiv \frac{\sum_{i=1}^{n} p_i^t q_i}{\sum p_i^0 q_i}$$

1.19 In principle, any set of quantities could serve as the basket. The basket does not have to be restricted to the quantities purchased in one or other of the two periods compared, or indeed any actual period of time. The quantities could, for example, be arithmetic or geometric averages of the quantities in the two periods. For practical reasons, the basket of quantities used for CPI purposes usually has to be based on a survey of household consumption expenditures conducted in an earlier period than either of the two periods whose prices are compared. For example, a monthly CPI may run from January 2000 onwards, with January 2000=100, but the quantities may be derived from an annual expenditure survey made in 1997 or 1998, or even spanning both those years. As it takes a long time to collect and process expenditure data, there is usually a considerable time lag before such data can be introduced into the calculation of CPIs. The basket may also refer to a year, whereas the index may be compiled monthly or quarterly.

1.20 The period whose quantities are actually used in a CPI is described as the *weight reference period* and it will be denoted as period b. Period 0 is the *price reference period.* As just noted, b is likely to precede 0, at least when the index is first published, and this is assumed here, but b could be any period, including one between 0 and t, if the index is calculated some time after t. The Lowe index using the quantities of period b can be written as follows:

$$P_{(Lo)} \equiv \frac{\sum_{i=1}^{n} p_i^t q_i^b}{\sum_{i=1}^{n} p_i^0 q_i^b} \equiv \sum_{i=1}^{n} (p_i^t/p_i^0) s_i^{0b}$$

$$\text{where} \quad s_i^{0b} = \frac{p_i^0 q_i^b}{\sum_{i=1}^{n} p_i^0 q_i^b} \qquad (1.1)$$

The index can be written, and calculated, in two ways: either as the ratio of two value aggregates, or as an arithmetic weighted average of the *price ratios, or price relatives,* p_i^t/p_i^0, for the individual products using the hybrid expenditure shares s_i^{0b} as weights. The expenditures are described as *hybrid* because the prices and

quantities belong to two different time periods, *0* and *b*, respectively. The hybrid weights may be obtained by updating the actual expenditure shares in period *b*, namely, $p_i^b q_i^b / \sum p_i^b q_i^b$, for the price changes occurring between periods *b* and *0* by multiplying them by the price relatives *b* and *0*, namely, p_i^0/p_i^b. Lowe indices are widely used for CPI purposes.

Laspeyres and Paasche indices

1.21 Any set of quantities could be used in a Lowe index, but there are two special cases which figure very prominently in the literature and are of considerable importance from a theoretical point of view. When the quantities are those of the price reference period, that is when *b=0*, the *Laspeyres* index is obtained. When quantities are those of the other period, that is when *b=t*, the *Paasche* index is obtained. It is necessary to consider the properties of Laspeyres and Paasche indices, and also the relationships between them, in more detail.

1.22 The Laspeyres price index, P_L, is defined as:

$$P_L = \frac{\sum_{i=1}^{n} p_i^t q_i^0}{\sum_{i=1}^{n} p_i^0 q_i^0} \equiv \sum_{i=1}^{n} (p_i^t/p_i^0) s_i^0 \qquad (1.2)$$

where s_i^0 denotes the share of the actual expenditure on commodity *i* in period 0: that is, $p_i^0 q_i^0 / \sum p_i^0 q_i^0$.

1.23 The Paasche index, P_P, is defined as:

$$P_P = \frac{\sum_{i=1}^{n} p_i^t q_i^t}{\sum_{i=1}^{n} p_i^0 q_i^t} \equiv \left\{ \sum_{i=1}^{n} (p_i^t/p_i^0)^{-1} s_i^t \right\}^{-1} \qquad (1.3)$$

where s_i^t denotes the actual share of the expenditure on commodity *i* in period *t*; that is, $p_i^t q_i^t / \sum p_i^t q_i^t$. Notice that the Paasche index is a weighted *harmonic* average of the price relatives that uses the actual expenditure shares in the later period *t* as weights. It follows from equation (1.1) that the Paasche index can also be expressed as a weighted arithmetic average of the price relatives using hybrid expenditure weights, in which the quantities of *t* are valued at the prices of 0.

Decomposing current value changes using Laspeyres and Paasche indices

1.24 Laspeyres and Paasche quantity indices are defined in a similar way to the price indices, simply by interchanging the *p* and *q* values in formulae (1.2) and (1.3). They summarize changes over time in the flow of quantities of goods and services consumed. A Laspeyres quantity index values the quantities at the fixed prices of the earlier period, while the Paasche quantity index uses the prices of the later period. The ratio of the values of the expenditures in two periods (*V*) reflects the combined effects of both price and quantity changes. When Laspeyres and Paasche indices are used, the value change can be exactly decomposed into a price index times a quantity index only if the Laspeyres price (quantity) index is matched with the Paasche quantity (price) index. Let P_{La} and Q_{La} denote the Laspeyres price and quantity indices and let P_{Pa} and Q_{Pa} denote the Paasche price and quantity indices: then,

$$P_{La} Q_{Pa} \equiv V \quad \text{and} \quad P_{Pa} Q_{La} \equiv V.$$

1.25 Suppose, for example, a time series of household consumption expenditures at current prices in the national accounts is to be deflated by a price index to show changes in real consumption. To generate a series of consumption expenditures at constant base period prices (whose movements are identical with those of the Laspeyres volume index), the consumption expenditures at current prices must be deflated by a series of Paasche price indices.

Ratios of Lowe and Laspeyres indices

1.26 The Lowe index is transitive. The ratio of two Lowe indices using the same set of q^b values is also a Lowe index. For example, the ratio of the Lowe index for period t+1 with price reference period 0 divided by that for period t also with price

reference period 0 is ... a Lowe index for period t+1 with period *t* as the price reference period. This kind of index is, in fact, widely used to measure short-term price movements, such as between *t* and t+1, even though the quantities may date back to some much earlier period *b*.

1.27 A Lowe index can also be expressed as the ratio of two Laspeyres indices. For example, the Lowe index for period t with price reference period 0 is equal to the Laspeyres index for period *t* with price reference period *b* divided by the Laspeyres index for period 0 also with price reference period *b*. ...

Updated Lowe indices

1.28 It is useful to have a formula that enables a Lowe index to be calculated directly as a chain index, in which the index for period *t*+1 is obtained by updating the index for period *t*. Because Lowe indices are transitive, the Lowe index for period *t*+1 with price reference period 0 can be written as the product of the Lowe index for period *t* with price reference period 0 multiplied by the Lowe index for period *t*+1 with price reference period *t*. ...

Interrelationships between fixed basket indices

1.30 Consider first the interrelationship between the Laspeyres and the Paasche indices. A well-known result in index number theory is that if the price and quantity changes (weighted by values) are *negatively* correlated, then the Laspeyres index exceeds the Paasche index. Conversely, if the weighted price and quantity changes are *positively* correlated, then the Paasche index exceeds the Laspeyres index. The proof is given in Appendix 15.1 of Chapter 15 (not included here).

1.31 As consumers are usually price-takers, they typically react to price changes by substituting goods or services that have become *relatively* cheaper for those that have become *relatively* dearer. This is known as the *substitution effect,* a phenomenon that figures prominently in this manual and the wider literature on index numbers. Substitution tends to generate a negative correlation between the price and quantity relatives, in which case the Laspeyres index is greater than the Paasche index, the gap between them tending to widen over time.

1.32 In practice, however, statistical offices do not calculate Laspeyres or Paasche indices but instead usually calculate Lowe indices as defined in equation (1.1). The question then arises of how the Lowe index relates to the Laspeyres and Paasche indices. It is shown in the text of Chapter 15, and also in Appendix 15.2 (both not included here), that if there are persistent long-term trends in relative prices and if the substitution effect is operative, the Lowe index will tend to exceed the Laspeyres, and therefore also the Fisher and the Paasche indices. Assuming that period *b* precedes period 0, the ranking under these conditions will be:

Lowe ≥ Laspeyres ≥ Fisher ≥ Paasche

Moreover, the amount by which the Lowe exceeds the other three indices will tend to increase, the further back in time period *b* is in relation to period 0.

1.33 The positioning of period *b* is crucial. Given the assumptions about long-term price trends and substitution, a Lowe index will tend to increase as period *b* is moved backwards in time, or to decrease as period *b* is moved forwards in time. While *b* may have to precede 0 when the index is first published, there is no such restriction on the positioning of *b* as price and quantity data become available for later periods with passage of time. Period $_b$ can then be moved forwards. If *b* is positioned midway between 0 and *t*, the quantities are likely to be equi-representative of both periods, assuming that there is a fairly smooth transition from the relative quantities of 0 to those of *t*. In these circumstances, the Lowe index is likely to be close to the Fisher and other superlative indices, and cannot be presumed to have either an upward or a downward bias. These points are elaborated further below....

1.34 It is important that statistical offices take these relationships into consideration in deciding upon their policies. There are obviously practical advantages and financial savings from continuing to make repeated use over many years of the same fixed set of quantities to calculate a CPI. However, the amount by which such a CPI exceeds some conceptually preferred target index, such as a cost of living index (COLI), is likely to get steadily larger the further back in time the period $_b$ to which the quantities refer. Most users are likely to interpret the difference as upward bias. A large bias may undermine the credibility and acceptability of the index.

Young index

1.35 Instead of holding constant the quantities of period *b*, a statistical office may calculate a CPI as a weighted arithmetic average of the individual price relatives, holding constant the revenue shares of period *b*. The resulting index is called a *Young* index in this manual, again after another index number pioneer. The Young index is defined as follows:

$$P_{Yo} \equiv \sum_{i=1}^{n} s_i^b \left(\frac{p_i^t}{p_i^0}\right) \quad \text{where} \quad s_i^b \equiv \frac{p_i^b q_i^b}{\sum_{i=1}^{n} p_i^b q_i^b} \tag{1.8}$$

In the corresponding Lowe index, equation (1.1), the weights are hybrid revenue shares that value the quantities of *b* at the prices of 0....

1.36 Whereas there is a presumption that the Lowe index will tend to exceed the Laspeyres index, it is more difficult to generalize about the relationship between the Young index and the Laspeyres index. The Young could be greater or less than the Laspeyres depending on how sensitive the quantities are to changes in relative prices. ...

Geometric Young, Laspeyres and Paasche indices

1.38 In the geometric version of the Young index, a weighted geometric average is taken of the price relatives using the expenditure shares of period *b* as weights. It is defined as follows:

$$P_{GYo} \equiv \prod_{i=1}^{n} \left(\frac{p_i^t}{p_i^0}\right)^{s_i^b} \tag{1.9}$$

where s_i^b is defined as above. The geometric Laspeyres is the special case in which *b=0*; that is, the expenditure shares are those of the price reference period 0. Similarly, the geometric Paasche uses the expenditure shares of period t. It should be noted that these geometric indices cannot be expressed as the ratios of value aggregates in which the quantities are fixed. They are not basket indices and there are no counterpart Lowe indices. ...

Symmetric indices

1.41 A symmetric index is one that makes equal use of the prices and quantities in both the periods compared and treats them in a symmetric manner. There are three particular symmetric indices that are widely used in economic statistics. It is convenient to introduce them at this point. As already noted, these three indices are also superlative indices.

1.42 The first is the *Fisher price index, P_F*, defined as the *geometric* average of the Laspeyres and Paasche indices; that is,

$$P_F \equiv \sqrt{P_L P_P} \tag{1.10}$$

1.43 The second is the *Walsh price index, P_W*. This is a basket index whose quantities consist of geometric averages of the quantities in the two periods; that is,

$$P_W \equiv \frac{\sum_{i=1}^{n} p_i^t \sqrt{q_i^t q_i^0}}{\sum_{i=1}^{n} p_i^0 \sqrt{q_i^t q_i^0}} \tag{1.11}$$

By taking a *geometric* rather than an arithmetic average of the quantities, equal weight is given to the relative quantities in both periods. The quantities in the Walsh index can be regarded as being equi-representative of both periods.

1.44 The third index is the *Törnqvist price index, P_T*, defined as a *geometric* average of the price relatives weighted by the average expenditure shares in the two periods.

$$P_T = \prod_{i=1}^{n} (p_i^t/p_i^0)^{\sigma_i} \quad (1.12)$$

where σ_i is the arithmetic average of the share of expenditure on product *i* in the two periods.

$$\sigma_i = \frac{s_i^t + s_i^0}{2} \quad (1.13)$$

where the s_i values are defined as in equations (1.2) and (1.3) above.

1.45 The theoretical attractions of these indices become more apparent in the following sections on the axiomatic and economic approaches to index numbers.

Fixed base versus chain indices

1.46 ...When a time series of Lowe or Laspeyres indices is calculated using a fixed set of quantities, the quantities become progressively out of date and increasingly irrelevant to the later periods for which prices are being compared. The base period, in which quantities are set, has to be updated sooner or later and the new index series linked to the old. Linking is inevitable in the long run.

1.47 In a chain index, each link consists of an index in which each period is compared with the preceding one, the weight and price reference periods being moved forward each period. Any index number formula can be used for the individual links in a chain index. For example, it is possible to have a chain index in which the index for t+1 on *t* is a Lowe index defined as $\sum p^{t+1}q^{t-j}/\sum p^t q^{t-j}$. The quantities refer to some period that is *j* periods earlier than the price reference period *t*. The quantities move forward one period as the price reference period moves forward one period. If *j=0*, the chain Lowe becomes a chain Laspeyres, while if *j=-1*, it becomes a chain Paasche.

1.48 The CPIs in some countries are, in fact, annual chain Lowe indices of this general type, the quantities referring to some year or years that precede the price reference period 0 by a fixed period. For example, the 12 monthly indices from January 2000 to January 2001, with January 2000 as the price reference period, could be Lowe indices based on price-updated expenditures for 1998. The 12 indices from January 2001 to January 2002 are then based on price updated expenditures for 1999, and so on.

1.49 The expenditures lag behind the January price reference period by a fixed interval, moving forward a year each January as the price reference period moves forward one year. Although, for practical reasons, there has to be a time lag between the quantities and the prices when the index is first published, it is possible to recalculate the monthly indices for the current year later, using current expenditure data when they eventually become available. In this way, it is possible for the long run index to be an annually chained monthly index, with contemporaneous annual weights. This method is explained in more detail in Chapter 9 (not included here). It is used by one statistical office.

1.50 A chain index has to be "path dependent". It must depend on the prices and quantities in all the intervening periods between the first and last periods in the index series. Path dependency can be advantageous or disadvantageous. When there is a gradual economic transition from the first to the last period, with smooth trends in relative prices and quantities, chaining will tend to reduce the index number spread between the Lowe, Laspeyres and Paasche indices, thereby making the movements in the index less dependent on the choice of index number formula.

1.51 If there are fluctuations in the prices and quantities in the intervening periods, however, chaining may not only increase the index number spread but also distort the measure of the overall change between the first and last periods. For example, suppose all the prices in the last period return to their initial levels in period 0, which implies that they must have fluctuated in between;

a chain Laspeyres index will not return to 100. It will tend to be greater than 100. If the cycle is repeated with all the prices periodically returning to their original levels, a chain Laspeyres index will tend to drift further and further above 100 even though there may be no long-term upward trend in the prices. Chaining is therefore not advised when prices fluctuate. When monthly prices are subject to regular and substantial seasonal fluctuations, for example, monthly chaining cannot be recommended. Seasonal fluctuations cause serious problems, which are analysed in Chapter 22 (not included here). While a number of countries update their expenditure weights annually, the 12-monthly indices within each year are not chain indices but Lowe indices using fixed annual quantities.

1.52 *The Divisia index.* If the prices and quantities are continuous functions of time, it is possible to partition the change in their total value over time into price and quantity components following the method of Divisia. As shown in Chapter 15 (not included here), the Divisia index may be derived mathematically by differentiating value (i.e., price multiplied by quantity) with respect to time to obtain two components: a relative-value-weighted price change and a relative-value-weighted quantity change. These two components are defined to be price and quantity indices, respectively. The Divisia is essentially a theoretical index. In practice, prices can be recorded only at discrete intervals, even if they vary continuously with time. A chain index may, however, be regarded as a discrete approximation to a Divisia. The Divisia index itself offers limited practical guidance about the kind of index number formula to choose for the individual links in a chain index.

Axiomatic and stochastic approaches to index numbers

1.53 Various *axiomatic approaches* to index numbers are explained in Chapter 16 (not included here). These approaches seek to determine the most appropriate functional form for an index by specifying a number of axioms, or tests, that the index ought to satisfy. They throw light on the properties possessed by different kinds of indices, some of which are not intuitively obvious. Indices that fail to satisfy certain basic or fundamental axioms, or tests, may be rejected completely because they are liable to behave in unacceptable ways. An axiomatic approach may also be used to rank indices on the basis of their desirable, and undesirable, properties.

First axiomatic approach

1.54 The first approach is the traditional test approach pioneered by Irving Fisher. The price and quantity indices are defined as functions of the two vectors of prices and two vectors of quantities relating to the two periods compared. The prices and quantities are treated as independent variables, whereas in the economic approach to index numbers considered later in this chapter the quantities are assumed to be functions of the prices.

1.55 Chapter 16 (not included here) starts by considering a set of 20 axioms, but only a selection of them is given here by way of illustration.

T1: *positivity* - the price index and its constituent vectors of prices and quantities should be positive.

T3: *identity test* - if the price of every product is identical in both periods, then the price index should equal unity, no matter what the quantity vectors are.

T5: *proportionality in current prices* - if all prices in period t are multiplied by the positive number λ, then the new price index should be λ times the old price index; i.e., the price index function is (positively) homogeneous of degree one in the components of the period t price vector.

T10: *invariance to changes in the units of measurement* (commensurability test) - the price index does not change if the units in which the products are measured are changed.

T11: *time reversal test* - if all the data for the two periods are interchanged, then the resulting price index should equal the reciprocal of the original price index.

T14: *mean value test for prices* - the price index lies between the highest and the lowest price relatives.

T16: *Paasche and Laspeyres bounding test* - the price index lies between the Laspeyres and Paasche indices.

T17: *monotonicity in current prices* - if any period t price is increased, then the price index must increase.

1.56 Some of the axioms or tests can be regarded as more important than others. Indeed, some of the axioms seem so inherently reasonable that it might be assumed that any index number actually in use would satisfy them. For example, test T10, the commensurability test, says that if the unit of quantity in which a product is measured is changed, say, from a gallon to a litre, the index must be unchanged. One index that does not satisfy this test is the *Dutot* index, which is defined as the ratio of the arithmetic means of the prices in the two periods. As explained later, this is a type of elementary index that is in fact widely used in the early stages of CPI calculation.

1.59 Another important test is T11, the time reversal test. In principle, it seems reasonable to require that the same result should be obtained whichever of the two periods is chosen as the price reference period: in other words, whether the change is measured forwards in time, i.e., from 0 to *t*, or backwards in time from *t* to 0. The Young index fails this test because an arithmetic average of a set of price relatives is not equal to the reciprocal of the arithmetic average of the reciprocals of the price relatives. ...

1.60 Both the Laspeyres and Paasche fail the time reversal test for the same reasons as the Young index. The Paasche index also fails the time reversal test.

1.61 In contrast, the Lowe index satisfies the time reversal test *provided* that the quantities q_i^b remain fixed when the price reference period is changed from 0 to *t*. The quantities of a Laspeyres index are, however, those of the price reference period *by definition,* and must change whenever the price reference period is changed. The basket for a forwards Laspeyres is different from that for a backwards Laspeyres, and the Laspeyres fails the time reversal test in consequence.

1.62 Similarly, the Lowe index is transitive whereas the Laspeyres and Paasche indices are not. Assuming that a Lowe index uses a fixed set of quantities, q_i^b, whatever the price reference period, it follows that

$$L_0^{0,t} = L_0^{0,t-k} L_0^{t-k,t}$$

where $L_0^{0,t}$, is the Lowe index for period *t* with period 0 as the price reference period. The Lowe index that compares *t* directly with 0 is the same as that calculated indirectly as a chain index through period *t-k.*

1.63 If, on the other hand, the Lowe index is defined in such a way that quantities vary with the price reference period, as in the index $\sum p^{t+1}q^{t-j} / \sum p^t q^{t-j}$ considered earlier, the resulting chain index is not transitive. The chain Laspeyres and chain Paasche indices are special cases of this index.

1.64 In the real world, the quantities do change and the whole point of chaining is to enable the *quantities* to be continually updated to take account of the changing universe of products. Achieving transitivity by arbitrarily holding the quantities constant, especially over a very long period of time, does not compensate for the potential biases introduced by using out-of-date quantities.

Ranking of indices using the first axiomatic approach

1.65 In Chapter 16 (not included here) it is shown not only that the Fisher price index satisfies all the 20 axioms listed but also, more remarkably, that it is the only possible index that can satisfy

all 20 axioms. Thus, on the basis of this particular set of axioms, the Fisher clearly dominates other indices.

1.66 In contrast to Fisher, the other two symmetric (and superlative) indices defined in equations (1.11) and (1.12) above do not emerge so well from the 20 tests. In Chapter 16 (not included here), it is shown that the Walsh price index fails four tests while the Törnqvist index fails nine tests. Nevertheless, the Törnqvist and the Fisher may be expected to approximate each other quite closely numerically when the data follow relatively smooth trends, as shown in Chapter 19 (not included here).

1.67 One limitation of the axiomatic approach is that the list of axioms is inevitably somewhat arbitrary. Some axioms, such as the Paasche and Laspeyres bounding test failed by both Törnqvist and Walsh, could be regarded as dispensable. Additional axioms or tests can be envisaged, and two further axioms are considered below. Another problem with a simple application of the axiomatic approach is that it is not sufficient to know which tests are failed. It is also necessary to know how badly an index fails. Failing badly one major test, such as the commensurability test, might be considered sufficient to rule out an index, whereas failing several minor tests marginally may not be very disadvantageous.

Some further tests

1.68 Consider a further symmetry test. Reversing the roles of prices and quantities in a price index yields a quantity index of the same functional form as the price index. The *factor reversal test* requires that the product of this quantity index and the original price index should be identical with the change in the value of the aggregate in question. The test is important if, as stated earlier, price and quantity indices are intended to enable changes in the values of aggregates over time to be factored into their price and quantity components in an economically meaningful way. Another interesting result given in Chapter 16 (not included here) is that the Fisher index is the only price index to satisfy four minimal tests: T1 (positivity), T11 (time reversal test), T12 (quantity reversal test) and T21 (factor reversal test). As the factor reversal test implicitly assumes that the prices and quantities must refer either to period 0 or to period *t*, it is not relevant to a Lowe index in which three periods are involved, *b*, 0 and *t*.

1.69 As shown earlier, the product of the Laspeyres price (quantity) index and the Paasche quantity (price) index is identical with the change in the total value of the aggregate in question. Thus, Laspeyres and Paasche indices may be said to satisfy a weak version of the factor reversal test in that dividing the value change by a Laspeyres (Paasche) price index does lead to a meaningful quantity index, i.e., the Paasche (Laspeyres), even though the functional forms of the price and quantity indices are not identical.

1.70 Another test discussed in Chapter 16 (not included here) is the *additivity test.* This is more important from the perspective of quantity than price indices. Price indices may be used to deflate value changes to obtain implicit quantity changes. The results may be presented for sub-aggregates such as broad categories of household consumption. Just as expenditure aggregates at current prices are, by definition, obtained simply by summing individual expenditures, it is reasonable to expect that the changes in the sub-aggregates of a quantity index should add up to the changes in the totals - the additivity test. Quantity indices such as Laspeyres and Paasche that use a common set of prices to value quantities in both periods must satisfy the additivity test. Similarly, the Lowe quantity index defined as $\sum p^j q^t / \sum p^j q^0$ is also additive. The Geary-Khamis quantity index (see annex 4) used to make international comparisons of real consumption and gross domestic product (GDP) between countries is an example of such a Lowe quantity index. It uses an arithmetically weighted average of the prices in the different countries as the common price vector p^j to compare the quantities in different countries.

1.71 Similarly, an average of the prices in two periods can be used to value the quantities in inter-temporal indices. If the quantity index is also to satisfy the time reversal test, the average must be symmetrical. The *invariance to proportional changes in current prices test* (which corresponds to test T 7 listed in Chapter 16 (not included here), except that the roles of prices and quantities are reversed) requires that a quantity index depend only on the *relative,* not the absolute, level of the prices in each period. The Walsh quantity index satisfies this test, is additive and satisfies the time reversal test as well. It emerges as a quantity index with some very desirable properties.

1.72 Although the Fisher index itself is not additive, it is possible to decompose the overall *percentage change* in a Fisher price, or quantity, index into additive components that reflect the percentage change in each price or quantity. A similar multiplicative decomposition is possible for a Törnqvist price or quantity index.

The stochastic approach and a second axiomatic approach

1.73 Before considering a second axiomatic approach, it is convenient to take the stochastic approach to price indices. The stochastic approach treats the observed price *changes or relatives* as if they were a random sample drawn from a defined universe whose mean can be interpreted as the general rate of inflation. There can, however, be no single unique rate of inflation. Many possible universes can be defined, depending on which particular sets of expenditures or transactions the user is interested in. Clearly, the sample mean depends on the choice of universe from which the sample is drawn. Specifying the universe is similar to specifying the scope of a CPI. The stochastic approach addresses issues such as the appropriate form of average to take and the most efficient way to estimate it from a sample of price relatives, once the universe has been defined.

1.74 The stochastic approach is particularly useful when the universe is reduced to a single type of product. Because of market imperfections, there may be considerable variation in the prices at which the same product is sold in different outlets and also in the price changes observed. In practice, statistical offices have to estimate the average price change for a single product from a sample of price observations. Important methodological issues are raised, which are discussed in some detail in Chapter 7 and Chapter 20 (both not included here).

The unweighted stochastic approach

1.75 In Chapter 16 (not included here), the unweighted stochastic approach to index number theory is explained. If simple random sampling has been used, equal weight may be given to each sampled price relative. Suppose each price relative can be treated as the sum of two components: a common inflation rate and a random disturbance with a zero mean. Using least squares or maximum likelihood, the best estimate of the common inflation rate is the unweighted *arithmetic* mean of price relatives, an index formula known as the *Carli* index. This index is the unweighted version of the Young index and is discussed further below, in the context of elementary price indices.

1.76 If the random component is multiplicative, not additive, the best estimate of the common inflation rate is given by the unweighted *geometric* mean of price relatives, known as the *Jevons* index. The Jevons index may be preferred to the Carli on the grounds that it satisfies the time reversal test, whereas the Carli does not. As explained below, this fact may be decisive when determining the functional form to be used to estimate the elementary indices compiled in the early stages of CPI calculations.

The weighted stochastic approach

1.77 ...a *weighted* stochastic approach can be applied at an aggregative level covering sets of different products. As the products may be of differing economic importance, equal weight should not be given to each type of product. The

products may be weighted on the basis of their share in the total value of the expenditures, or other transactions, in some period or periods. In this case, the index (or its logarithm) is the expected value of a random sample of price relatives (or their logarithms) whose probability of selection is proportional to the expenditure on that type of product in some period, or periods. Different indices are obtained depending on which expenditure weights are used and on whether the price relatives or their logarithms are used.

1.78 Suppose a sample of price relatives is randomly selected with the probability of selection proportional to the expenditure on that type of product in the price reference period 0. The expected price change is then the Laspeyres price index for the universe. Other indices may, however, also be obtained using the weighted stochastic approach. Suppose both periods are treated symmetrically and the probabilities of selection are made proportional to the arithmetic mean expenditure shares in both periods 0 and *t*. When these weights are applied to the logarithms of the price relatives, the expected value of the logarithms is the Törnqvist index, also known as the Törnqvist -Theil index. From an axiomatic viewpoint, the choice of a symmetric average of the expenditure shares ensures that the time reversal test is satisfied, while the choice of the arithmetic mean, as distinct from some other symmetric average, may be justified on the grounds that the fundamental proportionality in current prices test, T5, is thereby satisfied.

1.79 By focusing on price changes, the Törnqvist index emerges as an index with some very desirable properties. This suggests a second axiomatic approach to indices, in which the focus is shifted from the individual prices and quantities used in the traditional axiomatic approach, to price changes and values shares.

A second axiomatic approach

1.80 A second axiomatic approach is examined in Chapter 16 (not included here) in which a price index is defined as a function of the two sets of prices, or their ratios, and two sets of values. Provided the index is invariant to changes in units of measurement, i.e., satisfies the commensurability test, it makes no difference whether individual prices or their ratios are specified. A set of 17 axioms is postulated which are similar to the 20 axioms considered in the first axiomatic approach.

1.81 It is shown in Appendix 16.1 (not included here) that the Törnqvist, or Törnqvist -Theil, is the only price index to satisfy all 17 axioms, just as the Fisher price index is the only index to satisfy all 20 tests in the first approach. However, the Törnqvist index does not satisfy the factor reversal test, so that the implicit quantity index obtained by deflating the change in value by the Törnqvist price index is not the Törnqvist quantity index. The implicit quantity index is therefore not "best" in the sense of satisfying the 17 axioms when these are applied to the quantity, rather than price, indices.

1.82 Zero prices may cause problems for indices based on price ratios, and especially for geometric averages of price ratios. In particular, if any price tends to zero, one test that may be applied is that the price index ought not to tend to zero or plus infinity. The Törnqvist does not meet this test. It is therefore proposed ... that when using the Törnqvist index, care should be taken to bound the prices away from zero in order to avoid a meaningless index number.

1.83 Finally, ...[t]he Lowe index emerges quite well from the axiomatic approach, satisfying both the time reversal and circularity tests. On the other hand, the Young index, like the Laspeyres and Paasche indices, fails both tests. As already explained, however, the attractiveness of the Lowe index depends more on how relevant the fixed quantity weights are to the two periods being compared, that is on the positioning of period *b*, than its axiomatic properties.

1.84 Although the "best" indices emerging from the two axiomatic approaches, namely Fisher and Törnqvist, are not the same, they have much in common. As already noted, they are both

symmetric indices and they are both superlative indices. Although their formulae are different, they may be expected to behave in similar ways and register similar price movements. The same *type* of indices keep emerging as having desirable properties whichever approach to index theory is adopted, a conclusion that is reinforced by the economic approach to index numbers, which is explained in Chapter 17 (not included here).

Cost of living index

1.85 Approaching the consumer price index from the standpoint of economic theory has led to the development of the concept of a cost of living index (COLI). The theory of the COLI was first developed by Konüs [1924]. It rests on the assumption of optimizing behaviour on the part of a rational consumer. The COLI for such a consumer has been defined succinctly as the ratio of the minimum expenditures needed to attain the given level of utility, or welfare, under two different price regimes. ...

1.86 Whereas a Lowe index measures the change in the cost of purchasing a fixed basket of goods and services resulting from changes in their prices, a COLI measures the change in the *minimum* cost of maintaining a given level of utility, or welfare, that results from changes in the prices of the goods and services consumed.

1.87 A COLI is liable to possible misinterpretation because households' welfare depends on a variety of physical and social factors that have no connection with prices. Events may occur that impinge directly on welfare, such as natural or man-made disasters. When such events occur, households may need to increase their consumption of goods and services in order to compensate for the loss of welfare caused by those events. Changes in the costs of consumption triggered by events *other than changes in prices* are irrelevant for a CPI that is not merely intended to measure changes in the prices of consumer goods and services but is generally interpreted by users as measuring price changes, and only price changes. In order to qualify as a CPI, a COLI must therefore hold constant not only the consumer's preferences but all the non-price factors that affect the consumer's welfare and standard of living. If a CPI is intended to be a COLI it must be *conditional* on:

- a particular level of utility or welfare;
- a particular set of consumer preferences;
- a particular state of the physical and social environment. ...

1.88 Lowe indices and COLIs have in common the fact that they may both be defined as the ratios of expenditures in two periods. However, whereas, by definition, the quantities are fixed in Lowe indices, they vary in response to changes in relative prices in COLIs. In contrast to the fixed basket approach to index theory, the economic approach explicitly recognizes that the quantities consumed are actually dependent on the prices. In practice, rational consumers may be expected to adjust the relative quantities they consume in response to changes in *relative* prices. A COLI assumes that a consumer seeking to minimize the cost of maintaining a given level of utility will make the necessary adjustments. The baskets of goods and services in the numerator and denominator of a COLI are not therefore exactly the same.

1.90 The quantities required for the calculation of the COLI in at least one of the periods are not likely to be observable in practice. The COLI is not an operational index that can be calculated directly. The challenge is therefore to see whether it is possible to find methods of estimating a COLI indirectly or at least to find upper and lower bounds for the index. ...

Upper and lower bounds on a cost of living index

1.91 It follows from the definition of a Laspeyres index that, if the consumer's income were to change by the same proportion as the change in the Laspeyres index, the consumer must have the possibility of purchasing the same basket of products as in the base period. The consumer cannot be worse off. However, if relative prices have changed, a utility-maximizing consumer

would not continue to purchase the same quantities as before. The consumer would be able to achieve a *higher level* of utility by substituting, at least marginally, products that have become relatively cheaper for those that have become dearer. As a COLI measures the change in the minimum expenditures needed to maintain a constant level of utility, the COLI based on the first period will increase by less than the Laspeyres index.

1.92 By a similar line of reasoning, it follows that when relative prices change, the COLI based on the second period must increase by more than the Paasche index. ...the Laspeyres index provides an upper bound to the COLI based on the first period and the Paasche a lower bound to the COLI based on the second period. It should be noted that there are two different COLIs involved here: one based on the first period and the other based on the second period. In general, however, the two COLIs are unlikely to differ much.

1.93 Suppose that the theoretical target index is a COLI, but that, for practical reasons, the CPI is actually calculated as a Lowe index in which the quantities refer to some period *b* that precedes the price reference period 0. One important conclusion to be drawn from this preliminary analysis is that as the Lowe may be expected to exceed the Laspeyres, assuming long-term price trends and substitution, while the Laspeyres may in turn be expected to exceed the COLI, the widely used Lowe index may be expected to have an upward bias. This point has had a profound influence on attitudes towards CPIs in some countries. The bias results from the fact that, by definition, fixed basket indices, including Laspeyres, do not permit any substitution between products in response to changes in relative prices. It is therefore usually described as "substitution bias". A Paasche index would be expected to have a downward substitution bias.

Some special cases

1.94 The next step is to establish whether there are special conditions under which it may be possible to measure a COLI exactly. In Chapter 17 it is shown that if the consumer's preferences are homothetic - that is, each indifference curve has the same shape, each being a uniform enlargement, or contraction, of each other - then the COLI is independent of the utility level on which it is based. The Laspeyres and Paasche indices provide upper and lower bounds to the *same* COLI.

1.95 One interesting special case occurs when the preferences can be represented by the so-called "Cobb-Douglas" function in which the cross-elasticities of demand between the various products are all unity. Consumers adjust the relative quantities they consume inversely in proportion to the changes in relative prices so that expenditure shares remain constant. With Cobb-Douglas preferences, the geometric Laspeyres provides an exact measure of the COLI. As the expenditure shares remain constant over time, all three *geometric* indices - Young, Laspeyres and Paasche - coincide with each other and with the COLI. Of course, the arithmetic versions of these indices do not coincide in these circumstances, because the baskets in periods b, 0 and t are all different as substitutions take place in response to changes in relative prices.

1.96 One of the more famous results in index number theory is that if the preferences can be represented by a homogeneous quadratic utility function, the Fisher index provides an exact measure of the COLI (see Chapter 17) (not included here). Even though consumers' preferences are unlikely to conform exactly with this particular functional form, this result does suggest that, in general, the Fisher index is likely to provide a close approximation to the underlying unknown COLI and certainly a much closer approximation than either the arithmetic Laspeyres or Paasche indices.

Estimating COLIs by superlative indices

1.97 The intuition - that the Fisher index approximates the COLI - is corroborated by the following line of reasoning. Diewert [1976] noted that a homogeneous quadratic is a flexible functional form that can provide a second-order approximation to other twice-differentiable

functions around the same point. He then described an index number formula as *superlative* when it is exactly equal to the COLI based on a certain functional form *and* when that functional form is flexible, e.g., a homogeneous quadratic. The derivation of these results, and further explanation, is given in detail in Chapter 17 (not included here). In contrast to the COLI based on the true but unknown utility function, a superlative index is an actual index number that can be calculated. The practical significance of these results is that they provide a theoretical justification for expecting a superlative index to provide a fairly close approximation to the underlying COLI in a wide range of circumstances.

1.98 *Superlative indices as symmetric indices.* The Fisher is by no means the only example of a superlative index. In fact, there is a whole family of superlative indices. It is shown in Chapter 17 (not included here) that any quadratic mean of order r is a superlative index for each value of $r \neq 0$. A quadratic mean of order r price index P^r is defined as follows:

$$P^r \equiv \frac{\sqrt[r]{\sum_{i=1}^{n} s_i^0 \left(\frac{p_i^t}{p_i^0}\right)^{\frac{r}{2}}}}{\sqrt[r]{\sum_{i=1}^{n} s_i^t \left(\frac{p_i^0}{p_i^t}\right)^{\frac{r}{2}}}} = \frac{\left[\sum_{i=1}^{n} s_i^0 \left(\frac{p_i^t}{p_i^0}\right)^{\frac{r}{2}}\right]^{\frac{1}{r}}}{\left[\sum_{i=1}^{n} s_i^t \left(\frac{p_i^0}{p_i^t}\right)^{\frac{r}{2}}\right]^{\frac{1}{r}}} \qquad (1.15)$$

where s_i^0 and s_i^t are defined as in equations (1.2) and (1.3) above.

1.99 The symmetry of the numerator and denominator of equation (1.15) should be noted. A distinctive feature of equation (1.15) is that it treats the price changes and expenditure shares in both periods symmetrically, whatever value is assigned to the parameter r. Three special cases are of interest:

- when r=2, equation (1.1) reduces to the Fisher price index;
- when r=1 it is equivalent to the Walsh price index;
- in the limit as r -> 0, it equals the Törnqvist index. ...

1.100 *Choice of superlative index.* ... As each [superlative formula] may be expected to approximate to the same underlying COLI, it may be inferred that they ought also to approximate to each other. The fact that they are all symmetric indices reinforces this conclusion. These conjectures tend to be borne out in practice by numerical calculations. So long as the parameter r does not lie far outside the range 0 to 2, superlative indices tend to be very close to each other. In principle, however, there is no limit on r and it has recently been shown that as r becomes larger, the formula tends to assign increasing weight to the extreme price relatives and the resulting superlative indices may diverge significantly from each other. Only when the absolute value of r is small, as in the case of the three commonly used superlative indices (Fisher, Walsh and Törnqvist), is the choice of superlative index unimportant.

1.101 Both the Fisher and the Walsh indices date back nearly a century. The Fisher index owes its popularity to the axiomatic, or test, approach, which Fisher himself was instrumental in developing. As already noted, it dominates other indices using the first axiomatic approach, while the Törnqvist dominates using the second axiomatic approach outlined above. The fact that the Fisher and the Törnqvist are both superlative indices whose use can be justified on economic grounds suggests that, from a theoretical point of view, it may not be possible to improve on them for CPI purposes.

Representativity bias

1.102 The fact that the Walsh index is a Lowe index that is also superlative suggests that the bias in other Lowe indices depends on the extent to which their quantities deviate from those in the Walsh basket. This can be viewed from another angle.

1.103 As the quantities in the Walsh basket are *geometric* averages of the quantities in the two periods, equal importance is assigned to the *relative,* as distinct from the *absolute,* quantities in both periods. The Walsh basket may therefore

be regarded as being the basket that is most representative of *both* periods. If equal importance is attached to the consumption patterns in the two periods, the optimal basket for a Lowe index ought to be the most representative basket. The Walsh index then becomes the conceptually preferred target index for a Lowe index.

1.104 Suppose that period *b*, for which the quantities are actually used in the Lowe index, lies midway between 0 and *t*. In this case, assuming fairly smooth trends in the relative quantities, the actual basket in period *b* is likely to approximate to the most representative basket. Conversely, the further away that period *b* is from the midpoint between 0 and *t*, the more the relative quantities of *b* are likely to diverge from those in the most representative basket. In this case, the Lowe index between periods 0 and *t* that uses period b quantities is likely to exceed the Lowe index that uses the most representative quantities by an amount that becomes progressively larger the further back in time period *b* is positioned. The excess constitutes "bias" if the latter index is the target index. The bias can be attributed to the fact that the period *b* quantities tend to become increasingly unrepresentative of a comparison between 0 and *t* the further back period *b* is positioned. The underlying economic factors responsible are, of course, exactly the same as those that give rise to bias when the target index is the COLI. Thus, certain kinds of indices can be regarded as biased without invoking the concept of a COLI. Conversely, the same kinds of indices tend to emerge as being preferred, whether or not the objective is to estimate a cost of living bias.

1.105 If interest is focused on short-term price movements, the target index is an index between consecutive time periods *t* and *t+1*. In this case, the most representative basket has to move forward one period as the index moves forward. Choosing the most representative basket implies chaining. Similarly, chaining is also implied if the target index is a COLI between *t* and *t+1*. In practice, the universe of products is continually changing as well. As the most representative basket moves forward, it is possible to update the set of products covered, as well as take account of changes in the relative quantities of products that were covered previously.

Data requirements and calculation issues

1.106 As superlative indices require price and expenditure data for both periods, and as expenditure data are usually not available for the current period, it is not feasible to calculate a superlative CPI, at least at the time that a CPI is first published. In practice, CPIs tend to be Lowe indices with fixed quantities or annually updated chain Lowe indices. In the course of time, however, the requisite expenditure data may become available, enabling a superlative CPI to be calculated subsequently. Users will find it helpful for superlative CPIs to be published retrospectively as they make it possible to evaluate the properties and behaviour of the official index. Superlative CPIs can be treated as supplementary indices that complement, rather than replace, the original indices, if the policy is not to revise the official index.

1.107 Chapter 17 (not included here) notes that, in practice, CPIs are usually calculated in stages (see also Chapters 9 and 20, not included here) and addresses the question of whether indices calculated this way are consistent in aggregation: that is, have the same values whether calculated in a single operation or in two stages. The Laspeyres index is shown to be exactly consistent, but the superlative indices are not. The widely used Fisher and Törnqvist indices are nevertheless shown to be approximately consistent.

Allowing for substitution

1.108 Chapter 17 (not included here) examines one further index proposed recently, the Lloyd-Moulton index, P_{LM}, [is] defined as follows:

$$P_{LM} \equiv \left\{ \sum_{i=1}^{n} s_i^0 \left(\frac{p_i^t}{p_i^0} \right)^{1-\sigma} \right\}^{\frac{1}{1-\sigma}} \quad \sigma \neq 1 \qquad (1.16)$$

The parameter σ, which must be non-negative, is the elasticity of substitution between the products covered. It reflects the extent to which, on average, the various products are believed to be substitutes for each other. The advantage of this index is that it may be expected to be free of substitution bias to a reasonable degree of approximation, while requiring no more data than a Lowe or Laspeyres index. It is therefore a practical possibility for CPI calculation, even for the most recent periods, although it is likely to be difficult to obtain a satisfactory, acceptable estimate of the numerical value of the elasticity of substitution, the parameter used in the formula.

Aggregation issues

1.109 It has been assumed up to this point that the COLI is based on the preferences of a single representative consumer. ...The general conclusion is that essentially the same relationships hold at an aggregate level, although some additional issues arise which may require additional assumptions.

1.110 One issue is how to weight individual households. Aggregate indices that weight households by their expenditures are called "plutocratic", while those that assign the same weight to each household are called "democratic". Another question is whether, at any one point of time, there is a single set of prices or whether different households face different prices. In general, when defining the aggregate indices it is not necessary to assume that all households are confronted by the same set of prices, although the analysis is naturally simplified if there is only a single set.

1.111 A plutocratic aggregate COLI assumes that each individual household minimizes the cost of attaining a given level of utility when confronted by two different sets of prices, the aggregate COLI being defined as the ratio of the aggregate minimum costs over all households. ...

1.112 Like the index for a single representative consumer, an aggregate COLI cannot be calculated directly, but it may be possible to calculate aggregate Laspeyres and Paasche indices that bound their respective COLIs from above or below. If there is only one single set of national prices, the aggregate plutocratic Laspeyres index reduces to an ordinary aggregate Laspeyres index. As the aggregate plutocratic Laspeyres and Paasche can, in principle, be calculated, so can the aggregate plutocratic Fisher index. ... [T]his should normally provide a good approximation to the aggregate plutocratic COLI.

1.113 ... [I]n principle, both democratic and plutocratic Laspeyres, Paasche and Fisher indices could be constructed by a statistical Agency... The required data are unlikely to be available for *individual* households in practice and, even if they were to be, they could be subject to large errors.

Seasonal products

1.116 ... [T]he existence of seasonal products poses some intractable problems and serious challenges for CPI compilers and users. Seasonal products are products that are either:

- not available during certain seasons of the year; or
- are available throughout, but their prices or quantities are subject to regular fluctuations that are synchronized with the season or time of the year.

There are two main sources of seasonal fluctuations: the climate and custom. Month-to-month movements in a CPI may sometimes be so dominated by seasonal influences that it is difficult to discern the underlying trends in prices. Conventional seasonal adjustment programmes may be applied, but these may not always be satisfactory. ...seasonality creates serious problems for the compilation of a CPI when some of the products in the basket regularly disappear and reappear, thereby breaking the continuity of the price series from which the CPI is built up. There is no panacea for seasonality. A consensus on what is best practice in this area has not yet been formed. ...

1.117 One possibility is to exclude seasonal products from the index, but this may be an unacceptable reduction in the scope of the index, as seasonal products can account for a significant proportion of total household consumption. Assuming seasonal products are retained, one solution is to switch the focus from month-to-month movements in the index to changes between the same month in successive years. In some countries, it is common for the media and other users, such as central banks, to focus on the annual rate of inflation between the most recent month and the same month in the previous year. This year-on-year figure is much easier to interpret than month-to-month changes, which can be somewhat volatile, even in the absence of seasonal fluctuations.

1.118 This approach is extended in Chapter 22 (not included here) to the concept of a *rolling year-on-year* index that compares the prices for the most recent 12 months with the corresponding months in the price reference year. The resulting rolling year indices can be regarded as seasonally adjusted price indices. ...Such an index can be regarded as a measure of inflation for a year that is centred around a month that is six months earlier than the last month in the rolling index. For some purposes, this time lag may be disadvantageous, but ...under certain conditions the current month year-on-year monthly index, together with the previous month's year-on-year monthly index, can successfully predict the rolling year index that is centred on the current month. Of course, rolling year indices and similar analytic constructs are not intended to replace the monthly or quarterly CPI but to provide supplementary information that can be extremely useful to users. They can be published alongside the official CPI.

1.119 Various methods of dealing with the breaks in price series caused by the disappearance and reappearance of seasonal products are examined in Chapter 22 (not included here). However, this remains an area in which more research needs to be done.

Elementary price indices

1.120 ...the calculation of a CPI proceeds in stages. In the first stage, *elementary price indices* are estimated for the *elementary expenditure aggregates* of a CPI. In the second stage, these elementary indices are aggregated, or averaged, to obtain higher-level indices using the elementary expenditure aggregates as weights. An elementary aggregate consists of the expenditures on a small and relatively homogeneous set of products defined within the consumption classification used in the CPI. ... [S]tatistical offices usually select a set of representative products within each aggregate and then collect samples of their prices from a number of different outlets. The elementary aggregates serve as strata for sampling purposes.

1.121 The prices collected at the first stage are typically not prices observed in actual transactions between different economic units, but the prices at which the products are offered for sale in retail outlets of one kind or another. In principle, however, a CPI measures changes in the prices paid by households. These prices may actually vary during the course of a month, which is typically the time period to which the CPI relates. In principle, therefore, the first step should be to average the prices at which some product is sold during the period, bearing in mind that the price may vary even for the same product sold in the same outlet. In general, this is not a practical possibility. However, when the outlet is an electronic point of sale at which all the individual products are "scanned" as they are sold, the values of the transactions are actually recorded, thereby making it possible to calculate an average price instead of simply recording the offer price at a single point of time. Some use of scanner data is already made for CPI purposes and it may be expected to increase over the course of time.

1.122 Once the prices are collected for the representative products in a sample of outlets, the question arises of what is the most appropriate formula to use to estimate an elementary price index. This topic is considered in Chapter 20 (not included here). It was comparatively neglected

until a number of papers in the 1990s provided much clearer insights into the properties of elementary indices and their relative strengths and weaknesses. The quality of a CPI depends heavily on the quality of the elementary indices which are the building blocks from which CPIs are constructed.

1.123 Prices are collected for the same product in the same outlet over a succession of time periods. An elementary price index is therefore typically calculated from two sets of matched price observations. Here it is assumed that there are no missing observations and no changes in the quality of the products sampled so that the two sets of prices are perfectly matched. The treatment of new and disappearing products, and of quality change, is a separate and complex issue in its own right. It is outlined below, and discussed in detail in Chapters 7, 8 and 21 (not included here).

Weights within elementary aggregates

1.124 In most cases, the price indices for elementary aggregates are calculated without the use of explicit expenditure weights. Whenever possible, however, weights should be used that reflect the relative importance of the sampled items, even if the weights are only approximate. In many cases, the elementary aggregate is simply the lowest level at which any reliable weighting information is available. In this case, the elementary index has to be calculated without the use of weights. Even in this case, however, it should be noted that when the items are selected with probabilities proportional to the size of some relevant variable such as sales, for example, weights are implicitly introduced by the sampling selection procedure.

1.125 For certain elementary aggregates, information about sales of particular items, market shares and regional weights may be used as explicit weights within an elementary aggregate. Weights within elementary aggregates may be updated independently, and possibly more often than the elementary aggregates themselves (which serve as weights for the higher-level indices).

1.126 For example, assume that the number of suppliers of a certain product, such as petrol, is limited. The market shares of the suppliers may be known from business survey statistics and can be used as weights in the calculation of an elementary aggregate price index for petrol. As another example, prices for water may be collected from a number of local water supply services where the population in each local region is known. The relative size of the population in each region may then be used as a proxy for the relative consumption expenditures to weight the price in each region to obtain the elementary aggregate price index for water.

Interrelationships between different elementary index formulae

1.127 Useful insights into the properties of various formulae that have been used, or considered, for elementary price indices may be gained by examining the mathematical interrelationships between them. ... As it is assumed that there are no explicit weights available, the various formulae considered all make use of unweighted averages: that is, *simple* averages in which the various items are *equally* weighted. There are two basic options for an elementary index:

- some kind of simple average of the price ratios or relatives;
- the ratio of some kind of simple average of the prices in the two periods. In the case of a geometric average, the two methods coincide, as the geometric average of the price ratios or relatives is identical to the ratio of the geometric average prices.

1.128 Using the first of the above options, three possible elementary price indices are:

- a simple arithmetic average of the price relatives, known as the Carli index, or P_C; the *Carli* is the unweighted version of the Young index;
- a simple geometric average of the price relatives, known as the *Jevons* index, or P_J; the Jevons is the unweighted version of the geometric Young index;

- a simple harmonic average of the price relatives, or P_H.

As noted earlier, for any set of positive numbers the arithmetic average is greater than, or equal to, the geometric average, which in turn is greater than, or equal to, the harmonic average, the equalities holding only when the numbers are all equal. It follows that $P_C \geq P_J \geq P_H$.

1.129 ... [T]he gaps between the three indices widen as the variance of the price relatives increases. The choice of formula becomes more important the greater the diversity of the price movements. P_J can be expected to lie approximately halfway between P_C and P_H.

1.130 Using the second of the options, three possible indices are:

- the ratio of the simple arithmetic average prices, known as the *Dutot* index, or P_D;
- the ratio of the simple geometric averages, again the Jevons index, or P_J;
- the ratio of the simple harmonic averages, or P_H.

The ranking of *ratios* of different kinds of average are not predictable. For example, the Dutot, P_D, could be greater or less than the Jevons, P_J.

1.131 The Dutot can also be expressed as a weighted average of the price relatives in which the prices of period 0 serve as the weights. ...

As compared with the Carli, which is a simple average of the price relatives, the Dutot gives more weight to the price relatives for the products with high prices in period 0. It is nevertheless difficult to provide an economic rationale for this kind of weighting. Prices are not expenditures. If the products are homogeneous, very few quantities are likely to be purchased at high prices if the same products can be purchased at low prices. If the products are heterogeneous, the Dutot should not be used anyway, as the quantities are not commensurate and not additive.

1.132 While it is useful to establish the interrelationships between the various indices, they do not actually help decide which index to choose. However, as the differences between the various formulae tend to increase with the dispersion of the price relatives, it is clearly desirable to define the elementary aggregates in such a way as to try to minimize the variation in the price movements within each aggregate. The less variation there is, the less difference the choice of index formula makes. As the elementary aggregates also serve as strata for sampling purposes, minimizing the variance in the price relatives within the strata will also reduce the sampling error.

Axiomatic approach to elementary indices

1.133 One way to decide between the various elementary indices is to exploit the axiomatic approach outlined earlier. A number of tests are applied to the elementary indices in Chapter 20 (not included here).

1.134 The Jevons index, P_J, satisfies all the selected tests. It dominates the other indices in the way that the Fisher tends to dominate other indices at an aggregative level. The Dutot index, P_D, fails only one, the commensurability test. This failure is critical, however. It reflects the fundamental point made earlier that when the quantities are not additive from an economic viewpoint, the prices are also not additive and hence cannot be meaningfully averaged. However, PD performs well when the sampled products are homogeneous. ...

1.135 Although the Carli index, P_C, has been widely used in practice, the axiomatic approach shows it to have some undesirable properties. In particular, as the unweighted version of the Young index, it fails the time reversal and transitivity tests. This is a serious disadvantage, especially as elementary indices are often monthly chain indices. A consensus has emerged that the Carli may be unsuitable because it is liable to have a significant upward bias. ...Its use is not sanctioned for the Harmonized Indices of Consumer Prices used within the European Union. Conversely, the harmonic average of the price

relatives, P_H, is liable to have an equally significant downward bias; anyway, it does not seem to be used in practice.

1.136 Based on the axiomatic approach, the Jevons emerges as the preferred index, but its use may not be appropriate in all circumstances. If one observation is zero, the geometric mean is zero. The Jevons is sensitive to extreme falls in prices; it may be necessary to impose upper and lower bounds on the individual price relatives when using the Jevons.

Economic approach to elementary indices

1.137 The economic approach to elementary indices is explained in Chapter 20 (not included here). The sampled products for which prices are collected are treated as if they constituted a basket of goods and services purchased by rational utility-maximizing consumers. The objective is then to estimate a conditional cost of living index covering the set of products in question.

1.138 It should be noted, however, that the differences between the prices of the sampled products do not necessarily mean that the products are qualitatively different. If markets were perfect, relative prices should reflect relative costs of production and relative utilities. In fact, price differences may occur simply because of market imperfections. For example, exactly the same products may be bought and sold at different prices in different outlets simply because consumers lack information about the prices charged in other outlets. Producers may also practise price discrimination, charging different customers different prices for exactly the same products. Price discrimination is widespread in many service industries. When the price differences are a result of market imperfections, consumers cannot be expected to react to changes in the relative prices of products in the same way as they would if they were well informed and had free choice.

1.139 In any case, assuming there is no information about quantities or expenditures within an elementary aggregate, it is not possible to calculate any kind of superlative index. So the conditional cost of living index at the level of an elementary aggregate can be estimated only on the assumption that certain special conditions apply.

1.140 There are two special cases of some interest. The first case is where the underlying preferences are socalled Leontief preferences. With these preferences *relative* quantities remain fixed whatever the relative prices. No substitutions are made in response to changes in relative prices. The cross-elasticities of demand are zero. With Leontief preferences, a Laspeyres index provides an exact measure of the cost of living index. In this case, the Carli calculated for a random sample would provide an estimate of the cost of living index provided that the items were selected with probabilities proportional to the population expenditure shares. It might appear that if the items were selected with probabilities proportional to the population quantity shares, the sample Dutot would provide an estimate of the population Laspeyres. However, assuming that the basket for the Laspeyres index contains a number of heterogeneous products whose quantities are not additive, the quantity shares, and hence the probabilities, are undefined.

1.141 The second case is one already considered above, namely when the preferences can be represented by a Cobb-Douglas function. As already explained, with these preferences, the geometric Laspeyres would provide an exact measure of the cost of living index. In this case, the Carli calculated for a random sample would provide an unbiased estimate of the cost of living index, provided that the items were selected with probabilities proportional to the population expenditure shares.

1.142 On the economic approach, the choice between the sample Jevons and the sample Carli rests on which is likely to approximate the more closely to the underlying COLI: in other words, on whether the demand cross elasticities are likely to be closer to unity or zero, on average. In practice, the cross-elasticities could take on any value ranging up to plus infinity for an elementary aggregate in which the sampled products were

strictly homogeneous, i.e., perfect substitutes. It should be noted that in the limiting case in which the sampled products are homogeneous, there is only a single kind of product and therefore no index number problem: the price index is given by the ratio of the unit values in the two periods. It may be conjectured that, on average, the cross-elasticities are likely to be closer to unity than zero for most elementary aggregates so that, in general, the Jevons index is likely to provide a closer approximation to the cost of living index than the Carli. In this case, the Carli must be viewed as having an upward bias.

1.143 It is worth noting that the use of the Jevons index does not imply, or assume, that expenditure shares remain constant. Obviously, a geometric average of the price relatives can be calculated whatever changes do or do not occur in the expenditure shares, in practice. What the economic approach shows is that *if* the expenditure shares remain constant (or roughly constant), *then* the Jevons can be expected to provide a good estimate of the underlying cost of living index. The insight provided by the economic approach is that the Jevons is likely to provide a closer approximation to the cost of living index than the Carli because a significant amount of substitution is more likely than no substitution, especially as elementary aggregates should be deliberately constructed in such a way as to group together similar items that are close substitutes for each other.

1.144 An alternative to the Jevons, P_J, would be a geometric average of P_C and P_H ... This could be justified on grounds of treating the data in both periods symmetrically without invoking any particular assumption about the form of the underlying preferences.... [T]he geometric average of PC and P_H is likely to be very close to P_J, so that the latter may be preferred on the grounds that it is a simpler concept and easier to compile.

1.145 It may be concluded that, based on the economic approach, as well as the axiomatic approach, the Jevons emerges as the preferred index in general, although there may be cases in which little or no substitution takes place within the elementary aggregate and the Carli might be preferred. The index compiler must make a judgement on the basis of the nature of the products actually included in the elementary aggregate.

1.146 The above discussion has also thrown light on some of the sampling properties of the elementary indices. If the products in the sample are selected with probabilities proportional to expenditures in the price reference period:

- the sample (unweighted) Carli index provides an unbiased estimate of the population Laspeyres;
- the sample (unweighted) Jevons index provides an unbiased estimate of the population geometric Laspeyres.

These results hold irrespective of what the underlying cost of living index may be.

Concepts, scope and Classifications

...

1.148 While the general purpose of a CPI is to measure changes in the prices of *consumption* goods and services, there are a number of concepts that need to be defined precisely before an operational definition of a CPI can be arrived at. The concept of consumption is an imprecise one that can be interpreted in several different ways, each of which may lead to a different CPI. It is also necessary to decide whether the index is meant to cover all consumers, i.e., all households, or just a particular group of households. The scope of a CPI is inevitably influenced by what is intended, or believed, to be the main use of the index. Compilers also need to remember that the index may be used as proxy for a general price index and used for purposes other than those for which it is intended.

1.149 The word "consumer" can be used to refer both to a type of economic unit and to a type of product. To avoid confusion here, the term *consumption* good or service will be used where necessary, rather than *consumer* good or service. A consumption good or service provides utility to its user. It may be defined as *a good or service that members of households use, directly or*

indirectly, to satisfy their own personal needs and wants. "Utility" should be interpreted in a broad sense. It is simply the generic, technical term preferred by economists for the benefit or welfare that individuals or households derive from the use of a consumer good or service.

1.150 A CPI is generally understood to be a price index that measures changes in the prices of consumption goods and services acquired and used by households. In principle, more broadly based price indices can be defined whose scope extends beyond consumption goods and services to include the prices of physical assets such as land or dwellings. Such indices may be useful as broad measures of inflation as perceived by households, but most CPIs are confined to consumption goods and services. These may include the prices of the flows of services provided by assets such as dwellings, even though the assets themselves may be excluded. In any case, the prices of financial assets such as bonds, shares or other marketable securities purchased by households are generally regarded as being outside the scope of a CPI.

Acquisitions and uses

1.151 The times at which households acquire and use consumption goods or services are generally not the same. Goods are typically acquired at one point in time and used at some other point in time, or even used repeatedly over an extended period of time. The time of acquisition of a *good* is the moment at which the legal or effective economic ownership of the good passes to the consumer. In a market situation, this is the point at which the purchaser incurs a liability to pay. A *service* is acquired at the time that the producer provides it; no change of ownership being involved. The time at which acquisitions are recorded, and their prices, should also be consistent with the way in which the same transactions are recorded in the expenditure data used for weighting purposes.

1.152 The time at which payment is made may be determined mainly by institutional arrangements and administrative convenience. When payments are not made in cash, there may be a significant lapse of time before the consumer's bank account is debited for a purchase paid for by cheque, by credit card or similar arrangements. The time at which these debits are eventually made is irrelevant for the recording of the acquisitions and the prices. On the other hand, when the acquisition of a good or service is financed by the creation of a new financial asset at the time of acquisition, such as a loan to the purchaser, two economically separate transactions are involved, the purchase/sale of the good or service and the creation of the asset. The price to be recorded is the price payable at the time of acquisition, however the purchase is financed. Of course, the provision of finance may affect the price payable. The subsequent repayments of any debt incurred by the purchaser and the associated interest payments are financial transactions that are quite distinct from the purchase of the good or service whose price has to be recorded. The explicit or implicit interest payments payable on the amount depend on the capital market, the nature of the loan, its duration, the creditworthiness of the purchaser, and so on. These points are explained in more detail in Chapter 3 (not included here).

1.153 The distinction between the *acquisition* and the use of a consumer good or service outlined above has led to two different concepts of a CPI being proposed:

* A CPI may be intended to measure the average change between two time periods in the prices of the consumer goods and services acquired by
* households. Alternatively, a CPI may be intended to measure the average change between two time periods in the prices of the consumer goods and services used by households to satisfy their needs and wants.

The distinction between time of acquisition and time of use is particularly important for durable goods and certain kinds of services.

1.154 *Durable and non-durable goods.* A "non-durable" good might be better described as a *single use* good. For example, food or drink are used once only to satisfy hunger or thirst. Many so-called non-durable consumer goods are in fact extremely durable physically. Households may

hold substantial stocks of nondurables, such as many foodstuffs and fuel, for long periods of time before they are used.

1.155 The distinguishing feature of a durable consumption good is that it is durable under use. Consumer durables can be used repeatedly or continuously to satisfy the needs or wants of consumers over a long period of time, possibly many years: for example, furniture or vehicles. For this reason, a durable is often described as providing a flow of services to the consumer over the period it is used (see also Box 14.3 of Chapter 14) (not included here). ...

1.156 A list of the different kinds of consumer durables distinguished in the Classification of Individual Consumption according to Purpose (COICOP) is given in Chapter 3 (not included here). Of course, some durables last much longer than others, the less durable ones being described as "semi-durables" in COICOP: for example, clothing. It should be noted that dwellings are classified as fixed assets, not durable consumption goods, and are therefore not included in COICOP. Dwellings are used to produce housing services. These services are consumed by tenants or owner-occupiers, as the case may be, and are therefore included in COICOP.

1.157 Many services are durable and are also not fully consumed, or used up, at the time they are acquired. Some services bring about long-lasting improvements from which the consumers derive enduring benefits. The condition and quality of life of persons receiving medical treatments such as hip replacements or cataract surgery, for example, are substantially and permanently improved. Similarly, consumers of educational services can derive lifetime benefits from them. Expenditures on education and health also share with durable goods the characteristic that they are also often so costly that they have to be financed by borrowing or by running down other assets.

1.158 Expenditures on durable goods and durable services are liable to fluctuate, whereas using up such goods and services is likely to be a fairly steady process. However, the using up cannot be directly observed and valued. It can only be estimated by making assumptions about the timing and duration of the flows of benefits. Partly because of the conceptual and practical difficulties involved in measuring uses, statistical offices tend to adopt the acquisitions approach to consumer durables in both their national accounts and CPIs.

1.159 *A consumer price index based on the acquisitions approach.* Households may acquire goods and services for purposes of consumption in four main ways. They may:

- purchase them in monetary transactions;
- produce them themselves for their own consumption;
- receive them as payments in kind in barter transactions, particularly as remuneration in kind for work done;
- receive them as free gifts, or transfers, from other economic units.

1.160 The broadest possible scope for goods and services based on the acquisitions approach would be one covering all four categories, irrespective of who bears the costs. It would therefore include all *social transfers in kind* in the form of education, health, housing and other goods and services provided free of charge, or at nominal prices, to individual households by governments or non-profit institutions (NPIs). Total acquisitions are equivalent to the total actual individual consumption of (non-institutional) households, as defined in the SNA (see Chapter 14 (not included here)). *Collective* services provided by governments to the community as whole, such as public administration and defence, are not included and are outside the scope of a CPI.

1.161 From the point of view of the government or NPI that provides and pays for them, social transfers are valued either by the market prices paid for them or by the costs of producing them. From the point of view of the receiving households they have zero or nominal prices. For

CPI purposes, the appropriate price is that paid by the household. The price paid by the government belongs in a price index for government expenditures. When households incur zero expenditures, the services provided free carry zero weight in a CPI. However, when governments and NPIs introduce charges for goods or services that were previously provided free, the increase from a zero to a positive price could be captured by a CPI, as explained in Chapter 3 (not included here).

1.162 *Expenditures versus acquisitions.* Expenditures need to be distinguished from acquisitions. Expenditures are incurred by the economic units that bear the costs. Households do not incur expenditures on social transfers in kind, so the scope of households' expenditures is generally narrower than the scope of their acquisitions. Moreover, not all expenditures are monetary. A *monetary expenditure* occurs when a household pays in cash, by cheque or credit card, or otherwise incurs a financial liability to pay. Only monetary expenditures generate monetary prices that can be observed and recorded for CPI purposes.

1.163 *Non-monetary expenditures* occur when households pay, but in other ways than cash. There are three important categories of non-monetary expenditures:

* In barter transactions, households exchange consumption goods and services among themselves. As the values of the goods and services surrendered as payments constitute negative expenditures, the expenditures should cancel out so that barter transactions between households carry zero weight on aggregate. They can be ignored in practice for CPI purposes.
* When employees are remunerated in kind, they purchase the goods or services, but pay with their labour, not cash. Monetary values can be imputed for the expenditures implicitly incurred by the households.
* Similarly, when households produce goods and services for themselves, they incur the costs, some of which may be monetary in the form of purchased inputs. The monetary values of the implicit expenditures on the outputs produced can be imputed on the basis of the corresponding market prices. If such imputed prices were to be included in the CPI, the prices of the inputs would have to be excluded to avoid double counting.

1.164 *A hierarchy of consumption aggregates.* A hierarchy of possible consumption aggregates may be envisaged, as explained in Chapter 14 (not included here):

- total acquisitions of goods and services by households;
- less social transfers in kind=households' total expenditures;
- less non-monetary expenditures=households' monetary expenditures.

The choice of consumption aggregate is a policy matter. For example, if the main reason for compiling a CPI is to measure inflation, the scope of the index might be restricted to household monetary expenditures on consumption, inflation being essentially a monetary phenomenon. Prices cannot be collected for the consumer goods and services involved in non-monetary expenditures, although they can be estimated on the basis of the prices observed in corresponding monetary transactions. The European Union's Harmonized Indices of Consumer Prices, which are specifically intended to measure inflation within the EU, are confined to monetary expenditures.

Unconditional and conditional cost of living indices

1.165 ... [T]he scope of a COLI depends on whether it is conditional or unconditional. The welfare of a household depends not only on the utility derived from the goods and services it consumes, but on the social, political and physical environment in which the household lives. An *unconditional* cost of living index measures the change in the minimum cost of maintaining a given level of welfare in response to changes in any of the factors that affect welfare, whereas a

conditional cost of living index measures the change in the minimum cost of maintaining a given level of utility or welfare resulting from changes in consumer prices, holding the environmental factors constant.

1.166 An unconditional COLI may be a more comprehensive *cost of living* index than a conditional COLI, but it is not a more comprehensive *price* index. An unconditional index does not include any more price information than a conditional index and it does not give more insight into the impact of price changes on welfare. On the contrary, the impact of the price changes is diluted and obscured the more environmental variables are included within the scope of an unconditional index. In order to qualify as a price index, a COLI must be conditional.

Specific types of transactions

1.167 Given that conceptually, a CPI is an index that measures changes in the prices of consumption goods and services, expenditures on items that are not consumption goods and services fall outside the scope of the CPI; for example, expenditures on assets such as land or bonds, shares and other financial assets. Similarly, payments that do not involve any flows of goods or services in return for the payments are outside the scope; for example, payments of income taxes or social security contributions.

1.168 *Transfers.* A transfer occurs when one economic unit provides a good, service or asset, including money, to another without receiving any counterpart good, service or asset in return. As no good or service is acquired when a household makes a transfer, the transfer must be outside the scope. For this reason, compulsory cash transfers, such as payments of direct taxes on income or wealth, must be outside the scope of a CPI. It is not always clear, however, whether certain payments to government are transfers or purchases of services. For example, payments to obtain certain kinds of licences are sometimes taxes under another name, whereas in other cases the government may provide a service by exercising some kind of supervisory, regulatory or control function. Gifts or donations must be transfers and therefore outside the scope. On the other hand, subscriptions to clubs and societies which provide their members with some kind of service in return are included. Tips and gratuities can be borderline cases. When they are effectively an expected, even obligatory, part of the payment for a service they are not transfers and should be treated as part of the price paid.

1.169 *Undesirable or illegal goods or services.* All goods and services that households *willingly* buy on the market to satisfy their own needs and wants should be included, even if most people might regard them as undesirable or even if they are prohibited by law. Of course, illegal goods and services may have to be excluded in practice because the requisite data cannot be collected.

1.170 *Financial transactions.* Financial transactions occur when one kind of financial asset is exchanged for another, bearing in mind that money is itself a financial asset. For example, the purchase of a bond or share is a financial transaction. Borrowing is a financial transaction in which cash is exchanged, the counterpart being the creation of a financial asset or liability.

1.171 No consumption occurs when a financial transaction takes place, even though financial transactions may be undertaken in order to facilitate future consumption. Financial transactions as such are not covered by CPIs because, by definition, no goods are exchanged, nor services provided, in financial transactions. However, some "financial" transactions may not be entirely financial because they may include an explicit or implicit service charge in addition to the provision of an asset, such as a loan. As a service charge constitutes the purchase of a service by the household, it should be included in a CPI, although it may be difficult to separate out the service charge in some cases. For example, foreign exchange transactions are financial transactions in which one financial asset is exchanged for another. Changes in the price of a foreign currency in terms of the domestic currency resulting from changes in the exchange rate are outside the scope of a CPI. On the other hand, the

commission charges associated with the exchange of currencies are included as payments for the services rendered by the foreign exchange dealers.

1.172 Households may borrow in order to make large expenditures on durables or houses, but also to finance large educational or health expenses, or even expensive holidays. Whatever the purpose of the borrowing, the financial transaction in which the loan is contracted is outside the scope of a CPI. The treatment of the interest payable on loans is a separate issue considered below.

1.173 *Composite transactions.* As just noted, some transactions are composite transactions containing two or more components whose treatment may be quite different for CPI purposes. For example, part of a life insurance premium is a financial transaction leading to the creation of a financial claim and is therefore outside the scope, whereas the remainder consists of a service charge which should be covered by a CPI. The two components are not separately itemized, however.

1.174 As explained in Chapter 3 (not included here), the treatment of payments of nominal interest is difficult because it may have four conceptually quite different components:

- a pure interest payment;
- a risk premium that depends on the creditworthiness of the borrower;
- a service charge payable to the bank, moneylender or other financial institution engaged in the business of making loans;
- a payment to compensate the creditor for the real holding loss incurred on the principal of the loan during inflation.

The fourth component is clearly outside the scope of a CPI as it is a capital flow. Conversely, the third component, the service charge, should clearly be included. The treatment of the first two components is controversial. When there is significant inflation or a very imperfect capital market, payments of nominal interest may be completely dominated by the last two components, both of which are conceptually quite different from the concept of pure interest. For example, the "interest" charged by a village moneylender may be mostly a high service charge. It may be impossible to decompose the various components of nominal interest in practice. The treatment of nominal interest as a whole remains difficult and somewhat controversial.

Household production

1.175 When households engage in production for the market, the associated business transactions are all outside the scope of a CPI. Expenditures incurred for business purposes are excluded, even though they involve purchases of goods and services that might be used to satisfy the personal needs and wants of members of the household instead.

1.176 Households also produce goods and services for their own consumption, mainly service production such as the preparation of meals, the care of children, the sick or the elderly, the cleaning and maintenance of durables and dwellings, the transportation of household members, and so on. Owner-occupiers produce housing services for their own consumption. Households also grow vegetables, fruit, flowers or other crops for their own use.

1.177 Many of the goods or services purchased by households do not provide utility directly but are used as inputs into the production of other goods and services that do provide utility: for example, raw foodstuffs, fertilizers, cleaning materials, paints, electricity, coal, oil, petrol, and so on.

1.178 In principle, a CPI should record changes in the prices of the outputs from these production activities, as it is the outputs rather than the inputs that are actually consumed and provide utility. However, as the outputs are not themselves purchased, no prices can be observed for them. Prices could be imputed for them equal to the prices they would fetch on the market, but this would make a CPI heavily dependent on

assumed rather than collected prices. The pragmatic solution ...is to treat all goods and services purchased on the market to be used exclusively as inputs into the production of other goods and services that are directly consumed by households as if they were themselves consumption goods and services. On this principle, goods such as insecticides and electricity are treated as providing utility indirectly and included in CPIs. This is, of course, the solution usually adopted in practice not only for CPIs but also in national accounts, where most expenditures on inputs into household production are classified as final consumption expenditures.

1.179 In some countries, there is an increasing tendency for households to purchase prepared, take-away meals rather than the ingredients. As the prices of such meals cost more than the sum of the ingredients that the households previously purchased, the weight attached to food consumption increases. This partly reflects the fact that the costs of the households' own labour inputs into the preparation of meals were previously ignored. Various kinds of household service activities that were previously outside the scope of a CPI may be brought within the scope if households choose to pay others to perform the services.

1.180 *Subsistence agriculture and owner-occupied housing.* In the case of two important types of production for own consumption within households, namely agricultural production for own consumption and housing services produced by owner-occupiers, the national accounts do actually try to record the values of the outputs produced and consumed rather than the inputs. Similarly, CPIs may also try to price the outputs rather than the inputs in these two cases.

1.181 In principle, the prices of the outputs from own-account agricultural production may be included in CPIs, even though they are imputed. On the other hand, for households relying on subsistence agriculture, the prices of inputs of agricultural materials purchased on the market may be their main exposure to inflation. Two points may be noted. First, the imputed market value of the output should usually be greater than the costs of the purchased inputs, if only because it should cover the costs of the labour inputs provided by the household. Thus, pricing the purchased inputs rather than the outputs may mean that the consumption of own agricultural production in CPIs does not receive sufficient weight. Second, double counting should be avoided. If the imputed prices of the outputs are included, the actual prices of the inputs consumed should not be included as well.

1.182 In the case of owner-occupied housing, the situation is complicated by the fact that the production requires the use of the capital services provided by a large fixed asset in the form of the dwelling itself. Even if the inputs into the production of housing services are priced for CPI purposes, it is still necessary to impute prices for the inputs of capital services (mainly depreciation plus interest) provided by the dwelling. Some countries therefore prefer to impute the prices of the outputs of housing services actually consumed on the basis of the rents payable for the same kind of dwellings rented on the market. The treatment of owner-occupied housing is complex, and somewhat controversial, and is considered in Chapters 3, 9, 10 and 23 (not included here), among others.

Coverage of households and outlets

1.183 ... [H]ouseholds may be either individual persons or groups of persons living together who make common provision for food or other essentials for living. A CPI may be required to cover:

- *either* the consumption expenditures made by households resident in a particular area, usually a country or region, whether the expenditures are made inside or outside the area - this is called the "national" concept of expenditure;
- or the consumption expenditures that take place within a particular area, whether made by households resident in that area or residents of other areas - this is called the "domestic" concept.

Adopting the domestic concept may make it more difficult to collect the relevant disaggregated expenditure data in household surveys. A CPI may also be defined to cover a group of countries, such as the European Union.

1.184 Not all kinds of households have to be included. ... [S]ome countries choose to exclude particular categories of households such as very wealthy households or households engaged in agriculture. Some countries also compile different indices designed to cover different groups of households, such as households resident in different regions. Another possibility is to compile a general CPI designed to cover all or most households and, in addition, one or more special indices aimed at particular sections of the community, such as households headed by pensioners. The precise coverage of households is a matter of choice. It is inevitably influenced by what are believed to be the main uses of the index. The set of households actually covered by the CPI is described as the "reference population".

Price variation

1.185 Prices for exactly the same good or service may vary between different outlets, while different prices may sometimes be charged to different types of customers. Prices may also vary during the course of the month to which the index relates. Conceptually, it is necessary to distinguish such pure price variation from price differences that are attributable to differences in the quality of the goods or services offered, although it is not always easy to distinguish between the two in practice. The existence of pure price differences reflects some form of market imperfections, such as consumers' lack of information or price discrimination.

1.186 When pure price differences exist, a change in market conditions may make it possible for some households to switch from purchasing at higher prices to purchasing at lower prices, for example if new outlets open that offer lower prices. The resulting fall in the average price paid by households counts as a price fall for CPI purposes, even though the price charged by each individual outlet may not change. If the prices are collected from the outlets and switches in households' purchasing habits remain unobserved, the CPIs are said to be subject to outlet substitution bias, as explained in more detail in Chapter 11 (not included here). On the other hand, when the price differences reflect differences in the quality of the goods and services sold in the different outlets, switching from outlets selling at higher prices to outlets selling at lower prices simply means that households are choosing to purchase lower-quality goods or services. In itself, this does not imply any change in price.

Classifications

1.187 ... [T]he classification of household expenditures used in a CPI provides the necessary framework for the various stages of CPI compilation. It provides a structure for purposes of weighting and aggregation, and also a basis for stratifying the samples of products whose prices are collected. The goods and services covered by a CPI may be classified in several ways: not simply on the basis of their physical characteristics but also by the purposes they serve and the degree of similarity of their price behaviour. Product-based and purpose-based classifications differ but can usually be successfully mapped onto each other. In practice, most countries use a hybrid classification system in which the breakdown at the highest level is by purpose while the lower-level breakdowns are by product type. This is the case for the recently revised internationally agreed Classification of Individual Consumption according to Purpose (COICOP), which provides a suitable classification for CPI purposes.

...

Consumer price indices and national accounts price deflators

1.190 Appendix 3.1 of Chapter 3 (not included here) explains the differences between the overall CPI and the deflator for total household consumption expenditures in national accounts. In practice, CPIs may be designed to cover only a subset of the households and a subset of the expenditures covered by the national accounts.

Moreover, the index number formulae needed for CPIs and national accounts deflators may be different. These differences mean that the overall CPI is generally not the same as the deflator for total household consumption expenditures in the national accounts. On the other hand, the basic price and expenditure data collected and used for CPI purposes are also widely used to build up the price indices needed to deflate the individual components of household consumption in the national accounts.

Expenditure weights

1.191 ...Expenditure data are needed for the elementary aggregates that can be used as weights in the second stage. These weights are needed whatever index number formula is used for aggregation purposes. Chapter 4 (not included here) is concerned with the derivation, and sources, of the expenditure weights.

Household expenditure surveys and national accounts

1.192 The principal data source for household consumption expenditures in most countries is a household expenditure survey (HES). An HES is a sample survey of thousands of households that are asked to keep records of their expenditures on different kinds of consumer goods and services over a specified period of time, such as a week or longer. The size of the sample obviously depends on the resources available, but also on the extent to which it is desired to break down the survey results by region or type of household. HESs are costly operations. ... Household expenditure surveys may be taken at specified intervals of time, such as every five years, or they may be taken each year on a continuing basis.

1.193 HESs can impose heavy burdens on the respondents, who have to keep detailed expenditure records of a kind that they would not normally keep, although this may become easier when supermarkets or other retail outlets provide detailed printouts of purchases. HESs tend to have some systematic biases. For example, many households either deliberately, or unconsciously, understate the amounts of their expenditures on certain "undesirable" products, such as gambling, alcoholic drink, tobacco or drugs. Corrections can be made for such biases. Moreover, the data collected in HESs may also need to be adjusted to bring them into line with the concept of expenditure required by the CPI. For example, the imputed expenditures on the housing services produced and consumed by owner-occupiers are not collected in HESs.

1.194 ...the use of the commodity flow method within the supply and use tables of the SNA enables data drawn from different primary sources to be reconciled and balanced against each other. The commodity flow method may be used to improve estimates of household consumption expenditures derived from expenditure surveys by adjusting them to take account of the additional information provided by statistics on the sales, production, imports and exports of consumer goods and services. By drawing on various sources, the household expenditure data in the national accounts may provide the best estimates of aggregate household expenditures, although the classifications used may not be fine enough for CPI purposes. Moreover, because HESs may be conducted only at intervals of several years, the expenditure data in the national accounts may be more up to date, as national accounts are able to draw upon other kinds of more recent data, such as retail sales and the production and import of consumer goods and services. It is important to note, however, that national accounts should not be viewed as if they were an alternative, independent data source to HESs. On the contrary, HESs provide one of the main sources for the expenditure data on household consumption used to compile national accounts.

1.195 Household expenditure surveys in many countries may not be conducted as frequently as might be desired for CPI, or national accounts, purposes. National HESs can be very costly and onerous for the households, as already noted. They may be conducted only once every five or ten years, or even at longer intervals. In any case,

conducting and processing HESs is time-consuming, so the results may not be available for CPI purposes until one or two years after the surveys have been conducted. It is for these practical reasons that CPIs in many countries are Lowe indices that use the quantities of some base period *b* that may precede the time reference period 0 by a few years and period *t* by many years.

1.196 Some countries conduct continuous HESs not only in order to update their CPI weights but also to improve their national accounts. Of course, the same panel of households does not have to be retained indefinitely; the panel can be gradually rotated by dropping some households and replacing them by others. Countries that conduct continuous expenditure surveys are able to revise and update their expenditure weights each year so that the CPI becomes a chain index with annual linking. Even with continuous expenditure surveys, however, there is a lag between the time at which the data are collected and the time at which the results are processed and ready for use, so that it is never possible to have survey results that are contemporaneous with the price changes. Thus, even when the weights are updated annually, they still refer to some period that precedes the time reference period. For example, when the price reference period is January 2000, the expenditure weights may refer to 1997 or 1998, or both years. When the price reference period moves forward to January 2001, the weights move forward to 1998 or 1999, and so on. Such an index is a chain Lowe index.

1.197 Some countries prefer to use expenditure weights that are the average rates of expenditure over periods of two or three years in order to reduce "noise" caused by errors of estimation (the expenditure surveys are only samples) or erratic consumer behaviour over short periods of time resulting from events such as booms or recessions, stock market fluctuations, oil shocks, or natural or other disasters.

Other sources for estimating expenditure weights

1.198 If expenditures need to be disaggregated by region for sampling or analytical purposes, it is possible to supplement whatever information may be available by region in HESs by using data from population censuses. Another data source may be food surveys. These are special surveys, conducted in some countries, that focus on households' expenditures on food products. They can provide more detailed information on food expenditures than that available from HESs.

1.199 Another possible source of information consists of points of purchase (POP) surveys, which are conducted in some countries. A POP survey is designed to provide information about the retail outlets at which households purchase specified groups of goods and services. Households are asked, for each item, about the amounts spent in each outlet and the names and addresses of the outlets. The main use for a POP survey is for selecting the sample of outlets to be used for price collection purposes.

Collection of price data

...

1.201 Lower-level indices are calculated for elementary aggregates. Depending on the resources available and procedures adopted by individual countries, these elementary aggregates could be sub-classes or micro-classes of the expenditure classification described above. If it is desired to calculate CPIs for different regions, the sub-classes or micro-classes have to be divided into strata referring to the different regions. In addition, in order to improve the efficiency of the sampling procedures used to collect prices, it will usually be desirable, if feasible, to introduce other criteria into the definitions of the strata, such as the type of outlet. When the sub-classes or micro-classes are divided into strata for data collection purposes, the strata themselves become the elementary aggregates. As a weight needs to be attached to each elementary aggregate in order to calculate the higher-level indices, an estimate of the

expenditure within each elementary aggregate must be available. Expenditure or quantity data are typically not available within an elementary aggregate, so the elementary indices have to be estimated from price data alone. This may change if scanner data from electronic points of sale become more available.

1.202 ...In principle, the relevant prices for a CPI should be the purchasers' prices actually paid by households, but it is generally neither practical nor cost effective to try to collect prices each month or quarter directly from households, even though expenditure data are collected directly from households in household expenditure surveys. In practice, the prices that are collected are not actual transaction prices, but rather the prices at which goods and services are offered for sale in outlets such as retail shops, supermarkets or service providers. However, it may become increasingly feasible to collect actual transactions prices as more goods and services are sold through electronic points of sale that record both prices and expenditures.

Random sampling and purposive sampling

1.203 Given that the prices are collected from the sellers, there are two different sampling problems that arise. The first is how to select the individual products within an elementary aggregate whose prices are to be collected. The second is how to select a sample of outlets selling those products. For some products, it may not be necessary to visit retail outlets to collect prices because there may be only a single price applying throughout the country. Such prices may be collected from the central organization responsible for fixing the prices. The following paragraphs refer to the more common situation in which prices are collected from a large number of outlets.

1.204 ... [T]he universe of products from which the sample is taken has several dimensions. The products may be classified not only on the basis of the characteristics and functions that determine their place in COICOP, but also according to the locations and outlets at which they are sold and the times at which they are sold. The fact that the universe is continually changing over time is a major problem, not only for CPIs but also for most other economic statistics. Products disappear to be replaced by other kinds of products, while outlets close and new ones open. The fact that the universe is changing over time creates both conceptual and practical problems, given that the measurement of price changes over time requires some continuity in the products priced. In principle, the price changes recorded should refer to matched products that are identical in both time periods. The problems created when products are not identical are considered in some detail later.

1.205 In designing the sample for price collection purposes, due attention should be paid to standard statistical criteria to ensure that the resulting sample estimates are not only unbiased and efficient in a statistical sense, but also cost-effective. There are two types of bias encountered in the literature on index numbers, namely *sampling bias* as understood here and the *non-sampling biases* in the form of substitution bias or representativity bias.... It is usually clear from the context which type of bias is meant.

1.206 ... [I]n principle, it would be desirable to select both outlets and products using random sampling with known probabilities of selection. This ensures that the sample of products selected is not distorted by subjective factors and enables sampling errors to be calculated. Many countries nevertheless continue to rely heavily on the purposive selection of outlets and products, because random sampling may be too difficult and too costly. Purposive selection is believed to be more cost-effective, especially when the sampling frames available are not comprehensive and not well suited to CPI purposes. It may also be cost effective to collect a "cluster" of prices on different products from the same outlet, instead of distributing the price collection more thinly over a larger number of outlets.

1.207 Efficient sampling, whether random or purposive, requires comprehensive and up-to-date sampling frames. Two types of frames are needed for CPI purposes: one listing the universe of outlets, and the other listing the universe of products. Examples of possible sampling frames for outlets are business registers, central or local government administrative records or telephone directories. When the sampling frames contain the requisite information, it may be possible to increase efficiency by selecting samples of outlets using probabilities that are proportional to the size of some relevant economic characteristic, such as the total value of sales. Sampling frames for products are not always readily available in practice. Possible frames are catalogues or other product lists drawn up by major manufacturers, wholesalers or trade associations, or lists of products that are specific to individual outlets such as large supermarkets.

1.208 Depending on the information available in the sampling frame, it may be possible to group the outlets into strata on the basis of their location and size, as indicated by sales or employees. When there is information about size, it may be possible to increase efficiency by taking a random sample of outlets with probabilities proportional to size. In practice, however, there is also widespread use of purposive sampling.

1.209 In most countries, the selection of most of the individual items to be priced within the selected outlets tends to be purposive, being specified by the central office responsible for the CPI. The central office draws up lists of products that are deemed to be representative of the products within an elementary aggregate. The lists can be drawn up in collaboration with managers of wholesale or large retail establishments, or other experts with practical experience and knowledge. The actual procedures are described in more detail in Chapter 6 (not included here).

1.210 It has been argued that the purposive selection of products is liable to introduce only a negligible amount of sampling bias, although there is not much conclusive evidence on this matter. In principle, random sampling is preferable and it is also quite feasible. For example, the United States Bureau of Labor Statistics makes extensive use of random selection procedures to select both outlets and products within outlets. When the selection of products is delegated to the individual price collectors, it is essential to ensure that they are well trained and briefed, and closely supervised and monitored.

Methods of price collection

1.211 The previous section focused on the sampling issues that arise when prices have to be collected for a large number of products from a large number of outlets. This section is concerned with some of the more operational aspects of price collection.

1.212 *Central price collection.* Many important prices can be collected directly by the central office responsible for the CPI from the head office of the organization responsible for fixing the prices. When prices are the same throughout the country, collection from individual outlets is superfluous:

* Some tariffs or service charges are fixed nationally and apply throughout the country. This may be the case for public utilities such as water, gas and electricity, postal services and telephone charges, or public transport. The prices or charges can be obtained from the relevant head offices.
* Some national chains of stores or supermarkets may charge the same prices everywhere, in which case the prices can be obtained from their head offices. Even when national chains do not charge uniform prices, there may be only a few minor regional differences in the prices and all the relevant information may be obtainable centrally.
* Many of these prices determined centrally may change very infrequently, perhaps only once or twice or year, so they do not have to be collected monthly. Moreover, many of these prices can be collected by telephone, fax or email and may not require visits to the head offices concerned.

1.213 *Scanner data.* One important new development is the increasing availability in many countries of large amounts of very detailed "scanner" data obtained from electronic points of sale. Such data are collated by commercial databases. Scanner data are up to date and comprehensive. An increasingly large proportion of all goods sold are being scanned as they pass through electronic points of scale.

1.214 The potential benefits of using scanner data are obviously considerable and could ultimately have a significant impact on the way in which price data are collected for CPI purposes. Not enough experience is yet available to provide general guidelines about the use of scanner data. Clearly, statistical offices should monitor developments in this field closely and explore the possibility of exploiting this major new source of data. Scanner data also increase the scope for using improved methods of quality adjustment, including hedonic methods, as explained in Chapter 7 (not included here).

1.215 *Local price collection.* When prices are collected from local outlets, the individual products selected for pricing can be determined in two ways. One way is for a specific list of individual products to be determined in advance by the central office responsible for the CPI. Alternatively, the price collector can be given the discretion to choose from a specified range of products. The collector may use some kind of random selection procedure, or select the products that sell the most or are recommended by the shop owner or manager. An individual product selected for pricing in an individual outlet may be described as a sampled product. It may be a good or a service.

1.216 When the list of products is determined in advance by the central office, the objective is usually to select products that are considered to be representative of the larger group of products within an elementary aggregate. The central office also has to decide how loosely or tightly to describe, or specify, the representative products selected for pricing. In theory, the number of different products that might be identified is to some extent arbitrary, depending on the number of economic characteristics that are deemed to be relevant or important. For example, "beef" is a generic term for a group of similar but nevertheless distinct products. There are many different cuts of beef, such as minced beef, stewing steak or rump steak, each of which can be considered a different product and which can sell at very different prices. Furthermore, beef can also be classified according to whether it is fresh, chilled or frozen, and cross-classified again according to whether it comes from domestic or imported animals, or from animals of different ages or breeds.

1.217 Tightening the specifications ensures that the central office has more control over the items actually priced in the outlets, but it also increases the chance that some products may not actually be available in some outlets. Loosening the specifications means that more items may be priced but leaves the individual price collectors with more discretion with regard to the items actually priced. This could make the sample as a whole less representative.

Continuity of price collection

1.218 A CPI is intended to measure pure price changes. The products whose prices are collected and compared in successive time periods should ideally be perfectly *matched;* that is, they should be identical in respect of their physical and economic characteristics. When the products are perfectly matched, the observed price changes are *pure* price changes. When selecting representative products, it is therefore necessary to ensure that enough of them can be expected to remain on the market over a reasonably long period of time in exactly the same form or condition as when first selected. Without continuity, there would not be enough price changes to measure.

1.219 Having identified the items whose prices are to be collected, the normal strategy is to continue pricing exactly those same items for as long as possible. Price collectors can do this if they are provided with very precise, or tight,

specifications of the items to be priced. Alternatively, they must keep detailed records themselves of the items that they have selected to price.

1.220 The ideal situation for a price index would be one in which all the products whose prices are being recorded remain on the market indefinitely without any change in their physical and economic characteristics, except of course for the timing of their sale. It is worth noting that many theorems in index number theory are derived on the assumption that exactly the same set of goods and services is available in both the time periods being compared. Most products, however, have only a limited economic life. Eventually, they disappear from the market to be replaced by other products. As the universe of products is continually evolving, the representative products selected initially may gradually account for a progressively smaller share of total purchases and sales. As a whole, they may become less and less representative. As a CPI is intended to cover all products, some way has to be found to accommodate the changing universe of products. In the case of consumer durables whose features and designs are continually being modified, some models may have very short lives indeed, being on the market for only a year or less before being replaced by newer models.

1.221 At some point the continuity of the series of price observations may have to be broken. It may become necessary to compare the prices of some products with the prices of other new ones that are very similar but not identical. Statistical offices must then try to eliminate from the observed price changes the estimated effects of the changes in the characteristics of the products whose prices are compared. In other words, they must try to adjust the prices collected for any changes in the quality of the products priced, as explained in more detail below. At the limit, a completely new product may appear that is so different from those existing previously that quality adjustment is not feasible and its price cannot be directly compared with that of any previous product. Similarly, a product may become so unrepresentative or obsolete that it has to be dropped from the index because it is no longer worth trying to compare its price with those of any of the products that have displaced it.

Resampling

1.222 One strategy to deal with the changing universe of products would be to resample, or reselect, at regular intervals the complete set of items to be priced. For example, with a monthly index, a new set of items could be selected each January. Each set of items would be priced until the following January. Two sets have to be priced each January in order to establish a link between each set of 12 monthly changes. Resampling each year would be consistent with a strategy of updating the expenditure weights each year.

1.223 Although resampling may be preferable to maintaining an unchanged sample or selection, it is not used much in practice. Systematically resampling the entire set of products each year would be difficult to manage and costly to implement. Moreover, it does not provide a complete solution to the problem of the changing universe of products, as it does not capture price changes that occur at the moment of time when new products or new qualities are first introduced. Many producers deliberately use the time when products are first marketed to make significant price changes.

1.224 A more practical way in which to keep the sample up to date is to rotate it gradually by dropping certain items and introducing new ones. Items may be dropped for two reasons:

* The product is believed by the price collector or central office to be no longer representative. It appears to account for a steadily diminishing share of the total expenditures within the basic categories in question.
* The product may simply disappear from the market altogether. For example, it may have become obsolete as a result of changing technology or unfashionable because of changing tastes, although it could disappear for other reasons.

1.225 At the same time, new products or new qualities of existing products appear on the market. At some point, it becomes necessary to include them in the list of items priced. This raises the general question of the treatment of quality change and the treatment of new products.

Adjusting prices for quality changes

1.226 The treatment of quality change is perhaps the greatest challenge facing CPI compilers. It is a recurring theme throughout this manual. It presents both conceptual and practical problems for compilers of CPIs. The whole of Chapter 7 (not included here) is devoted to the treatment of quality change, while Chapter 8 (not included here) addresses the closely related topic of new goods and item substitution.

1.227 When a sampled product is dropped from the list of products priced in some outlet, the normal practice is to find a new product to replace it in order to ensure that the sample, or selection, of sampled products remains sufficiently comprehensive and representative. If the new product is introduced specifically to replace the old one, it is necessary to establish a link between the series of past price observations on the old item and the subsequent series for the new item. The two series of observations may, or may not, overlap in one or more periods. In many cases, there can be no overlap because the new quality, or model, is only introduced after the one which it is meant to replace is discontinued. Whether or not there is an overlap, the linking of the two price series requires some estimate of the change in quality between the old product and the product selected to replace it.

1.228 However difficult it is to estimate the contribution of the change in quality to the change in the observed price, it must be clearly understood that some estimate has to be made either explicitly or, by default, implicitly. The issue cannot be avoided or bypassed. All statistical offices have limited resources and many may not have the capacity to undertake the more elaborate explicit adjustments for quality change described in Chapter 7 (not included here). Even though it may not be feasible to undertake an explicit adjustment through lack of data or resources, it is not possible to avoid making some kind of implicit adjustment. Even apparently "doing nothing" necessarily implies some kind of implicit adjustment, as explained below. Whatever the resources available to them, statistical offices must be conscious of the implications of the procedures they adopt.

1.229 Three points are stressed in the introductory section of Chapter 7 (not included here):

* The pace of innovation is high, and possibly increasing, leading to continual changes in the characteristics of products.
* There is not much consistency between countries in the methods they use to deal with quality change.
* A number of empirical studies have demonstrated that the choice of method does matter, as different methods can lead to very different results.

Evaluation of the effect of quality change on price

1.230 It is useful to try to clarify why one would wish to adjust the observed price change between two items that are similar, but not identical, for differences in their quality. A change in the quality of a good or service occurs when there is a change in some, but not most, of its characteristics. For purposes of a CPI, a quality change must be evaluated from the consumer's perspective. As explained in Chapter 7 (not included here), the evaluation of the quality change is essentially an estimate of the additional amount that a consumer is willing to pay for the new characteristics possessed by the new quality. This additional amount is not a price increase because it represents the monetary value of the additional satisfaction or utility that is derived from the new quality. Of course, if the old quality is preferred to the new one, consumers would only be willing to buy the new quality if its price were lower.

1.231 Consider the following hypothetical experiment in which a new quality appears alongside an old one. Assume that the two products are substitutes and that the consumer is familiar with the characteristics of the old and the new qualities. Use lower case p to refer to prices of the old quality and upper case P for the prices of the new quality. Suppose that both qualities are offered to the consumer at the same price, namely the price P_t at which the new quality is actually being sold in period t. The consumer is then asked to choose between them and prefers the new quality.

1.232 Suppose next that the price of the old quality is progressively reduced until it reaches p_t^*, at which point the consumer becomes indifferent between purchasing the old quality at p_t^*, and the new quality at P_t. Any further decrease below p_t^*, causes the consumer to switch back to the old quality. The difference between P_t and p_t^*, is a measure of the additional value that the consumer places on the new quality as compared with the old quality. It measures the maximum amount that the consumer is willing to pay for the new quality over and above the price of the old quality.

1.233 Let p_{t-1} denote the actual price at which the old quality was sold in period $t-1$. For CPI purposes, the price increase between the two qualities is not the observed difference $P_t - p_{t-1}$ but p_t^*, - p_{t-1}. It is important to note that p_t^*,, the hypothetical price for the old quality in period t, is directly comparable with the actual price of the old quality in period $t-1$ because both refer to the same identical product. The difference between them is a *pure* price change. The difference between P_t and p_t^*, is not a price change but an evaluation of the difference in the quality of the two items in period t. The actual price of the new quality in period t needs to be multiplied by the ratio p_t^*/P_t in order to make the comparison between the prices in periods $t-1$ and t a comparison between products of equal quality in the eyes of the consumer. The ratio p_t^*/P_t is the required quality adjustment.

1.234 Of course, it is difficult to estimate the quality adjustment in practice, but the first step has to be to clarify conceptually the nature of the adjustment that is required in principle. In practice, producers often treat the introduction of a new quality, or new model, as a convenient opportunity at which to make a significant price change. They may deliberately make it difficult for consumers to disentangle how much of the observed difference in price between the old and the new qualities represents a price change.

1.235 Chapter 7 (not included here) explains the two possibilities open to statistical offices. One possibility is to make an explicit adjustment to the observed price change on the basis of the different characteristics of the old and new qualities. The other alternative is to make an implicit adjustment by making an assumption about the pure price change; for example, on the basis of price movements observed for other products. It is convenient to take the implicit methods first.

Implicit methods for adjusting for quality changes

1.236 *Overlapping qualities.* Suppose that the two qualities overlap, both being available on the market at time t. If consumers are well informed, have a free choice and are collectively willing to buy some of both at the same time, economic theory suggests that the ratio of the prices of the new to the old quality should reflect their relative utilities to consumers. This implies that the difference in price between the old and the new qualities does not indicate any change in price. The price changes up to period t can be measured by the prices for the old quality, while the price changes from period t onwards can be measured by the prices for the new quality. The two series

of price changes are linked in period t, the difference in price between the two qualities not having any impact on the linked series.

1.237 When there is an overlap, simple linking of this kind may provide an acceptable solution to the problem of dealing with quality change. In practice, however, this method is not used very extensively because the requisite data are seldom available. Moreover, the conditions may not be consistent with those assumed in the theory. Even when there is an overlap, consumers may not have had time to acquire sufficient knowledge of the characteristics to be able to evaluate the relative qualities properly, especially when there is a substantial change in quality. Not all consumers may have access to both qualities. When the new quality first appears, the market is liable to remain in disequilibrium for some time, as it takes time for consumers to adjust their consumption patterns.

1.238 There may be a succession of periods in which the two qualities overlap before the old quality finally disappears from the market. If the market is temporarily out of equilibrium, the relative prices of the two qualities may change significantly over time so that the market offers alternative evaluations of the relative qualities depending on which period is chosen. When new qualities that embody major new improvements appear on the market for the first time, there is often a tendency for their prices to fall relatively to older qualities before the latter eventually disappear. In this situation, if the price series for the old and new qualities are linked in a single period, the choice of period can have a substantial effect on the overall change in the linked series.

1.239 The statistician has then to make a deliberate judgement about the period in which the relative prices appear to give the best representation of the relative qualities. In this situation, it may be preferable to use a more complex linking procedure which uses the prices for both the new and the old qualities in several periods in which they overlap. However, the information needed for this more complex procedure will never be available if price collectors are instructed only to introduce a new quality when an old one is dropped. In this case, the timing of the switch from the old to the new can have a significant effect on the long-term change in the linked series. This factor must be explicitly recognized and taken into consideration.

1.240 If there is no overlap between the new and the old qualities, the problems just discussed do not arise as no choice has to be made about when to make the link. Other and more difficult problems nevertheless take their place.

1.241 *Non-overlapping qualities.* In the following sections, it is assumed that the overlap method cannot be used because there is a discontinuity between the series of price observations for the old and new qualities. Again, using lower case p for the old quality and upper case P for the new, it is assumed that the price data available to the index compiler take the following form:

$$\ldots, p_{t-3}, p_{t-2}, p_{t-1}, P_t, P_{t+1}, P_{t+2}, \ldots$$

The problem is to estimate the pure price change between t-1 and t in order to have a continuous series of price observations for inclusion in the index. Using the same notation as above:

- price changes up to period t-1 are measured by the series for the old quality;
- the change between t-1 and t is measured by the ratio p^*_t / p_{t-1} where p^*_t is equal to P_t *after* adjustment for the change in quality;
- price changes from period t onwards are measured by the series for the new quality.

1.242 The problem is to estimate p^*_t. This may be done explicitly by one of the methods described later. Otherwise, one of the implicit methods has to be used. These may be grouped into three categories:

* The first solution is to assume that $p^*_t/p_{t-1}=P_t/p_{t-1}$ or $p^*_t=P_t$. No change in quality is assumed to have occurred, so the whole of the observed price increase is treated as a pure price increase. In effect, this contradicts the assumption that there has been a change in quality.
* The second is to assume that $p^*_t/p_{t-1}=1$, or $p^*_t=p_{t-1}$. No price change is assumed to have occurred, the whole of the observed difference between p_{t-1} and P_t being attributed to the difference in their quality.
* The third is to assume that $p^*_t/p_{t-1}=I$, where I is an index of the price change for a group of similar products, or possibly a more general price index.

1.243 The first two possibilities cannot be recommended as default options to be used automatically in the absence of any adequate information. The use of the first option can only be justified if the evidence suggests that the extent of the quality change is negligible, even though it cannot be quantified more precisely. 'Doing nothing', in other words ignoring the quality change completely, is equivalent to adopting the first solution. Conversely, the second can only be justified if the evidence suggests that the extent of any price change between the two periods is negligible. The third option is likely to be much more acceptable than the other two. It is the kind of solution that is often used in economic statistics when data are missing.

1.244 Elementary indices are typically based on a number of series relating to different sampled products. The particular linked price series relating to the two qualities is therefore usually just one out of a number of parallel price series. What may happen in practice is that the price observations for the old quality are used up to period t-1 and the prices for the new quality from t onwards, the price change between t-1 and t being omitted from the calculations. In effect, this amounts to using the third option: that is, estimating the missing price change on the assumption that it is equal to the average change for the other sampled products within the elementary aggregate.

1.245 It may be possible to improve on this estimate by making a careful selection of the other sampled products whose average price change is believed to be more similar to the item in question than the average for the group of sampled products as a whole. This procedure is described in some detail in Chapter 7 (not included here), where it is illustrated with a numerical example and described as 'targeting' the imputation or estimation.

1.246 The general method of estimating the price on the basis of the average change for the remaining group of products is widely used. It is sometimes described as the 'overall' class mean method. The more refined targeted version is the 'targeted' mean method. In general, one or other method seems likely to be preferable to either of the first two options listed above, although each case must be considered on its individual merits.

1.247 While the class mean method seems a sensible practical solution, it may nevertheless give biased results, as explained in Chapter 7 (not included here). The introduction of a new quality is precisely the occasion on which a producer may choose to make a significant price change. Many of the most important price changes may be missed if, in effect, they are assumed to be equal to the average price changes for products not subject to quality change.

1.248 It is necessary, therefore, to try to make an explicit adjustment for the change in quality, at least when a significant quality change is believed to have occurred. Again there are several methods that may be used.

Explicit quality adjustments

1.249 *Quantity adjustments.* The quality change may take the form of a change in the physical characteristics of the product that can easily be quantified, such as change in weight, dimensions, purity, or chemical composition of a product. It is generally a considerable oversimplification to assume that the quality of a product

changes in proportion to the size of some single physical characteristic. For example, most consumers are very unlikely to rate a refrigerator that has three times the capacity of a smaller one as being worth three times the price of the latter. Nevertheless it is clearly possible to make some adjustment to the price of a new quality of different size to make it more comparable with the price of an old quality. There is considerable scope for the judicious, or common sense, application of relatively straightforward quality adjustments of this kind. A thorough discussion of quality adjustments based on 'size' is given in Chapter 7 (not included here).

1.250 *Differences in production or option costs.* An alternative procedure may be to try to measure the change in quality by the estimated change in the costs of producing the two qualities. The estimates can be made in consultation with the producers of the goods or services, if appropriate. This method, like the first, is only likely to be satisfactory when the changes take the form of relatively simple changes in the physical characteristics of the good, such as the addition of some new feature, or option, to an automobile. It is not satisfactory when a more fundamental change in the nature of the product occurs as a result of a new discovery or technological innovation. It is clearly inapplicable, for example, when a drug is replaced by another more effective variant of the same drug that also happens to cost less to produce.

1.251 Another possibility for dealing with a quality change that is more complex or subtle is to seek the advice of technical experts. This method is especially relevant when the general consumer may not have the knowledge or expertise to be able to assess or evaluate the significance of all of the changes that may have occurred, at least when they are first made.

1.252 *The hedonic approach.* Finally, it may be possible to systematize the approach based on production or option costs by using econometric methods to estimate the impact of observed changes in the characteristics of a product on its price. In this approach, the market prices of a set of different qualities or models are regressed on what are considered to be the most important physical or economic characteristics of the different models. This approach to the evaluation of quality change is known as *hedonic analysis.* When the characteristics are attributes that cannot be quantified, they are represented by dummy variables. The regression coefficients measure the estimated marginal effects of the various characteristics on the prices of the models and can therefore be used to evaluate the effects of changes in those characteristics, i.e., changes in quality, over time.

1.253 The hedonic approach to quality adjustment can provide a powerful, objective and scientific method of evaluating changes in quality for certain kinds of products. It has been particularly successful in dealing with computers. The economic theory underlying the hedonic approach is examined in more detail in Chapter 21 (not included here). The application of the method is explained in some detail in Chapter 7 (not included here). Products can be viewed as bundles of characteristics that are not individually priced, as the consumer buys the bundle as a single package. The objective is to try to 'unbundle' the characteristics to estimate how much they contribute to the total price. In the case of computers, for example, three basic characteristics are the processor speed, the size of the RAM and the hard drive capacity. An example of a hedonic regression using these characteristics is given in Chapter 7 (not included here).

1.254 The results obtained by applying hedonics to computer prices have had a considerable impact on attitudes towards the treatment of quality change in CPIs. They have demonstrated that for goods where there are rapid technological changes and improvements in quality, the size of the adjustments made to the market prices of the products to offset the changes in the quality can largely determine the movements of the elementary price index. ... [T]he

results obtained by using hedonics and matched models can differ significantly when there is a high turnover of models.

...

Item substitution and new goods

1.256 As noted above, ideally price indices would seek to measure pure price changes between matched products that are identical in the two periods compared. However, ...the universe of products that a CPI has to cover is a dynamic universe that is gradually changing over time. Pricing matched products constrains the selection of products to a static universe of products given by the intersection of the two sets of products existing in the two periods compared. This static universe, by definition, excludes both new products and disappearing products, whose price behaviour is likely to diverge from that of the matched products. Price indices have to try to take account of the price behaviour of new and disappearing products as far as possible.

1.257 A formal consideration and analysis of these problems are given in Appendix 8.1 to Chapter 8 (not included here). A replacement universe is defined as one that starts with the base period universe but allows new products to enter as replacements as some products disappear. Of course, quality adjustments of the kind discussed above are needed when comparing the prices of the replacement products with those of the products that they replace.

1.258 One way in which to address the underlying problem of the changing universe is by sample rotation. This requires a completely new sample of products to be drawn to replace the existing one. The two samples must overlap in one period that acts as the link period. This procedure can be viewed as a systematic exploitation of the overlap method of adjusting for quality change. It may not therefore deal satisfactorily with all changes in quality that occur, because the relative prices of different goods and services at a single point of time may not provide satisfactory measures of the relative qualities of all the goods and services concerned. Nevertheless, frequent sample rotation helps by keeping the sample up to date and may reduce the extent to which explicit quality adjustments are required. Sample rotation is expensive, however.

New goods and services

1.259 The difference in quality between the original product and the one that it replaces may become so great that the new quality is better treated as a new good, although the distinction between a new quality and a new good is inevitably somewhat arbitrary. ... [A] distinction is also drawn in the economics literature between evolutionary and revolutionary new goods. An evolutionary new good or service is one that meets existing needs in much more efficient or new ways, whereas a revolutionary new good or service provides completely new kinds of services or benefits. In practice, an evolutionary new good can be fitted into some sub-class of the product or expenditure classification, whereas a revolutionary new good will require some modification to the classification in order to accommodate it.

1.260 There are two main concerns with new goods or services. The first relates to the timing of the introduction of the new product into the index. The second relates to the fact that the mere availability of the new product on the market may bring a welfare gain to consumers, whatever the price at which it is sold initially. Consider, for example, the introduction of the first antibiotic drug, penicillin. The drug provided cures for conditions that previously might have been fatal. The benefit might be virtually priceless to some individuals. One way of gauging how much benefit is gained by the introduction of a new good is to ask how high its price would have to be to reduce the demand for the product to zero. Such a price is called the 'demand reservation price'. It could be very high indeed in the case of a new life-saving drug. If the demand reservation price could be estimated, it could be treated as the price in the period just before the new product

appeared. The fall between the demand reservation price and the price at which the product actually makes its first appearance could be included in the CPI.

1.261 In practice, of course, statistical offices cannot be expected to estimate demand reservation prices with sufficient reliability for them to be included in a CPI. The concept is nevertheless useful because it highlights the fact that the mere introduction of a new good may bring a significant welfare gain that could be reflected in the CPI, especially if it is intended to be a COLI. In general, any enlargement of the set of consumption possibilities open to consumers has the potential to make them better off, other things being equal.

1.262 It is often the case that new goods enter the market at a higher price than can be sustained in the longer term, so their prices typically tend to fall relatively over the course of time. Conversely, the quantities purchased may be very small initially but increase significantly. These complications make the treatment of new products particularly difficult, especially if they are revolutionary new goods. Because of both the welfare gain from the introduction of a new product and the tendency for the price of a new good to fall after it has been introduced, it is possible that important price reductions may fail to be captured by CPIs because of the technical difficulties created by new products. Chapter 8 (not included here) concludes by expressing concern about the capacity of CPIs to deal satisfactorily with the dynamics of modern markets. In any case, it is essential that statistical offices are alert to these issues and adopt procedures that take account of them to the maximum extent possible, given the data and resources available to them.

Calculation of consumer price indices in practice

1.263 Chapter 9 (not included here) provides a general overview of the ways in which CPIs are calculated in practice. The methods used in different countries are by no means all the same, but they have much in common. There is clearly interest from users as well as compilers in knowing how most statistical offices set about calculating their CPIs. ...[B]ecause of the greater insights into the properties and behaviour of indices gained in recent years, it is now recognized that not all existing practices are necessarily optimal. Elementary price indices.

...

1.267 It is noted in Chapter 9 (not included here) that the chaining and direct approaches have different implications when there are missing price observations, quality changes and replacements. The conclusion is that the use of a chain index can make the estimation of missing prices and the introduction of replacement items easier from a computational point of view.

1.268 ...Table 9.2 (not included here) contains a numerical example of the treatment of the temporarily missing prices. One possibility is simply to omit the product whose price is missing for one month from the calculation of indices that compare that month with the preceding and following months, and also with the base period. Another possibility is to impute a price change on the basis of the average price for the remaining products, using one or other of the three types of average.

...

1.269 Tables 9.3 and 9.4 (not included here) illustrate the case in which one product disappears permanently to be replaced by another product. In Table 9.3 there is no overlap between the two products and the options considered are again to omit the products or to impute price changes for them based on averages for the other products. Table 9.4 illustrates the situation in which the products overlap in one month.

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Higher-level indices

1.271 Later sections of Chapter 9 (not included here) illustrate the calculation of the higher-level indices using the elementary price indices and the

weights provided by the elementary expenditure aggregates. It is at this stage that the traditional index number theory that was summarized earlier ...comes into play.

1.272 At the time the monthly CPI is first calculated, the only expenditure weights available must inevitably refer to some earlier period or periods of time. As explained earlier in this chapter, this predisposes the CPI to some form of Lowe or Young index in which the quantities, or expenditures, refer to some weight reference period *b* which precedes the price reference period 0. Such indices are often loosely described as Laspeyres type indices, but this description is inappropriate. At some later date, however, estimates may become available of the expenditures in both the price reference period 0 and the current period *t*, so that retrospectively the number of options open is greatly increased. It then becomes possible to calculate both Laspeyres and Paasche type indices, and also superlative indices such as Fisher or Törnqvist. There is some interest in calculating such indices later, if only to see how the original indices compare with the superlative indices. Some countries may wish to calculate retrospective superlative indices for that reason. ...

1.273 *Production and maintenance of higher-level indices.* In practice, the higher-level indices up to and including the overall CPI are usually calculated as Young indices; that is, as weighted averages of the elementary price indices using weights derived from expenditures in some earlier weight reference period. This is a relatively straightforward operation, and a numerical example is given in Table 9.5 of Chapter 9 (not included here) in which, for simplicity, the weight and price reference periods are assumed to be the same. Table 9.6 (not included here) illustrates the case in which weight and price reference periods are not the same, and the weights are price updated between weight reference period *b* and the price reference period 0. It illustrates the point that statistical offices have two options when a new price reference period is introduced: they can either preserve the relative quantities of the weight reference period or they can preserve the relative expenditures, but they cannot do both. Price updating preserves the quantities.

1.274 The introduction of new weights is a necessary and integral part of the compilation of a CPI over the long run. Weights have to be updated sooner or later, some countries preferring to update their weights each year. Whenever the weights are changed, the index based on the new weights has to be linked to the index based on the old weights. Thus, the CPI inevitably becomes a chain index over the long term. An example of the linking is given in Table 9.7 (not included here). Apart from the technicalities of the linking process, the introduction of new weights, especially if carried out at intervals of five years or so, provides an opportunity to undertake a major review of the whole methodology. New products may be introduced into the index, classifications may be revised and updated, while even the index number formula might be changed. Annual chaining facilitates the introduction of new products and other changes on a more regular basis, but in any case some ongoing maintenance of the index is needed whether it is annually chained or not.

1.275 Chapter 9 (not included here) concludes with a section on data editing, a process that is very closely linked to the actual calculation of the elementary prices indices. Data editing comprises two steps: the detection of possible errors and outliers, and the verifying and correction of the data. Effective monitoring and quality control are needed to ensure the reliability of the basic price data fed into the calculation of the elementary prices indices, on which the quality of the overall index depends.

Organization and management

1.276 The collection of price data is a complex operation involving extensive fieldwork by a large number of individual collectors. The whole process requires careful planning and management to ensure that data collected conform to the

requirements laid down by the central office with overall responsibility for the CPI. Appropriate management procedures are described in Chapter 12 (not included here) of this manual.

1.277 Price collectors should be well trained to ensure that they understand the importance of selecting the right products for pricing. Inevitably, price collectors are bound to use their own discretion to a considerable extent. As already explained, one issue of crucial importance to the quality and reliability of a CPI is how to deal with the slowly evolving set of products with which a price collector is confronted. Products may disappear and have to be replaced by others, but it may also be appropriate to drop some products before they disappear altogether, if they have become unrepresentative. Price collectors need to be provided with appropriate training and very clear instructions and documentation about how to proceed. Clear instructions are also needed to ensure that price collectors collect the right prices when there are sales, special offers or other exceptional circumstances.

1.278 As just noted, the price data collected have also to be subjected to careful checking and editing. Many checks can be carried out by computer, using standard statistical control methods. It may also be useful to send out auditors to accompany price collectors and monitor their work. The various possible checks and controls are explained in detail in Chapter 12 (not included here).

1.279 Improvements in information technology should obviously be exploited to the fullest extent possible. For example, collectors may use hand-held computers and transmit their results electronically to the central office.

Publication and dissemination

1.280 ... [T]he CPI is an extremely important statistic whose movements can influence the central bank's monetary policy, affect stock markets, influence wage rates and social security payments, and so on. There must be public confidence in its reliability, and in the competence and integrity of those responsible for its compilation. The methods used to compile it must therefore be fully documented, transparent and open to public scrutiny. Many countries have an official CPI advisory group consisting of both experts and users. The role of such a group is not just to advise the statistical office on technical matters but also to promote public confidence in the index.

1.281 Users of the index also attach great importance to having the index published as soon as possible after the end of each month or quarter, preferably within two or three weeks. There are also many users who do not wish the index to be revised once it has been published. Thus there is likely to be some trade-off between the timeliness and the quality of the index.

1.282 Publication should be understood to mean the dissemination of the results in any form. In addition to publication in print, or hard copy, the results should be released electronically and be available through the Internet on the web site of the statistical office.

1.283 ... [G]ood publication policy goes beyond timeliness, confidence and transparency. The results should be made available to all users, in both the public and the private sectors, at the same time and according to a publication schedule announced in advance. There should be no discrimination among users in the timing of the release of the results. The results should not be subject to governmental scrutiny as a condition for their release, and should be seen to be free from political or other pressures.

1.284 There are many decisions to be taken about the degree of detail in the published data and the different ways in which the results may be presented. Users need to be consulted about these questions. These issues are discussed in Chapter 13 (not included here). As they do not affect the actual calculation of the index, they need not be pursued further at this point.

APPENDIX 3.1 CONSUMER PRICE INDICES AND NATIONAL ACCOUNTS PRICE DEFLATORS

1. The purpose of this appendix is to explain why and how consumer price indices (CPIs) differ from the price indices used to deflate household consumption expenditures in national accounts. The differences between the two kinds of price index are often not well understood.

Coverage of households

2. The sets of households covered by CPIs and the national accounts are not intended to be the same, CPIs typically covering a smaller set of households. Household consumption expenditures in national accounts cover the expenditures made by all households, including institutional households resident in the country or region, whether those expenditures are made inside or outside the country or region of residence. CPIs tend to cover the expenditures and prices paid by households within the geographical boundaries of a country or region, whether the households are residents or visitors. More importantly, most CPIs are purposely defined to cover only selected groups of non-residential households. For example, CPIs may exclude very wealthy households or be confined to households in urban areas or headed by wage-earners.

Coverage of consumption expenditures

3. The sets of expenditures covered by CPIs and national accounts are not intended to be the same, CPIs typically covering a smaller set of expenditures. Most CPIs do not cover most of the imputed non-monetary consumption expenditures included in national accounts, either on principle or in practice because of lack of data. Many CPIs include the imputed rents on owner-occupied housing, but CPIs are not intended to cover the imputed expenditures and prices of agricultural products or other goods produced for own consumption that are included in national accounts.

Timing

4. Most CPIs measure price changes between two points of time or very short intervals of time such as a week. The price indices in national accounts are intended to deflate expenditures aggregated over long periods of time, generally a year. The ways in which monthly or quarterly CPIs are averaged to obtain annual CPI indices are unlikely to be conceptually consistent with the annual price indices in national accounts.

Index number formulae

5. The index number formulae used by CPIs and national accounts are not intended to be the same. In practice, most CPIs tend to use some kind of Lowe price index that uses the quantities of an earlier period, whereas the price indices, or price deflators, in national accounts are usually meant to be Paasche indices. Paasche indices are used in order to obtain Laspeyres volume indices. These differences, arising from the use of different index formulae, would tend to be reduced if both CPIs and national accounts adopted annual chaining.

Conclusions

6. It is clear that, in general, CPIs and the price deflators for national accounts can differ for a variety of reasons, such as major differences in the coverage of households and expenditures, differences in timing and differences in the underlying index number formulae. These differences are intentional and justified. Of course, the price data collected for CPI purposes may also be used to build up the detailed price deflators used for national accounts purposes, but at an aggregate level CPIs and national accounts deflators may be quite different for the reasons just given.

CHAPTER 10. SOME SPECIAL CASES

Introduction

10.1 This chapter focuses on a number of expenditure areas that pose particular problems for price index compilers, both in terms of identifying an agreed conceptual approach and also overcoming practical measurement difficulties. Six areas have been selected for discussion, mainly from the service sector. They are:

- owner-occupied housing;
- clothing;
- telecommunication services;
- financial services;
- real estate agency services;
- property insurance services.

10.2 This chapter is therefore structured into six sections, in turn dealing with the problem areas listed above. Under each section, any necessary theoretical considerations are discussed and relevant measurement issues explored. Where appropriate, illustrative examples of alternative approaches to the measurement of weights or price changes are provided, and the advantages and disadvantages are outlined.

10.3 It is important to note that the examples shown are neither definitive nor prescriptive, but rather provide broad guidance as to how the problem areas can be approached. User requirements, data availability and the statistical resources available are important factors that need to be taken into consideration in choosing an appropriate methodology. Market conditions and product market regulations, which can differ widely between countries, also have a critical impact on the choice of method.

Owner-occupied housing

10.4 The treatment of owner-occupied housing in consumer price indices (CPIs) is arguably the most difficult issue faced by CPI compilers. Depending on the proportion of the reference population that are owner occupiers, the alternative conceptual treatments can have a significant impact on the CPI, affecting both weights and, at least, short-term measures of price change.

10.5 Ideally, the approach chosen should align with the conceptual basis that best satisfies the principal purpose of the CPI. However, the data requirements for some (or even all) of these options may be such that it is not feasible to adopt the preferred treatment. Equally important, it may be difficult to identify a single principal purpose for the CPI. In particular, the dual use of CPIs as both macroeconomic indicators and also for indexation purposes can lead to clear tensions in designing an appropriate treatment for owner-occupied housing costs. In these circumstances, it may be necessary to adopt a treatment that is not entirely consistent with the approach adopted for other items in the CPI. In some countries, the difficulties in resolving such tensions have led to the omission of owner-occupied housing from the CPI altogether or the publication of more than one index.

...

Use

10.7 The general objective of this approach is to measure the change over time in the value of the flow of shelter services consumed by owner-occupiers. Detailed approaches fall under one of two broader headings: user cost or rental equivalence.

10.8 The *user cost* approach attempts to measure the changes in the cost to owner-occupiers of using the dwelling. In the weighting base period, these costs comprise two elements: recurring actual costs, such as those for repairs and maintenance, and property taxes; and the opportunity cost of having money tied up in the dwelling rather than being used for some other purpose. At its simplest, and where houses are purchased outright, this latter element is represented by the rate of return available on alternative assets. More usually, house purchase will be at

least part financed through mortgage borrowing. In this case, opportunity cost can be viewed as an average of interest rates on mortgages and alternative assets, weighted by the proportion of the purchase price borrowed and paid outright, respectively.

10.9 Estimation of the base period weight for recurring actual costs such as expenditures on repairs and maintenance is relatively straightforward and generally obtainable from household expenditure surveys. Similarly, the construction of price measures for these items presents few difficulties.

10.10 Estimation of the base period weight for opportunity costs is more complicated and will require modelling. One approach is to assume that all owner occupiers purchased their dwellings outright at the beginning of the period and sold them at the end. During the period their opportunity costs comprise the amount of interest forgone (i.e., the amount of interest they might have earned by investing this money elsewhere) and depreciation. Offsetting these costs would be any capital gains earned on the sale of the dwellings. Construction of the required measures of price change is likewise quite complicated (see Chapter 23 (not included here) for a more complete discussion) and, particularly for the depreciation element, a good deal of imputation is required. Allowing for house purchases part financed by mortgage borrowing, a typical formula for user cost (UC) is:

$$UC=rM+iE+D+RC - K$$

where M and E represent mortgage debt and equity in the home, and r and i represent mortgage interest rates and the rate of return available on alternative assets, respectively. D is depreciation, RC other recurring costs and K capital gains.

10.11 No national statistical office is currently using the full user cost approach. This partly reflects the conceptual and methodological complexity of the measure, which may also make it difficult to obtain widespread public support for the approach. For this reason, the methodology is not discussed in detail here. It is, however, worth noting that both the weights and the ongoing measures of price change are significantly influenced by the relative rate of change in house prices. Since the user cost formula is typically dominated by capital gains and interest rates, where house price inflation exceeds nominal interest rates the user cost weight is likely to be negative (implying a negative price for user cost).

10.12 In practice, it is possible to avoid some of these difficulties by adopting a variant or a narrower definition of user cost. For example, some countries have adopted a variant of the user cost approach focusing on gross mortgage interest payments and depreciation, in part because these items are readily recognizable as key costs by home owners. The former may be viewed as the cost of retaining housing shelter today, while the depreciation element represents current expenditure that would be required to offset the deterioration and obsolescence in dwellings that would otherwise occur over time. Methodologies for calculating actual average mortgage interest payments for index households are described in the section on the payments approach to owner-occupied housing costs, below.

10.13 Depreciation is a gradual process and so is best represented by the amount that needs to be put aside year by year as opposed to actual expenditures (which will typically be large but infrequent). The base period weight for depreciation may be estimated from the current market value of the owner-occupied housing stock excluding land values, multiplied by an average rate of depreciation. The latter may be derived from national accounts estimates of housing capital consumption. Imputed this way, the appropriate price indicator should ideally be an index of house prices excluding land rather than an index of the costs of renovation work.

10.14 The *rental equivalence* approach attempts to measure the change in the price of the housing service consumed by owner-occupiers by estimating the market value of those services. In other words, it is based on estimating how much owner-occupiers would have to pay to rent their

dwelling. Under this approach, it would be inappropriate also to include those input costs normally borne by landlords such as dwelling insurance, major repair and maintenance, and property taxes as this would involve an element of double counting. The rental equivalence approach is recommended in *SNA 1993* for measuring household consumption and is also used in constructing international comparisons of living standards.

10.15 Deriving the weight for rental equivalence requires estimating how much owner-occupiers would have paid in the weighting base period to rent their dwellings. This is not something that owner-occupiers can normally be expected to estimate reliably in a household expenditure survey. In principle, however, it can be estimated by matching the dwellings of owner-occupiers with comparable dwellings that are being rented and applying those rents to the owner-occupied dwellings.

10.16 In practice, this raises a number of problems, particularly in countries where the overall size of the private rental market is small or if rented housing is of a different type from owner-occupied housing in terms of general quality, age, size and location. Direct imputation from actual rents may also be inappropriate if the rental market is subject to price control. In addition, owner-occupiers may be considered to derive significant additional utility from features such as security of tenure and the ability to modify the dwelling, implying a need to make additional adjustments to the initial imputations.

10.17 In those countries where the reference population for the CPI corresponds to all resident households, the estimation problem is identical to that faced by the national accountants and a collaborative approach would be beneficial.

10.18 The corresponding price series for owneroccupiers' rent can be derived from an actual rent index, except where such rents are subject to price control. Depending on both the relative significance of owner-occupiers to renters and the composition of the two markets in terms of dwelling characteristics, any existing rent surveys may need to be modified to meet the particular requirements of an owners' equivalent rent series. If the total value of owners' equivalent rent is significantly larger than actual rents, the absolute size of the existing price sample may be deemed insufficient. If the characteristics of owner-occupied dwellings differ significantly from the overall rental market, the existing rent survey may also require stratifying more finely (e.g., by type and size of dwelling, and by location). The price measures for the different strata can then be given different weights when calculating the actual rents and the owners' equivalent rent series, respectively.

10.19 While it may be acceptable to include subsidized and controlled prices in the actual rent series, these should not be used in calculating the owners' equivalent rent series. Given the increased significance of rent prices in the overall index, it may also be necessary to pay greater attention to the measurement of price change for individual properties when tenancies change. As this often presents landlords with an opportunity to refurbish properties and increase rents, the practice of regarding the whole of all such price changes as arising from quality change should be avoided. Furthermore, the rent series may need to be quality-adjusted to take account of ongoing depreciation to housing structures. This question is discussed in Chapter 23 (not included here), paragraphs 23.69 to 23.78.

Payments

10.20 The item domain for a payments index is defined by reference to actual outlays made by households to gain access to consumer goods and services. The set of outlays peculiar to owner-occupiers in the weighting base period includes:

- down payments or deposits on newly pur-
- chased dwellings;
- legal and real estate agency fees payable on
- property transfers;
- repayments of mortgage principal;
- mortgage interest payments;
- alterations and additions to the dwelling;

- insurance of the dwelling;
  repair and maintenance of the dwelling;
  property rates and taxes.

10.21 While it is conceivable to include all of these items in the index, it is generally agreed that at least some represent capital transactions that ought to be excluded from a CPI. For example, while down payments and repayments of mortgage principal result in a running down of household cash reserves, they also result in the creation of a real asset (at least part of a dwelling) or in the reduction of a liability (the amount of mortgage debt outstanding). Similarly, any cash expenditures on alterations and additions result in a running down of cash reserves offset by increases in dwelling values. In other words, those transactions which result in no net change to household balance sheets should be excluded.

10.22 The remaining items can be regarded as current expenditures which do not result in any offsetting adjustments to household balance sheets. It is therefore considered appropriate that these items be included in a payments-based CPI. By defining a payments index in this way, it is clear that the aggregate payments equal a household's source of funds which comprise income after tax (wages, transfers, property income, insurance claims, etc.) and net savings (as a balancing item). It is for this reason that a payments-based CPI is commonly considered to be the best construct for assessing changes in net money incomes over time.

10.23 Estimation of gross expenditures on these items in the weighting base period is readily achievable via a household expenditure survey, as the items are generally reportable by households. The construction of price indices for real estate agency fees and insurance is discussed later in this chapter. Indices for repair and maintenance, and property rates and taxes are not considered particularly problematic so are not discussed here. The remainder of this section is therefore devoted to the construction of price measures for mortgage interest charges.

10.24 The construction of price indices for mortgage interest charges is not altogether straightforward. The degree of complexity will vary from country to country depending on the operation of domestic financial markets and the existence (or otherwise) of any income tax provisions applying to mortgage interest payments. What follows therefore is a description of an overall objective and an illustrative methodology for producing the required index in the most straightforward of cases. The methodology will require modifying to account for additional complexities that may be encountered in some countries.

10.25 The general approach may be summarized briefly as follows. Under a fixed basket approach, the objective of the index is to measure the change over time in the interest that would be payable on a set of mortgages equivalent to those existing in the weighting base period. This base stock of mortgages will, of course, vary widely in age, from those taken up in the base period itself to those taken up many years previously. In compiling a fixed base index, the distribution of mortgages by age is required to be held constant.

10.26 The amount of interest payable on a mortgage is determined by applying some rate of interest, expressed as a percentage, to the monetary value of debt. Changes in mortgage interest charges over time therefore can, in principle, be measured by periodically collecting information on a representative selection of mortgage interest rates, using these to derive an average interest rate, and then applying this to an appropriate debt figure. At least for standard variable rate mortgages, interest due on the revalued stock of base period mortgages may be derived simply with reference to current mortgage interest rates.

10.27 The main problem then is in determining the appropriate debt figure in each of the comparison periods. Since the real value of any monetary amount of debt varies over time according to changes in the purchasing power of money, it is not appropriate to use the actual base period monetary value of debt in calculations for subsequent periods. Rather, it is necessary first to

update that monetary value in each comparison period so that it remains constant in real terms (i.e., so that the quantities underpinning the base period amount are held constant).

10.28 In order to do this, it is necessary to form at least a theoretical view of the quantities underpinning the amount of debt in the base period. The amount of mortgage debt outstanding for a single household in the base period depends on the original house purchase price and loan-to-value ratio, and also the rate of repayment of principal since the house was purchased. An equivalent value of debt can be calculated in subsequent comparison periods by holding constant the age of the debt, the original value of the debt (as some fixed proportion of the total value of the dwelling when the mortgage was initially entered into) and the rate of repayment of the principal (as some proportion of the original debt), and applying these factors to house prices for periods corresponding to the age of the debt.

10.29 To illustrate, suppose a base period household purchased a dwelling five years earlier for $100,000 and financed 50 per cent by mortgage. If, between the time of purchase and the base period, the household repaid 20 per cent of this debt, then the outstanding debt on which base period interest charges were calculated would have been $40,000. Now move to some subsequent comparison period and suppose that it is known that house prices doubled between the period when the household originally purchased and the period five years prior to the comparison period. The equivalent amount of outstanding debt in the comparison period would be calculated by first taking 50 per cent of the revalued house price (of $200,000) to give $100,000, and then reducing this by the principal repayment rate (of 20 per cent) to give $80,000.

10.30 Under these assumptions, it is clear that the comparison period value of outstanding debt may be estimated directly from the base period value of outstanding debt solely on the basis of house price movements between five years prior to the base period and five years prior to the comparison period. In other words, while preservation of original debt/equity ratios and rates of repayment of principal help in understanding the approach, estimates of these variables are not strictly required to calculate the required comparison period debt. All that is required is the value of the outstanding debt in the base period, the age of that debt and a suitable measure of changes in dwelling prices.

10.31 Now suppose that all mortgages are of the variable rate type, and that average nominal interest rates rose from 5 per cent in the base period to 7.5 per cent in the comparison period. Interest payments in the two periods can be calculated as $2,000 and $6,000 respectively, and so the mortgage interest payments index for the comparison period is 300.0. An identical result may of course be found directly from index number series for debt and nominal interest rates. The mortgage interest charges index equals the debt index multiplied by the nominal interest rate index divided by 100. In this example, the debt index equals 200.0 and the nominal interest rate index equals 150.0. Therefore the mortgage interest rate index equals $(200.0 \times 150.0)/100$ or 300.0. This simple example also serves to illustrate the very important point that percentages (interest rates, taxes, etc.) are not prices and cannot be used as if they were. Percentages must be applied to some monetary value in order to determine a monetary price.

10.32 While the single-household example shown above is useful in explaining the basic concepts, it is necessary to devise a methodology that can be employed to calculate a mortgage interest charges index for the reference population as a whole. The main complication when moving from the single-household to the manyhousehold case is the fact that the age of the debt will vary across households. Given the importance of revaluing base period debt to maintain a constant age, this is no trivial matter. While it is conceivable that information on the age of mortgage debt could be collected in household expenditure surveys, the additional respondent burden and the generally small number of households reporting mortgages often

serve to make estimates from this source unreliable. Another option is to approach a sample of providers of mortgages (banks, building societies, etc.) for an age profile of their current mortgage portfolio. This type of data is normally available and is generally reliable.

10.33 Table 10.1 illustrates how an aggregate debt price index can be constructed. For the purpose of illustrating the methodology, some simplifying assumptions have been made:

* The index is assumed to be quarterly rather than monthly.
* The oldest age of mortgage debt is assumed to be between three and four years (in practice, it is normally the case that debt older than eight years is insignificant).
* Each annual cohort of debt is assumed to be distributed evenly across the year.
* A quarterly index of dwelling prices (new and secondhand dwellings, including land) is available.

10.34 Column (1) of Table 10.1(a) contains index numbers for dwelling prices extending back four years prior to the base period for the debt series (quarter 1 of year 0). Column (2) contains a four-quarter moving average of the first series - this is required to reflect 'yearly' prices to correspond with the debt cohorts, which are only available in yearly age groups in this example (if quarterly cohorts were available it would not be necessary to calculate the moving average series).

10.35 Columns (1) to (4) of Table 10.1(b) contain the calculated debt indices for each cohort re-referenced to Y0 Q1=100. These series are simple transformations of the series in column (2) of Table 10.1(a), each with a different starting point. For example, the debt series for that cohort contracted for between three and four years ago has as a starting point the index number from Y-4 Q4 (i.e., 113.9) in column (2), and the series for debt aged between two and three years starts from Y-3 Q4 (i.e., 118.7) and so on. Column (5) of Table 10.1(b) contains the aggregate debt index which is derived by weighting together the indices for the four age cohorts. The weights are derived from data from financial institutions on debt outstanding by age, revalued to period Y0 Q1 prices.

10.36 A nominal mortgage interest rate index number series is obtained by calculating average quarterly interest rates on variable rate mortgages from a sample of lending institutions (starting in period Y0 Q1) and presenting them in index number form. The nominal interest rate series can then be combined with the debt series to calculate the final mortgage interest rate charges series, as illustrated in Table 10.2.

Table 10.1 Calculation of a Mortgage Debt Series

(a) Dwelling price index

Year	Quarter	Original house price index (1)	Four-quarter moving average of (1) (2)
Y-4	Q1	111.9	
	Q2	112.8	
	Q3	114.7	
	Q4	116.2	113.9
Y-3	Q1	117.6	115.3
	Q2	118.5	116.8
	Q3	119.0	117.8
	Q4	119.8	118.7
Y-2	Q1	120.1	119.4
	Q2	120.3	119.8
	Q3	120.5	120.2
	Q4	122.0	120.7
Y-1	Q1	122.3	121.3
	Q2	123.8	122.2
	Q3	124.5	123.2
	Q4	125.2	124.0
Y0	Q1	125.9	124.9
	Q2	126.1	125.4
	Q3	127.3	126.1
	Q4	129.2	127.1

(b) Debt index

Year	Quarter	Age of debt				
		3-4 years Wt = 10% (1)	2-3 years Wt = 20% (2)	1-2 years Wt = 30% (3)	0-1 year Wt = 40% (4)	Weighted average (5)
Y0	Q1	100.0	100.0	100.0	100.0	100.0
	Q2	101.2	100.6	100.7	100.7	100.7
	Q3	102.5	100.9	101.6	101.1	101.4
	Q4	103.4	101.3	102.2	101.7	101.9

Table 10.2 Calculation of a Mortgage Interest Charges Series

Year	Quarter	Debt index (1)	Nominal interest rates index (2)	Mortgage interest charges index (1)_(2)/100 (3)
Y0	Q1	100.0	100.0	100.0
	Q2	100.7	98.5	99.2
	Q3	101.4	100.8	102.2
	Q4	101.9	101.5	103.4

10.37 The construction of equivalent indices for fixed interest mortgages is more complicated in so far as an interest charges index has to be calculated separately for each age cohort of debt to reflect the fact that interest payable today, on a loan four years old, depends on the interest rate prevailing four years ago. This requires the compilation of a nominal fixed interest rate index extending back as far as the dwelling price series. To the extent that the interest rates charged on fixed interest loans also depend on the duration of the loan, calculation of the nominal fixed interest rate series is also more complex. The additional complexity of these indices may make the construction of a mortgage interest charges index impractical for countries where fixed interest rate mortgages predominate.

10.38 The construction of the index for mortgage interest payments is predicated on the assumption that the purpose of the mortgage is to .nance the purchase of the dwelling (hence revaluation of debt by changes in dwelling prices). However, it is increasingly common, particularly in developed countries, for households to draw down on the equity they have in their home. That is, households may take new or additional mortgages, or redraw part of the principal already paid to finance other activities, for example to purchase a large consumer durable such as a car or a boat, to go on holiday or even to purchase stocks and bonds. If these alternative uses of the funds made available by way of mortgages are significant, it may be appropriate to regard at least some proportion of mortgage interest charges as the cost of a general financial service rather than a housing cost. For that proportion of the debt deemed to be used for other purposes, it would be more appropriate to use a general index of price inflation for debt revaluation purposes.

Acquisitions

10.39 The item domain for an acquisitions index is defined as all those consumer goods and services acquired by households. Those countries which compile their CPIs on an acquisitions basis have generally concluded that the principal purpose of their CPI is to provide a measure of price inflation for the household sector as a whole. Based on the view that price inflation is a phenomenon peculiar to the operation of markets, the domain is also normally restricted to those consumer goods and services acquired in monetary transactions. That is, consumer goods and services provided at no cost to households by governments and non-profit institutions serving households are excluded.

10.40 The expenditures of owner-occupiers that could be included in an acquisitions index are:

- net purchases of dwellings (i.e., purchases less sales by the reference population);
- direct construction of new dwellings;
- alterations and additions to existing dwellings;
- legal and real estate agency fees payable on property transfers;
- repair and maintenance of dwellings;
- insurance of dwellings;
- property rates and taxes.

10.41 The construction of price indices for real estate agency fees and insurance is discussed later in this chapter. Indices for repair and maintenance, and property rates and taxes are not considered particularly problematic so are not discussed here. The remainder of this section is therefore devoted to a discussion of the issues involved in constructing measures for dwelling purchase, construction, and alterations and additions. An advantage of the acquisitions approach is that, consistent with the treatment of

most other goods and services in the CPI, the owner-occupied housing index will reflect the full price paid for housing. Moreover, it is not affected by methods of financing for house purchase.

10.42 As CPIs are constructed to measure price change for a group of households in aggregate (the reference or target population), the index should not include any transactions that take place between those households. In the case of an index covering all private households, the weight should only reflect net additions to the household sector owner-occupied housing stock. In practice, net additions will mainly comprise those dwellings purchased from businesses (newly constructed dwellings, company houses, or rental dwellings) and those purchased from or transferred from the government sector plus any purchases, for owner-occupation, of rental dwellings from reference population households. If the CPI is constructed for some subgroup of the population (e.g., wage and salary earners), the weight should also include purchases from other household types.

10.43 Economists regard all housing as fixed capital and hence would exclude purchases of dwellings from household consumption. While this is unambiguously the case for housing purchased for rental, the case is less clear-cut when it comes to housing for owner-occupation. Although households recognize the likelihood of making capital gains when they purchase housing and invariably regard their dwelling as an asset, they also commonly cite the primary motivation for the purchase of a dwelling as being to gain access to a service (i.e., shelter and security of tenure). From the households' perspective, therefore, the costs borne by owner-occupiers in respect of their principal dwelling represent a mix of investment and consumption expenditure, and the total exclusion of these costs from an acquisitions-based CPI can lead to a loss of con.dence in the CPI by the population at large. Particularly in those countries where rental sectors are relatively small, with limited opportunities for substitution between owner-occupation and renting, it might be argued that the consumption element dominates.

10.44 The problem confronting compilers of CPIs is how to separate the two elements so as to include only the consumption element in the CPI. Although there is no single agreed technique, one approach is to regard the cost of the land as representing the investment element and the cost of the structure as representing the consumption element. The rationale for this is that while the structure may deteriorate over time and hence be 'consumed', the land remains at constant quality for all time (except under extremely unusual circumstances). As the land (or location element) accounts for most of the variation in observable prices for otherwise identical dwellings sold at the same point in time, the exclusion of land values may also be seen as an attempt to exclude asset price inflation from the CPI. (Measures of asset price inflation are, of course, useful in their own right.)

10.45 Derivation of weighting base period expenditures on the net acquisition of dwellings (excluding land), the construction of new dwellings, and alterations and additions to existing dwellings poses some problems. Although household expenditure surveys may yield reliable estimates of the amounts households spend on alterations and additions, and construction of dwellings, it is unlikely that they will provide reliable estimates of net expenditures on existing dwellings exclusive of the value of the land.

10.46 An alternative approach is to combine data from censuses of population and housing and building activity surveys. Population censuses normally collect information on housing tenure, from which average annual growth in the number of owner-occupier households represents a good proxy for net additions to the housing stock. Building activity surveys are also conducted in most countries, providing data on the total value of dwellings constructed. These data can be used to estimate the average value of new dwellings, which can then be applied to the estimated volumes derived from the population census. Of course, the suitability of this approach would need to be assessed by each country and may be complicated if the CPI relates only to some subset of the total population.

10.47 The price index is required to measure the change over time in existing dwelling structures, newly constructed dwellings, and alterations and additions. As the appropriate price for existing dwelling structures is current replacement cost, an index measuring changes in prices of newly constructed dwellings is also appropriate for this purpose. Given that the prices for both newly constructed dwellings and alterations and additions are, in principle, determined by costs of building materials, labour costs and producers' profits, it may also be satisfactory to construct a single price sample for all elements. The requirement for a separate price sample for alterations and additions will depend on the relative significance of this activity and whether the material and labour components differ significantly from those for a complete dwelling (e.g., if alterations and additions are predominantly to kitchens and bathrooms). In all cases, it is important that the price indices are mix-adjusted to eliminate price variations that reflect changes in the characteristics of newly constructed dwellings.

10.48 The type of dwelling constructed in individual countries will significantly in.uence the complexity and cost of constructing appropriate price measures. If each newly constructed dwelling is essentially unique (i.e., designed to meet site or other requirements) it will be necessary to adopt 'model pricing'. This requires selection of a sample of building firms, identifying samples of recently constructed dwellings and collecting prices for constructing identical dwellings in subsequent periods (exclusive of site preparation costs, which will vary from site to site). This approach is likely to entail significant costs for the respondents. Moreover, care needs to be taken to ensure that the supplied prices truly reflect all prevailing market conditions. That is, prices need to reflect the amount builders could realistically expect to be able to charge in the current market rather than the prices they would like to be able to charge based on conditions prevailing in some prior period.

10.49 In a number of countries, a significant proportion of newly constructed dwellings are of the type referred to as 'project homes'. These are homes that builders construct on a regular basis from a suite of standard designs maintained for this purpose. This practice is most feasible in countries where a significant proportion of new dwelling construction takes place in new developments (i.e., land recently developed or redeveloped specifically for residential housing). Where project home construction is significant in scale, then it is possible to select a sample of these project homes for pricing over time, safe in the knowledge that the prices provided will be actual transaction prices (again, priced net of any site preparation costs). Even if project homes do not account for the majority of new dwellings constructed, they may still provide a representative measure of overall price change.

10.50 In pricing project homes, it is necessary to monitor the selected sample to ensure that the selected plans remain representative and to detect changes in quality arising from modi.cations in design and changes to basic inclusions. Whenever a change is made to the plans, the change in overall quality has to be estimated. For physically measurable characteristics, such as a small increase in the overall size of the dwelling, it may be assumed that the change in quality is proportional to the change in the relevant quantity. Other changes, such as the addition of insulation, inclusion of a free driveway and so on, will need to be valued, preferably in terms of current value to the consumer. These could be estimated by obtaining information on the amounts that consumers would have to pay if they were to have the items provided separately (the option cost method). An alternative is to ask the builder if a cash rebate is available in lieu of the additional features. Where plans are modi.ed to meet changed legal requirements, the consumer has no choice in purchase and so it is acceptable to classify the full change in price as pure price movement (even though there may be some discernible change in quality).

Clothing

10.51 Clothing is a semi-durable good and its treatment is not a.ected by the conceptual basis chosen for the CPI (acquisitions, use or payments). Particular features of the clothing market do, however, create problems for price index compilers. Although clothing is purchased throughout the year, many types of clothing are only available in particular seasons and, unlike seasonal fruit and vegetables, the specific items on sale in one season (say summer) may not return the following year. In addition to seasonal availability, the physical characteristics of some items of clothing can also change as a result of changing fashions.

10.52 The remainder of this section seeks to provide a general description of the clothing market applicable to most countries, discusses the most significant problems faced by index compilers and looks at some options for overcoming or at least minimizing these.

The clothing market

10.53 Most countries experience at least some climatic variation throughout the year. The number of discrete 'seasons' may range from two ('wet' and 'dry', summer and winter) up to the four experienced in most regions (winter, spring, summer and autumn). Items of clothing tend to fall into two categories: those that are available in one season only, and those that are available all year round.

10.54 Clothing (whether seasonal or not) is also subject to changes in fashion. The fashion for trousers can change from straight legged to flared; jackets from single-breasted to double-breasted; shirts from buttondown collar to not; skirts from long length to short length, and so on.

10.55 Even within categories of garments which are not unduly affected by seasonal in.uences or general changes in fashions, the garments that are available for pricing from one period to the next can vary greatly. Retailers change suppliers in order to seek the best prices or to maintain an image of a constantly changing range in order to attract shoppers. Many producers will also frequently change product lines in order to maintain buyer appeal. The practice of single producers using different and changing brands as a marketing tool is also common. Isolated countries that rely predominantly on imported clothing also face the additional problem of discontinuities in supply because of shipping failures or even the whim of importers.

10.56 The often short life cycles of specific items, and whole categories of items in the case of seasonal items, mean that retailers have to pay particular attention to inventory control, since they cannot a.ord to be left with large volumes of stock that they cannot sell. This is most commonly handled by progressively discounting or marking down prices throughout the estimated life cycle of an item.

10.57 The fragmented and changing nature of the clothing market invariably means that price index compilers have to strike a balance between the ideal requirements for index purposes and the cost of data collection (of both prices and characteristics that may be required to make quality adjustments).

Approaches to constructing indices for non-seasonal clothing

10.58 Even where seasonality is not a problem, the construction of a price index for clothing is not a simple task. The range of available items can differ significantly across outlets, making central determination and detailed specification of items to be priced ineffective. The brands and styles of particular garment types can also vary significantly over time in individual outlets, requiring close attention to procedures for replacing items and making quality adjustments.

10.59 Although it is virtually impossible to set out specific procedures that will be applicable in all countries, it is possible to develop a set of guidelines to help avoid the most significant pitfalls. In developing these guidelines, the key objective is to maximize the number of usable

price quotations (for a given collection cost) in any month, and to minimize the incidence of measures of price change being a.ected by changes in quality.

10.60 In some circumstances, it may be possible to identify 'national' specifications to be priced at each outlet (e.g., brand X, model Y jeans). The use of these types of specifications can help minimize the effort that needs to be put into quality adjustment, and movements in prices of these items can provide a useful benchmark against which to assess the movements of other items. Reliable identification of such items necessitates ongoing relationships with the buyers for large chains, or large domestic producers or importers. These sources need to be contacted on a regular basis to identify the current range of items, the extent of their availability across the country and any planned changes (including changes in style and quality as well as deletions from and additions to the range). This information may be used proactively to update specifications or descriptions of items to be priced in the field, so minimizing the incidence of price collectors attempting to price items that are no longer available. It can also be used to assist in the quantification of any quality changes.

10.61 For some items where availability by brand varies, it may be possible to identify a number of brands which are assessed as being of equal quality (e.g., different brands of T-shirts). In these cases, price collectors could be provided with the list of equivalent brands and instructed to price the cheapest one of these available at each outlet without having to ensure that the same brand is priced this time as on the last visit. The argument for this practice is that, if the brands are truly equivalent, discerning shoppers will purchase the cheapest at the time of purchase, and to reflect this in the CPI will result in an index that more closely follows the experience of households. Clearly, the success or otherwise of this technique depends vitally on the assessment of the 'equality' of brands which, while largely a matter of judgement, may be assisted by an analysis of past price behaviour. In general, brand equality might be indicated by narrow longer-term price dispersion and a tendency for brands to swap prices over time or outlets.

10.62 In other cases it might be appropriate to restrict sampled items to a subset of brands without regarding the brands as equivalent. For example, a number of brands of jeans might together dominate the market but with the availability of the individual brands varying by outlet. In these cases, price collectors could be provided with a list of acceptable brands and instructed to price the most representative of these brands at each outlet. Once the initial selection has been made, price collectors should be instructed to record the specific brand and model priced at each outlet, and should continue to price that specification on subsequent visits until such time as it ceases to be stocked (or it becomes clear that it is no longer representative of the sales of that particular outlet).

10.63 The clothing market has become so diverse that it is not always possible to specify centrally either the item to be priced or even the brand (or brands). In these cases, it is necessary to give price collectors much greater discretion when it comes to selecting the individual items for pricing. To avoid the selection of inappropriate items, it is important for price collectors to be provided with guidelines to assist in this process. At the very least, they should be instructed to select the brand and model that the retailer advises is both representative and is expected to be stocked for some time (little advantage is to be gained from selecting an item which, while popular, has been purchased by the retailer on a one-off basis and is thus unlikely to be available for pricing in subsequent periods).

10.64 More sophisticated guidelines can incorporate a checklist of features that the selected item should match as closely as possible. These features should be ranked from most to least important, and it should be clear which features the selected item possesses and which it does not (either from the detailed description recorded by the price collector or through the

completion of a separate feature pro-forma). In addition to brand (or acceptable brands), where possible, the list might include features such as:

- fabric type (e.g., cotton, wool, linen);
- weight of the fabric (e.g., heavy, medium, light);
- existence of a lining;
- number of buttons;
- type of stitching (e.g., single, double).

10.65 It is recognized that high fashion items pose particular difficulties in terms of quality adjustment. There is certainly clear potential for such items to bias the CPI towards the end of their life cycle when prices may be heavily discounted and sales volumes are low. For example, compilers need to guard against the danger that items leave the index at a heavily discounted price to be replaced by items that are on sale at the full price (which for a highly fashionable item may be at a premium). More generally, any decision on the inclusion of high fashion items ought certainly to reflect the intended reference population of the index, for example where this excludes households at the upper end of the income distribution.

Replacement of items and quality change

10.66 Even for garment types that are available all year round, there remains a strong need to replace items or to otherwise recognize changes in item characteristics. It is therefore important to ensure that procedures are established to minimize any bias resulting from changes in the quality of items priced.

10.67 The appropriate conceptual basis for assessing changes in the quality of garments is from the perspective of value to the consumer. In other words, a garment can be said to be of different quality to another garment if it is valued differently by the consumer. The difficulty confronted by index compilers is that quality differences are only observable in terms of changes in the physical characteristics of garments (including brand), some of which will have an impact on customer value and some of which will not. The problem is how to distinguish between them.

10.68 To assist in this task it is important to develop guidelines for selecting replacement items, with the general objective of minimizing the quality difference between the old and new items. For most items, research has shown that brand is an important price- and quality-determining characteristic (particularly for items that have a significant fashion element) and so, in the first instance, an effort should be made to select a replacement from the same brand (but noting the danger that as brands go out of fashion they become less representative). As this will not always be possible, it is useful to enlist experts in the trade to assist in drawing up a list that classifies brands into quality groups along the following lines:

- exclusive brands, usually international brands, mostly sold in exclusive stores;
- higher-quality brands, well-known brands at the national level (which may also include international brands);
- average quality brands;
- other or unknown brands.

10.69 If it is not possible to select a replacement from the same brand, the fallback should be to select a replacement from a brand in the same quality group. Similarity of price should never be the guiding objective when a substitute variety has to be chosen.

10.70 Once a replacement item has been selected, a detailed description of the new item needs to be recorded. The physical differences between the old and new items should be described in as much detail as possible to enable the index compiler to assess whether the replacement item is comparable (i.e., of equal quality) to the old item or not. As a general guide, changes such as single rows of stitching replacing double rows, of lighter-weight fabrics replacing heavier-weight ones, reductions in the number of buttons on shirts, reductions in the length of shirt tails, disappearance of linings and so on should

be regarded as changes in quality. Changes in physical characteristics attributable solely to changes in fashion (e.g., straight leg to flared leg trousers) should not be regarded as quality changes.

10.71 Where an item is assessed as not being comparable, action will need to be taken to remove the impact of the quality change from the index. There are a number of approaches that may be taken to value the quality difference:

* Industry experts may be asked to place a cash value on the differences.
* The statistical office may arrange for some index compilers to receive additional training to become commodity experts able to estimate the value of such changes themselves.
* Hedonic methods may be employed if resources permit. Descriptions of hedonic techniques for clothing can be found in Liegey [1992] and Norberg [1999].

10.72 Each of these methods requires that the changes in the quality-determining characteristics (such as quality of material and standard of manufacture) are quantifiable. If such information is not available, implicit quality adjustment methods may have to be used. In this case, it is important that the price for the outgoing specification is returned to a normal price before it is removed from index calculation.

Approaches to including seasonal clothing in the consumer price index

10.73 The practices adopted by statistical agencies for handling seasonal clothing in CPIs vary widely, ranging from complete exclusion of such items to various methods of imputation of prices of items that are unavailable at a particular time of year, or to systems of weights that vary throughout the year. In some respects, the treatment of seasonal clothing raises similar issues to those found in dealing with fashion items, in particular reflecting the short life cycles of products and the likelihood of price-discounting during those cycles.

10.74 This section describes some practical alternatives for indices constructed using the traditional annual basket approach to produce a monthly CPI (i.e., systems of explicitly changing weights are not explored, nor is the use of year-on-year changes as proposed in Chapter 22) (not included here). Further, the examples will be restricted to the so-called multiple basket approach because of the inherent difficulty of making quality adjustments between seasons in the so-called single basket approach. (The single basket approach takes the view that, say, summer and winter seasonal items are different varieties of the same article, whereas the multiple basket approach takes the view that they are completely different articles.)

10.75 CPI compilers may choose to exclude seasonal clothing from the CPI altogether. While this might simplify the job of compiling the index, it clearly reduces the representativeness of the basket. This might be considered as the option of last resort and will cause presentational difficulties from the point of view of external users, particularly where relative expenditure on seasonal clothing is high. Including seasonal items makes the basket more representative of consumption patterns but complicates the process of compiling the index. In reaching a decision, it will be necessary to strike a balance between representativeness and complexity (cost). Where seasonal items are excluded, their expenditure weight should be distributed among non-seasonal counterparts.

10.76 Six possible approaches to constructing aggregate clothing price indices in the presence of seasonal items are described below. A synthetic set of prices is used (see Table 10.3) to illustrate the various options. For simplicity, it is assumed that there are only three categories of clothing: those available all year (non-seasonal); and two seasonal categories (labelled summer and winter here). The two seasons are assumed to be non-overlapping and the prices of the seasonal varieties are contrived to show progressive discounting over the course of each season. The prices of the non-seasonal items show a steady rate of growth. Within each category, prices are

assumed to be for items of identical physical characteristics (or alternatively, to have been adjusted to remove the effects of changes in physical characteristics).

10.77 The price indices have been compiled with a base period of month 1 in year 0 and extend for 24 months (prices are provided for year Y-1 in order to impute base period prices for the winter seasonal item). For the purpose of weighting, it is assumed that each of the seasonal categories accounts for 25 per cent of expenditure, while non-seasonal items account for the remaining 50 per cent. For ease of computation, imputation is based on the simple arithmetic average of the price movements of the available series (including movements from imputed to real prices), though in practice these imputations would be based on weighted averages. Tables 10.4 to 10.6 present the calculated indices and monthly percentage changes for summer seasonal, winter seasonal and total clothing, respectively, based on the alternative methodologies described below.

10.78 *Exclude seasonal items.* This is the simplest option from an index construction point of view, but suffers from a lack of representativeness, which may be a cause of concern to some users. In this example, only 50 per cent of expenditures would be directly represented in the index. Clearly, the greater the relative expenditure on seasonal items, the more users are likely to be concerned about the lack of representativeness of the index. The results for this index are shown in column (1) of Table 10.6 and may be used as a benchmark against which the following options can be assessed.

10.79 *Impute only on items available all year.* This approach is one of the targeted imputation approaches. In this case, the out of season prices for both summer and winter items are imputed based only on the movement in the prices of those items available all year round. The results for the summer and winter items are shown in column (1) of Tables 10.4 and 10.5, respectively, while the total clothing index is shown in column (2) of Table 10.6.

10.80 *Impute on all available items.* This approach imputes all missing prices based on the movements in all available prices of related or similar items. This approach is similar in principle to the approach that would be taken in the case of a missing price observation. Prices for seasonal items are collected while they are observable, and when out of season are imputed based on items available all year round together with other seasonal items if available. The results are shown in column (2) in Tables 10.4 and 10.5, and in column (3) of Table 10.6.

10.81 *Carry forward of last observed price.* This simpler variant of the methods described above involves the carry forward of the last observed prices for seasonal items during the months when such prices are unavailable. This approachwould not normally be recommended in the general case where prices are not available for non-seasonal items, on the grounds that the likely downward bias imparted could easily be avoided by observing the price of some similar item that is available. But where a whole class of goods is unavailable and hence unobservable, and particularly where price movements are not strongly correlated with other items, carry forward of prices may be seen as an acceptable approach. The results are shown in column (3) in Tables 10.4 and 10.5, and in column (4) of Table 10.6.

10.82 Under this approach, it is preferable to determine in advance during which months seasonal prices will be collected. This helps prevent distortion of the index through collection of possibly atypical prices for seasonal items unexpectedly available outside those periods when they would normally be available. Such decisions should be subject to regular review on the basis of market developments.

10.83 *Return to normal, then impute.* This approach requires the index compiler to estimate the 'normal' price for the item during the first month when it is unavailable (out of season). This estimated normal price is then imputed forward until such time as the item becomes available again. Compared to the methods discussed so far, this approach is designed to avoid artificial depression of the aggregate index beyond the end of season, following progressive discounts over the item's short life cycle.

Table 10.3 Synthetic Price Data to Illustrate Approaches to Constructing Clothing Price Indices

Month	Year Y - 1			Year Y			Year Y + 1		
	Non-seasonal	Summer seasonal	Winter seasonal	Non-seasonal	Summer seasonal	Winter seasonal	Non-seasonal	Summer seasonal	Winter seasonal
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	100	100		113	110		127	125	
2	101	80		114	90		128	100	
3	102	60		115	70		130	80	
4	103			116			131		
5	104			117			132		
6	105			118			133		
7	106		100	120		110	135		125
8	107		80	121		90	136		100
9	108		60	122		70	137		80
10	109			123			139		
11	110			124			140		
12	112			126			142		

Table 10.4 Alternative Price Indices for Summer Seasonal Clothing

Month	Impute only on items available all year	Impute on all available items	Carry forward of last observed price	Return to normal, then impute	Include first seasonal observation, then impute
	(1)	(2)	(3)	(4)	(5)
			Index numbers		
1	100.0	100.0	100.0	100.0	100.0
2	81.8	81.8	81.8	81.8	100.9
3	63.6	63.6	63.6	63.6	101.8
4	64.2	64.2	63.6	100.0	102.7
5	64.7	64.7	63.6	100.9	103.5
6	65.3	65.3	63.6	101.7	104.4
7	66.4	77.0	63.6	102.9	105.4
8	67.0	70.3	63.6	94.0	106.3
9	67.5	62.8	63.6	83.9	107.1
10	68.1	63.3	63.6	108.3	108.0
11	68.6	63.8	63.6	109.2	108.9
12	69.7	64.9	63.6	110.9	110.7
13	113.6	113.6	113.6	113.6	113.6
14	90.9	90.9	90.9	90.9	114.5
15	72.7	72.7	72.7	72.7	116.3
16	73.3	73.3	72.7	113.6	117.2
17	73.8	73.8	72.7	114.5	118.1
18	74.4	74.4	72.7	115.4	119.0
19	75.5	93.3	72.7	117.4	120.8
20	76.1	84.3	72.7	106.1	121.7
21	76.6	76.2	72.7	95.8	122.6
22	77.8	77.3	72.7	123.5	124.4
23	78.3	77.9	72.7	124.4	125.3
24	79.4	79.0	72.7	126.2	127.1

(Contd.)

Table 10.4 *(Concld.)*

	Monthly percentage changes				
2	-18.2	-18.2	-18.2	-18.2	0.9
3	-22.2	-22.2	-22.2	-22.2	0.9
4	0.9	0.9	0.0	57.2	0.9
5	0.8	0.8	0.0	0.9	0.8
6	0.9	0.9	0.0	0.8	0.9
7	1.7	17.9	0.0	1.2	1.0
8	0.9	-8.7	0.0	-8.6	0.9
9	0.7	-10.7	0.0	-10.7	0.8
10	0.9	0.8	0.0	29.1	0.8
11	0.7	0.8	0.0	0.8	0.8
12	1.6	1.7	0.0	1.6	1.7
13	63.0	75.0	78.6	2.4	2.6
14	-20.0	-20.0	-20.0	-20.0	0.8
15	-20.0	-20.0	-20.0	-20.0	1.6
16	0.8	0.8	0.0	56.3	0.8
17	0.7	0.7	0.0	0.8	0.8
18	0.8	0.8	0.0	0.8	0.8
19	1.5	25.4	0.0	1.7	1.5
20	0.8	-9.6	0.0	-9.6	0.7
21	0.7	-9.6	0.0	-9.7	0.7
22	1.6	1.4	0.0	28.9	1.5
23	0.6	0.8	0.0	0.7	0.7
24	1.4	1.4	0.0	1.4	1.4

10.84 There are some problems with this procedure. Particularly during periods of high inflation, it will be difficult to determine what the normal price is. More generally, it can be argued that the procedure reduces the objectivity of the index. In the illustrative examples presented here, the normal price to which the item is returned is the price observed at the start of the season. Compared with the previous three approaches, it can be seen that this has the effect of shifting the price increase from the commencement of the next season to immediately after the current season, i.e., the index records a sharp price change when none is observable. The results are shown in column (4) in Tables 10.4 and 10.5, and in column (5) of Table 10.6.

Table 10.5 Alternative Price Indices for Winter Seasonal Clothing

Month	Impute only on items available all year (1)	Impute on all available items (2)	Carry forward of last observed price (3)	Return to normal, then impute (4)	Include first seasonal observation, then impute (5)
			Index numbers		
1	100.0	100.0	100.0	100.0	100.0
2	100.9	91.4	100.0	91.4	100.9
3	101.8	81.6	100.0	81.6	101.8
4	102.7	82.3	100.0	105.3	102.7
5	103.5	83.0	100.0	106.2	103.5
6	104.4	83.7	100.0	107.1	104.4
7	175.2	112.4	183.3	107.8	104.6
8	143.4	91.9	150.0	88.2	105.4
9	111.5	71.5	116.7	68.6	106.3
10	112.4	72.1	116.7	107.8	107.2
11	113.3	72.7	116.7	108.7	108.1
12	115.2	73.9	116.7	110.4	109.8
13	116.1	101.9	116.7	112.2	111.7
14	117.0	92.1	116.7	101.5	112.6
15	118.8	83.6	116.7	92.1	114.4
16	119.7	84.3	116.7	118.4	115.2
17	120.6	84.9	116.7	119.3	116.1
18	121.6	85.6	116.7	120.2	117.0
19	199.1	127.7	208.3	122.5	118.8
20	159.3	102.2	166.7	98.0	119.7
21	127.4	81.7	133.3	78.4	120.6
22	129.3	82.9	133.3	122.5	122.4
23	130.2	83.5	133.3	123.4	123.2
24	132.1	84.7	133.3	125.2	125.0

(Contd.)

Table 10.5 *(Concld.)*

Monthly percentage changes

2	0.9	-8.6	0.0	-8.6	0.9
3	0.9	-10.7	0.0	-10.7	0.9
4	0.9	0.9	0.0	29.0	0.9
5	0.8	0.9	0.0	0.9	0.8
6	0.9	0.8	0.0	0.8	0.9
7	67.8	34.3	83.3	0.7	0.2
8	-18.2	-18.2	-18.2	-18.2	0.8
9	-22.2	-22.2	-22.2	-22.2	0.9
10	0.8	0.8	0.0	57.1	0.8
11	0.8	0.8	0.0	0.8	0.8
12	1.7	1.7	0.0	1.6	1.6
13	0.8	37.9	0.0	1.6	1.7
14	0.8	-9.6	0.0	-9.5	0.8
15	1.5	-9.2	0.0	-9.3	1.6
16	0.8	0.8	0.0	28.6	0.7
17	0.8	0.7	0.0	0.8	0.8
18	0.8	0.8	0.0	0.8	0.8
19	63.7	49.2	78.6	1.9	1.5
20	-20.0	-20.0	-20.0	-20.0	0.8
21	-20.0	-20.1	-20.0	-20.0	0.8
22	e1.5	1.5	0.0	56.3	1.5
23	0.7	0.7	0.0	0.7	0.7
24	1.5	1.4	0.0	1.5	1.5

Table 10.6 Alternative Price Indices for Total Clothing

Month	Only on items available all year round (1)	Impute only on items available all year (2)	Impute on all available items (3)	Carry forward of last observed price (4)	Return to normal, then impute (5)	Include first seasonal observation, then imput (6)
			Index numbers			
1	100.0	100.0	100.0	100.0	100.0	100.0
2	100.9	96.1	93.8	95.9	93.8	100.9
3	101.8	92.3	87.2	91.8	87.2	101.8
4	102.7	93.1	88.0	92.2	102.7	102.7
5	103.5	93.8	88.7	92.7	103.5	103.5
6	104.4	94.6	89.5	93.1	104.4	104.4
7	106.2	113.5	100.5	114.8	105.8	105.6
8	107.1	106.2	94.1	106.9	99.1	106.5
9	108.0	98.8	87.6	99.1	92.1	107.4
10	108.8	99.5	88.3	99.5	108.4	108.2
11	109.7	100.3	89.0	99.9	109.3	109.1
12	111.5	102.0	90.5	100.8	111.1	110.9
13	112.4	113.6	110.1	113.8	112.7	112.5
14	113.3	108.6	102.4	108.5	104.8	113.4
15	115.0	105.4	96.6	104.9	98.7	115.2
16	115.9	106.2	97.4	105.3	116.0	116.1
17	116.8	107.0	98.1	105.8	116.9	117.0
18	117.7	107.9	98.9	106.2	117.8	117.9
19	119.5	128.4	115.0	130.0	119.7	119.7
20	120.4	119.1	106.8	120.0	111.2	120.6
21	121.2	111.6	100.1	112.1	104.2	121.4
22	123.0	113.3	101.6	113.0	123.0	123.2
23	123.9	114.1	102.3	113.5	123.9	124.1
24	125.7	115.7	103.8	114.3	125.7	125.9

(Contd.)

Table 10.6 *(Concld.)*

Monthly percentage changes

2	0.9	-3.9	-6.2	-4.1	-6.2	0.9
3	0.9	-4.0	-7.0	-4.3	-7.0	0.9
4	0.9	0.9	0.9	0.5	17.8	0.9
5	0.8	0.8	0.8	0.5	0.8	0.8
6	0.9	0.9	0.9	0.5	0.9	0.9
7	1.7	20.0	12.3	23.3	1.3	1.1
8	0.8	-6.4	-6.4	-6.9	-6.3	0.9
9	0.8	-7.0	-6.9	-7.4	-7.1	0.8
10	0.7	0.7	0.8	0.4	17.7	0.7
11	0.8	0.8	0.8	0.4	0.8	0.8
12	1.6	1.7	1.7	0.9	1.6	1.6
13	0.8	11.4	21.7	12.8	1.4	1.4
14	0.8	-4.4	-7.0	-4.6	-7.0	0.8
15	1.5	-2.9	-5.7	-3.4	-5.8	1.6
16	0.8	0.8	0.8	0.4	17.5	0.8
17	0.8	0.8	0.7	0.4	0.8	0.8
18	0.8	0.8	0.8	0.4	0.8	0.8
19	1.5	19.0	16.3	22.4	1.6	1.5
20	0.8	-7.2	-7.1	-7.7	-7.1	0.8
21	0.7	-6.3	-6.3	-6.6	-6.3	0.7
22	1.5	1.5	1.5	0.8	18.0	1.5
23	0.7	0.7	0.7	0.4	0.7	0.7
24	1.5	1.4	1.5	0.8	1.5	1.5

10.85 *Include only the first seasonal observation, then impute.* This approach requires that seasonal items be priced only once per season, when they first appear in the marketplace. This first observed price is then imputed forward until the item is priced again at the commencement of the next season. The rationale for this technique is that it is a means of adjusting for the quality degradation of seasonal items associated with the commonly observed feature of falling prices throughout the season. Further, if it is desirable that the index behave as if it were constructed as a moving year index (see Chapter 22) (not included here), then this approach provides a cost-effective alternative that also accommodates changing seasons (e.g., when the items that were in season last March do not appear until April this year).

10.86 On the downside, in fully discounting observable price movements through a seasonal item's life cycle, an implicit assumption is made that all such movements reflect quality changes with no change in underlying price. This is not likely to fully accord with user perceptions of price evolution and, unless similar techniques are employed for fashion items, it can be argued that the approach is inconsistent. The results are shown in column (5) in Tables 10.4 and 10.5, and column (6) in Table 10.6.

Summary comments

10.87 First, it is worth noting that the consequences of imputing price changes for baskets of seasonal items based on the price movements for other items of clothing is equivalent to allocating the weight for seasonal items to other items when they are out of season, so avoiding the complexity involved in systems of explicitly changing weights. In these circumstances, some care needs to be taken in the presentation of estimates of the contribution of both seasonal and non-seasonal items to the change in the aggregate CPI. The standard practice of determining an item's contribution to the total change in the CPI is to multiply the item's previous period (price-updated) weight by its percentage change. Only those seasonal items for which prices are actually measured in the current period will contribute to the change in the aggregate index. Similarly, though only non-seasonal items will contribute to the change in the aggregate index

when seasonal items are out of season, the standard measure of their contribution will be understated. This is mainly an issue of presentation, although some compilers might prefer to present assessments of contributions only down to the level that includes both the seasonal and non-seasonal baskets.

10.88 There is likely to be a range of views across countries, and indeed users, concerning the appropriate treatment of seasonal items within a CPI. There is likely to be a particular diversity of views about whether the quality of seasonal items should be regarded as diminishing over the life of the season or not and, if so, whether a similar approach should (or can) be taken in respect of fashion items. The example data set was contrived so that each category displayed broadly constant growth in prices on a year-on-year basis. Those users primarily interested in measures that best capture persistent or underlying price pressures in the economy are likely to prefer those approaches which do not yield significant variations in the rate of price change that are solely attributable to how the statistical agency treats seasonal items. Such users may prefer that seasonal items be excluded altogether or that only the first seasonal observation be included with prices for other months being imputed.

10.89 What is clear is that national statistical offices need to carefully weigh up user requirements, theoretical issues, costs and the implications of alternative approaches before settling on the methodology to be adopted.

Telecommunication services

10.90 The global telecommunications sector has undergone rapid change in recent years. Technological innovation has resulted in a proliferation of new services while deregulation has led to sharp growth in the number of providers in many countries. Taken together, these factors have resulted in suppliers adopting a range of new strategies to differentiate their services in order to attract and retain customers.

10.91 Characteristics of particular significance to compilers of price indices are:

* fewer linear pricing schedules and the adoption of different pricing structures across providers;
* the increasing tendency to offer contracts that bundle services together in different ways to appeal to different types of consumers;
* rapid changes in the contracts offered to consumers as an effective means of encouraging the take-up of the ever-increasing range of services.

10.92 Increasingly, telecommunication companies offer services via plans that require customers to enter into longer-term contractual arrangements with the providers. This also poses problems for index compilation. Two broad types of plan are typically offered. The first has no fixed duration and makes allowance for the provider to change pricing structures with advance notice to the consumer. The second and increasingly more popular type provides a fixed term contract (generally of one to two years) with prices fixed for the duration of the contract. These plans are differentiated by charging different prices for different services. For example, a simple plan may be differentiated by charging more for monthly line rental but less for local calls, so appealing to users who make a higher volume of local calls. The emergence of new tailored plans designed to maximize customer demand overall is continuous.

10.93 If statistical agencies follow traditional sampling approaches and select price schedules according to some base period set of plans, and follow them until they expire, no price changes will be observed (likewise if plans expire and replacements are linked to show no change). The marketplace reality, by contrast, is that unit values for telecommunication services have been declining significantly in many countries.

10.94 All statistical agencies are struggling to develop methodologies capable of coping with the complexities of this sector. In particular, it is recognized that current best practice approaches

have difficulty in accounting for substitutions across providers and in adequately accounting for changes in the quality of the services provided.

10.95 With the telecommunications sector under continual change, statistical practices need to be kept under constant review. Statistical agencies that are considering the construction of telecommunications indices for the first time, or considering reviewing their current practices, are advised to seek out the most recent research in this field. Nevertheless, this section seeks to provide a general description of four approaches that are currently used by national statistical agencies to measure changes in the prices of telecommunication services. The approaches, in increasing order of cost, are:

- representative items
- matched samples;
- representative items
- unit values;
- customer profiles;
- sample of bills.

10.96 Each approach is briefly described and potential deficiencies noted. There is no firm recommendation on the best approach as the choice will depend largely on the market conditions prevailing in individual countries, the sophistication of the index compilation system in use, and the extent of access to accurate and timely telecommunication services data. Depending on these factors, it may be appropriate to use different approaches for different telecommunication services, or even for the different services of specific providers.

Representative items - matched samples

10.97 This approach mirrors traditional techniques adopted elsewhere in the CPI. Total expenditure of reference group households on telecommunication services in the weighting base period is derived from sources such as household expenditure surveys. A sample of service providers is approached to obtain information on revenue by types of services (such as line rental, local calls, international calls, handset sales or rentals, connection fees, voicemail services, Internet charges and so on) and a number of these are selected as *representative items* with weights derived from the revenue data.

10.98 For each representative item, a sample of detailed specifications (such as a telephone call from location A to location B, at time X, of duration Y minutes) is drawn up sufficient to represent the range of specific services purchased by consumers within each representative item. This sample of specifications is held constant from period to period, and movements in the indices for representative items are computed, based on the movements in the prices of this *matched sample* of specifications. Table 10.7 illustrates the approach.

Table 10.7. An Illustrative Index Structure for Telecommunication Services (representative item approach)

Fixed line services
Telephone connection costs
Telephone line rental
Local calls
Long-distance national calls
International calls
Mobile telephones
Connection costs
Handset purchase or rental
National calls
International calls
Payphones
Local calls
Internet services
Connection fees
Usage fees

10.99 The list of representative items (the lowest level in the structure) generally does not need to cover all telecommunication services, but those selected should be sufficient to be representative of price behaviour as a whole, in particular taking account of published tariffs. Expenditures on those services not selected for pricing should be distributed over the other services within that general class for the purpose of deriving weights. For example, the expenditures on any fixed line services not selected for pricing should be distributed over those fixed line services selected.

10.100 Compared to suppliers of goods, service providers have an almost infinite capacity to tailor both the services and the prices they charge, for example based on the time at which the service is provided. A telephone call of five minutes' duration at 8 a.m. can be regarded as a different product to an equivalent call made at 8 p.m., and service providers are able to charge different prices for these calls. Representative items therefore need to be described in sufficient detail to capture all the pricedetermining characteristics.

10.101 Furthermore, given the ease with which providers can adjust the differential aspects of their pricing schedules (such as the time span designated as peak and the duration of a call before a different rate applies), it is necessary to use a sufficient number of varied specifications to capture these aspects reliably. It is not sufficient to simply describe a call as peak or off-peak, or from zone 1 to zone 2. Illustrative examples of the types of specifications that may be applicable for two representative items - international calls (fixed line) and usage fees (Internet services) - are provided in Table 10.8.

Table 10.8 Examples of Specifications of Telecommunication Services

Representative item	Examples of specifications
International calls (fixed line)	Plan A: Call to Athens at 8 a.m. on a Friday, duration 10 minutes Plan B: Call to London at 9 p.m. on a Saturday, duration 5 minutes Plan A: Call to New York at 11 a.m. on a Wednesday, duration 20 minutes Plan B: Call to Paris at 7 p.m. on a Sunday, duration 15 minutes Plan A: Call to Durban at 8 p.m. on a Monday, duration 30 minutes
Usage fees (Internet)	Plan A: 10 hours dial-up connect time between 4 p.m. and 7 p.m. weekends, total download 20Mb Plan B: 20 hours dial-up connect time between 6 p.m. and midnight weekdays, total download 50Mb Plan C: Permanent broadband connection, total download 100Mb

10.102 It is assumed that the origin of both the telephone calls and Internet access is also identified. All times are domestic. It should also be noted that the nature of Internet access generally precludes pricing on the basis of access, and hence the timing of access cannot be as tightly defined as for international telephone calls; instead, all specifications are for total monthly use.

10.103 The most costly aspect of this approach therefore is obtaining the data required to establish the representative items and to identify suitable specifications, as this will require detailed information from service providers. Once implemented, most price information should be readily available from published fee schedules, so minimizing the burden on respondents between reviews of the specifications.

10.104 The dynamic nature of the telecommunication sector and the common use of the pricing mechanism to change consumer behaviour are likely to require that the specifications be updated relatively frequently. When a specification disappears (i.e., a particular plan is no longer offered), all efforts must be made to find a suitable comparison specification. Where specifications are replaced, it is possible to argue that because different plans involve different conditions of sale they are fundamentally different products. It is equally reasonable to question whether all of the price difference between plans is due to quality differences, particularly in light of the evidence of ever-increasing volumes and reductions in unit values. The difficulty lies in quantifying the quality differences. Although hedonic techniques offer some prospects for resolving this dilemma, they are costly to implement.

Representative items - unit values

10.105 The unit value approach is similar to the previous approach, with the exception that specifications are not priced. The price for each representative item is calculated from revenue and quantity data collected from the service provider. For example, the price for national long-distance calls can be derived as the total revenue received from such calls divided by the number of call-minutes. Similarly, in the case of monthly line rental fees, the price can be calculated as the total revenue from line rental divided by the total number of subscribers.

10.106 Compared to the matched sample approach, the unit value approach attributes all of the difference between plans, and time and duration of calls to price (i.e., the quality difference is assumed to be zero). The unit value approach is also seen as providing a method for accounting for price change when the items are subject to a proliferation of discount schemes or promotions (e.g., $2 to call anywhere for as long as you like for the next week). While the approach avoids some of the customer sampling choices inherent in other methodologies, compilation does rest on analysis of aggregate company data and so is likely to be less timely than methodologies based on pre-published prices. Moreover, care needs to be exercised with this approach to ensure that the measure is not a.ected by undesirable compositional changes (see Chapter 9 (not included here), where unit value indices are discussed in more detail). A unit value index should only be constructed for truly homogeneous items. This points to a requirement for defining the representative items at a relatively fine level of disaggregation. For example, international calls may need to be further subdivided by destination to avoid changes in unit values arising purely from shifts in the numbers of calls made to different destinations.

10.107 Although this approach appears to address at least some of the known deficiencies of the matched sample approach, it is likely to have a medium- to longterm downward bias and, unless implemented carefully, it is likely to exhibit period-to-period volatility because of compositional shifts, if only as a result of seasonal variations in usage patterns. There are also a number of respondent and data quality aspects that need to be considered. The unit value approach imposes a greater data burden on service providers, who often regard revenue and quantity data as highly commercially sensitive. To be effective, the service providers also need to be able to furnish data relating only to households (i.e., they have to be able to separate out revenue and quantities relating to businesses) and the revenue information needs to conform to the requirements of the index. For example, some service providers may record certain discounts as a marketing expense, rather than a reduction in revenue as is required for the unit value index.

Customer profiles

10.108 For marketing purposes, telecommunication companies often classify their customers according to their volume of service use. Although the number of categories can vary, a common approach is to use a threeway classification: low-volume, medium-volume and high-volume customers. Service providers analyse customer usage patterns by category when developing new plans targeted specifically at each group. National regulatory authorities may also be in a position to provide detailed customer use profiles on a confidential basis.

10.109 Statistical agencies can take a similar approach for the construction of price indices by devising profiles which reflect the average usage patterns for each category of consumer. Costs faced by these average consumers in each period can then be estimated by reference to the rates set out in that plan that is currently most commonly applicable to each customer category. Variations on this general theme include estimation of costs based on the plan that would deliver the cheapest overall cost to the consumer (based on the simplifying assumption of cost-minimizing consumer behaviour with perfect knowledge). This has the advantage of providing a clear basis for choosing a comparable replacement should an existing package cease to be available. Alternatively, costs to each customer group may be estimated with reference to several plans, where sales information indicates that this is a closer approximation to reality. The overall index is derived by weighting together the results from these user profiles according to information about the relative importance of each category of consumer.

10.110 In constructing the aggregate index, these calculations are likely to be made for a representative sample of service providers, exploiting information on their overall market share for sampling or weighting purposes if

available. This opens up the possibility of fully exploiting all the possible relevant permutations of profiles and companies. Information on the distribution of customer profiles by service provider may, however, not be available or at least very costly to obtain. Table 10.9 gives an example of a profile for mobile telephone services, taken from Beuerlein [2001], which describes the current approach used in the German CPI.

Table 10.9 Example of a User Profile for Mobile Phone Services

Specification	Unit	Rare callers	Low-volume callers	Average callers
(1)	(2)	(3)	(4)	(5)
Total length of calls	Minutes	16	42	96
Length of individual call				
Type A	Seconds	35	45	45
Type B	Seconds	65	95	115
Calls[1]	Number	20	36	72
Within the same network	Number	8	12	24
Beyond the network	Number	12	24	48

[1]The calls are distributed over times ofthe day and days ofthe week so that it is possible to take account ofchanges in the delimitation ofbetween peak and off-peak, weekday and weekend tariffs.
Source: Beuerlein [2001].

10.111 Consistent with the fixed basket approach, the activity of consumers (in terms of numbers and types of calls) is held constant between comparison periods. Prices may, of course, change when not fixed by contract or when plans are replaced. Index compilers may also allow rates to change in response to a changing mix of plans within customer categories. This approach assumes that plan changes, as such, fundamentally represent price change rather than quality change, but it eliminates the cruder compositional effects associated with the unit value approach, which does not take account of customer profiles.

10.112 The success of this approach is determined by the degree to which the profiles truly reflect consumer behaviour and therefore a great deal of thought needs to be put into their development. The construction of the customer profiles will require a high degree of cooperation from service providers and, given the known volume changes, they will require updating at reasonably regular intervals, possibly more frequently than other items in the CPI basket. Data on plan usage by customer category for each index compilation period (month or quarter) may also be required if compilers decide to allow for such effects.

Sample of bills

10.113 This method can be seen as a more refined application of the customer profile approach. A fixed level of service activity from an actual sample of customers is priced each month rather than defining profiles representative of the average monthly activities of customers. A sample of customers should be selected from each category of customer (low-, medium- and high-volume customers) and, ideally, the bills (or activity statements) should cover a full year's activity.

10.114 The advantages of this approach compared to the customer profile approach are:

* It is able to take account of any within-year variations in customer behaviour (e.g., a higher incidence of international calls associated with religious or cultural events of significance).
* It better reflects the diversity of consumer behaviour by identifying actual activities (i.e., calls actually made by a sample of consumers).
* It accommodates within each bill any instances of annual charges.
* It allows for the detection and recording of other sources of price change associated with customers' overall relationship with the service provider (e.g., where overall discounts are provided when aggregate monthly spending exceeds certain values, or where an aggregate discount is provided if customers acquire bundles of services from a single provider, such as fixed line phone plus Internet).

10.115 Calculation of the index still requires monthly information on the relative significance of various plans by customer category (which can then be randomly allocated across the sampled bills). With the bill sample repriced each period, the resulting index measures the cost of a full

year's consumption at the prices prevailing in each index period compared to the same cost at base prices. This assumes that the quality difference between old and new plans is zero for households' changing plans. Because of the generally larger number of bills (compared with the number of available profiles), price changes can be reflected more gradually, as the proportion of bills priced using each plan can better mirror the changing population distribution.

10.116 As with the profile approach, it is important that the sample of bills is updated regularly to reflect changes in consumption patterns and the take-up of new services such as call-waiting, voicemail and text messaging. Although, with adequate sampling, the bill approach is likely to provide a better measure of the aggregate rate of price change for telecommunication services as a whole, it may not be best suited to the calculation of separate indices for the components of those services (depending on whether overall or bottom-line discounts are offered). The approach is also data intensive, requiring a large number of calculations each period and thus a sophisticated data processing system.

Financial services

10.117 The construction of reliable, comprehensive price indices for financial services in CPIs is in its infancy. Given the increasing use of financial services by households, however, national statistical agencies are coming under pressure to account for at least some financial services in their CPIs. There is a particularly strong demand for CPIs to include those fees and charges faced by households in respect of deposit and loan accounts held with financial institutions.

10.118 The construction of price indices for financial services is inherently difficult, as there is no unanimous view about which financial services ought to be included in the CPI, or indeed about precisely how they should be measured. The discussion in this section attempts to present what might be regarded as the majority view based on what is practically feasible. Much of the material is based on Fixler and Zieshang [2001], Frost [2001] and Woolford [2001].

10.119 Common examples of financial services acquired by households include financial advice, currency exchange, services associated with deposit and loan facilities, services provided by fund managers, life insurance offices and superannuation funds, stockbroking services, and real estate agency services. The range of items explicitly regarded as financial services for inclusion in a CPI, and also the way in which they are measured, will depend on the principal purpose of the CPI and hence on whether an acquisitions, use or payments approach is employed.

10.120 Where a *payments* approach is used, the gross interest payable on mortgages is often included as a cost of owner-occupied housing (see paragraphs 10.4 to 10.50 above). In the interests of strict consistency, this might imply that the CPI should also include consumer credit charges (measured in a similar way to mortgage interest charges), as well as gross outlays on direct fees and charges paid in respect of other financial services. In practice, and as noted in the earlier section on housing costs, the treatment of housing sometimes differs in concept from other interest charges in national CPIs, partly reflecting mixed objectives for the overall index combined with public perceptions of the importance of this item within overall budgets. The specific requirements for a payments approach will not be discussed further here as the principles are either described elsewhere (e.g., under owner-occupied housing) or are relatively straightforward.

10.121 Assuming that households acquire all of their financial services from the private sector (i.e., they are not generally subsidized by governments or provided by non-profit institutions serving households), the *acquisitions* and *use* approaches take an identical view of the measurement of financial services. In terms of coverage, however, some proponents of the use approach take a more restrictive view of which services should be included by limiting the scope

to only those financial services which are acquired to directly facilitate current household consumption.

10.122 Under the more restrictive view of coverage, it is argued that the use of some financial services is inextricably linked with capital (or investment) activity. This suggests that such activities should be considered outside the scope of CPIs intended to provide measures of changes in consumption prices. Proponents of this view often draw upon national accounts practices as the starting point. For example, *SNA 1993* classifies expenses associated with the transfer of real estate (real estate agents' commissions, legal fees, and government taxes and charges) as part of gross fixed capital formation. It is important to note, however, that the CPI is not constrained to follow the practices adopted for national accounting. Rather, individual countries will need to make decisions on the item coverage of the CPI which best meets the domestic requirements of the price index itself.

10.123 One broad definition that could be adopted for the coverage of financial services within the CPI is: *all those services acquired by households in relation to the acquisition, holding and disposal of financial and real assets, including advisory services, except those acquired for business purposes.* This definition serves two purposes. First, it distinguishes between the services facilitating the transfer and holding of assets and the assets themselves. Second, it makes no distinction between whether the underlying asset is a real asset or a financial asset.

10.124 The degree of complexity involved in placing a value on financial services acquired by households and constructing the companion price indices varies markedly by service. Three specific examples reflecting current Australian research are used to illustrate the issues: currency exchange, stockbroking, and deposit and loan facilities. Real estate agency services are discussed separately in this chapter (see paragraphs 10.149 to 10.155) because they may be classified as either a housing expense or a financial service.

Currency exchange

10.125 For weighting purposes, the estimation of the base period expenditures incurred by households in exchanging domestic currency for currencies of other countries is, in principle, relatively straightforward and should be reportable in household expenditure surveys.

10.126 Construction of the companion price index is more complex. The service for which a price is required is that of facilitating the exchange of domestic currency for that of another country (the acquisition of an asset - foreign currency). The price for the service is usually specified in terms of some percentage of the domestic currency value of the transaction. These percentage margins may change only rarely, with service providers relying on the nominal value of the transactions increasing over time to deliver increases in fee receipts. The price required for index construction purposes is the monetary value of the margin (i.e., the amount determined by applying the percentage rate to the value of the currency transaction). To measure price change over time, the index compiler has to form a view about the quantity underpinning the original transaction.

10.127 The purchase of foreign currency can be seen as facilitating the purchase of some desired quantity of foreign goods and services (e.g., expenditure on foreign travel, or direct import of a commodity). The service price in comparison periods would be expressed as the amount payable on the conversion of a sum of domestic currency corresponding to that sum of foreign currency required to purchase the same quantum of foreign goods and services purchased in the base period.

10.128 A practical translation implies that the original foreign currency amount is indexed forward using changes in foreign prices, and then converted to domestic currency at the prevailing exchange rate, with the prevailing percentage margin applied to this new amount to deliver the current price. This current price would be compared to the base price to derive the measure of price change. Although the ideal measure for indexing forward the foreign currency amount would be an index specifically targeting those foreign goods and services purchased by resident households, this is unlikely to be feasible. A practical alternative is to use the published aggregate CPI for the foreign countries.

10.129 If a single margin (percentage rate) does not apply to all transactions (e.g., different rates apply to different size transactions), then the price measure should be constructed by reference to a representative sample of base period transactions. The value margin for each transaction in the current period in the domestic currency would be determined by the current domestic currency value of each transaction and the current period percentage margin applying to each. This captures any price change resulting from the value of an underlying transaction moving from one price band to another.

Stockbroking services

10.130 Consider the case of the purchase of a parcel of shares in a publicly listed company. In most countries, the purchase has to be arranged through a licensed broker (stockbroker). The total amount paid by the purchaser generally comprises three elements: an amount for the shares (the asset); a fee for the brokerage service; and some form of transaction tax (stamp duty).

10.131 The tax should be considered part of the cost of acquiring the shares, as opposed to being part of the price of the security. The tax should be included along with the brokerage cost in the CPI. This is consistent with both the intention of the tax and the more commonly accepted basis for the valuation of the shares. (It also proves convenient to adopt this principle here, as it allows for the - perhaps less contentious - comparable treatment of taxes on banking services.) Allowing for current tax schedules poses no difficulty in that they will be widely available in all countries.

10.132 Working from the premise that stockbrokers' fees are more likely to follow a step function than a linear function, a price measure would be constructed as follows. First, select a representative sample of transactions (domestic currency values) and calculate the tax payable and the fees payable by reference to the respective schedules. The taxes and fees payable in subsequent periods are calculated by first indexing forward the values of the sample transactions and then applying current fee and tax schedules to the revalued transactions. This methodology raises two main issues. First, what is the most appropriate index for revaluing the transactions and, second, how should the current schedule of fees be determined?

10.133 The quantum underlying share transactions can be regarded as forgone consumption, i.e., the quantity of goods and services that could have been purchased instead. The value of a constant quantum of consumption forgone in successive comparison periods therefore will vary with consumer prices. In this case, the obvious choice for an escalator would be the CPI itself, based on current period preliminary estimates, or the previous period's result. However, the use of a single period's movement in the CPI (either previous or current) has the potential to result in the prices of stockbroking services moving in a way that is unlikely to reflect reality. This would be particularly evident where, for example, the current or previous period's CPI was influenced significantly by some one-off, temporary or unusual price change (e.g., an oil price shock, or change to health care arrangements). Any 'echoing' of abnormal shorter-term price changes through the precise treatment of stockbrokers' or similar fees is likely to stretch public credibility in the CPI. As an alternative, a 12-month moving average CPI might be employed, itself consistent with a base period comprising a full year's activity.

10.134 Alternatively, it might be argued that the quantum of shares could be revalued in subsequent periods in line with movements in equity prices themselves. According to this view, the price of equities may be seen as an important in.uence on the actual costs of storing forgone consumption in much the same way as tax and fee schedules specific to equity purchases are allowed to enter the calculations described above. The strong argument against this treatment is that it assumes that households have a desire to own equities *per se,* rather than using them simply as an appropriate vehicle to store forgone consumption. Moreover, the introduction of equity prices within the price indicator is likely to impart additional short-term volatility to the CPI.

10.135 Competition in the stockbroking industry means that there is unlikely to be a common fee schedule. If individual brokers adhere reasonably closely to an inhouse fee schedule, obtaining copies of these schedules should be a relatively simple matter. On the other hand, if no such fee schedules exist, then a survey of stockbrokers may be required to collect information on a sample of trades (value of trade and fee charged), and this information used to derive a current period fee schedule.

10.136 In the case of sales of shares, the underlying transaction represents the exchange of one asset for another (shares for cash). Quantities underlying sales can be viewed similarly to share purchases (i.e., some current period basket of consumption goods and services). In reality, households review their investment strategies regularly in order to 'store' their deferred consumption in whatever asset class they believe offers the greatest security or prospect for growth. A symmetrical treatment of the purchase and sale of shares is particularly appealing. Unless different fees or taxes apply to sales, there is no need to distinguish between the two in constructing the index.

Deposit and loan facilities

10.137 Accounting for the costs of services provided by financial intermediaries represents a significant step up in complexity. Even where a prior decision has been made to include such facilities within the scope of the CPI, the service being provided is difficult to visualize comprehensively, and the prices comprise significant elements that are not directly observable.

10.138 *SNA 1993* recommends (6.125 and Annex III) that the value of financial intermediation services output produced by an enterprise should be valued as the following sum:

* for financial assets involved in financial intermediation, such as loans, the value of services provided by the enterprise to the borrower per monetary unit on account is the margin between the rate payable by the borrower and a reference rate; plus
* for financial liabilities involved in financial intermediation, such as deposits, the value of services provided by the enterprise to the lender or depositor per monetary unit on account is the margin between the reference rate and the rate payable by the enterprise to the lender; plus
* the value of actual or explicit financial intermediation service charges levied.

10.139 For a summary of the developments in national accounts treatment in this area, and a discussion of the notion of a reference rate, see OECD [1998]. In concept, SNA 1993 describes the reference rate as the risk-free or pure interest rate. The value of the service provided to a borrower is the difference between the actual amount of interest paid by the borrower and the lower amount that would have been paid had the reference rate applied. The converse applies for depositors. In practice, it is very difficult to identify the reference rate, and in particular to avoid either volatility in or even negative measures of the value of such services (as would occur if the reference rate lay above the lending rate or below the deposit rate). As a matter of practical expediency, an average of borrowing and lending rates may be used (with the mid-point being

favoured).[1] Given the complexities involved, expenditures on financial intermediation required for index weighting purposes cannot be collected from households in expenditure surveys and so must be estimated by collecting data from financial institutions.

10.140 In thinking about the construction of the index number, it is useful to start by considering the case of a traditional bank providing a single loan product and a single deposit product; the example will then be extended to a typical bank. In some countries, the traditional bank does not charge direct fees, but all income is derived through an interest margin on lending rates over deposit rates.

10.141 The base period weighting value of the financial service (and so household consumption of such services) therefore is estimated by applying a margin (the absolute difference between the reference rate and the rate of interest charged to borrowers or paid to depositors) to an aggregate balance (loan or deposit). In line with the suggested treatment of other financial transactions, the construction of accompanying price measures should allow for the indexation forward of base period balances, applying comparison period margins to calculate a money value. The price index is then calculated as the ratio of comparison period and base period money values.

10.142 Again, the issue of an appropriate escalator needs to be addressed. While the base period flows of deposits and withdrawals can readily be conceptualized as forgone consumption at base period prices, how should the balances (stocks) reflecting an accumulation of flows over a number of years be viewed? If an age profile for balances were available, accumulated consumption forgone could be computed as a moving average of the CPI. The more practical alternative is to view base period balances as representing some quantum of consumption goods and services at base period prices, in which case the 12-month moving average CPI can be used. This is consistent with the idea that households review temporal consumption or investment decisions (and so accumulated financial balances) on a regular basis, in this case annually.

10.143 The traditional bank has all but disappeared in some countries and most financial institutions now derive income from a combination of indirect fees (margins) and direct fees and charges, with the trend being for a move from margins towards direct fees. In this case, the challenge is to construct measures of price change that reflect the total price of the service and therefore capture any offsets between margins and direct fees. As with stockbroking services, there may also be taxes levied on financial transactions or balances and these should also be included in the 'price'. Frost [2001], for example, provides a description of the more practical aspects of constructing price indices for deposit and loan facilities based on recent Australian experience.

10.144 Given the clear scope for financial intermediaries to shift charges between the direct (fee) and indirect (margin) elements, there are clear dangers in constructing broad measures of margins - known by national accountants as financial intermediation services indirectly measured (FISIM) - independent of direct fees and taxes. Rather, the approach should be to construct price measures for specific (relatively homogeneous) products that can then be weighted together to provide a measure for deposit and loan facilities in aggregate, and taking account of both the direct and indirect elements in total price. This represents a similar strategy to that adopted throughout the CPI. For example, the index for motor vehicles is constructed by pricing a sample of individual vehicles and weighting these price

[1] OECD [1998] expresses some concerns about the use of a mid-point reference rate as a measure of the risk-free rate of interest. There are, however, some doubts about whether the conceptual ideal is for some 'risk-free' interest rate, or whether a more appropriate concept might be the interest rate that would have been struck in the absence of financial intermediaries (i.e., the rate that would have been struck by depositors dealing directly with borrowers). Such a rate would have incorporated the lenders' knowledge of risk. Taking the mid-point of the borrowing and lending rates would appear to be a good means of estimating this market-clearing rate.

measures to derive an aggregate, instead of, for example, attempting to directly construct an index for the supplier or producer of a range of vehicles.

10.145 The basic process is: first, to select a sample of representative products from each sampled institution; second, to select a sample of customers for each product, and third, to estimate the total base period value of the service associated with each product by element (margin, direct fees and taxes). These value aggregates can be viewed as being equivalent to prices for some quantum. Comparison period prices are derived by moving forward the base period value aggregates as follows:

* Margin - index forward the base period balance and apply the comparison period margin (the difference between the comparison period reference rate and the product yield). In practice, the 'price' movement is given as the product of the indexation factor and the ratio of margins.
* Fees - index forward the transaction values for each sampled account (or profile) and apply the comparison period fee structure. The ratio of new aggregate fees to base fees is used to move the fee value aggregate. The aggregate fees in the base and comparison periods can be constructed as either arithmetic or geometric averages of the fees calculated for the individual customers.
* Taxes - as for fees, but use tax schedules instead of fee schedules.

10.146 Appendix 10.1 contains a worked example of the calculation of a price index for a single deposit product.

10.147 Since step function pricing and taxing schedules (for example, fees that are only payable after some number of transactions or if balances fall below some level) are prevalent in financial services, samples of detailed customer accounts with all the necessary charging variables identi.ed will be required. These samples should cover a full year's activity. If it is not possible to sample actual accounts, customer profiles may be developed as a fallback option.

10.148 To minimize problems associated with nonresponse and changing industry structures, a separate reference rate should be constructed for each sampled service provider. The reference rate should be calculated in respect of all loans and deposits (including those to businesses). Further, to avoid problems that may arise in the timing of accounting entries (e.g., revisions, or interest income on credit cards), monthly yields, reference rates and margins should be constructed by reference to three-month moving averages of the reported underlying balances and interest flows.

Real estate agency services

10.149 The services provided by real estate agencies in the acquisition and disposal of properties can be treated in a number of ways. If the CPI is constructed as an economic cost of use index, these services are out of scope as they form part of the input costs of the notional landlords (*SNA 1993* also assigns all transfer costs on dwellings to gross fixed capital formation). The transfer costs associated with the acquisition of a dwelling (legal fees, real estate agency fees and taxes) can be included in both a *payments* and an *acquisitions* CPI. They can be classified as either a cost of home ownership or as a distinctly separate financial service. Although all transfer costs should be included in such measures, the discussion below focuses on real estate agents' fees for simplicity. Price measures for the other elements are calculated using similar procedures. In all cases, the general approach is to estimate the current cost of the various services relative to, and as they would apply to, some fixed basket of activity in the base period. Consistent with some of the areas already discussed, this involves indexing forward the base period expenditures on which the fees are charged (to preserve the underlying quantum) via some appropriate price index, and then estimating the fees payable in the comparison period.

10.150 Real estate agents typically quote their fees as some percentage of the price received for the dwelling. In common with other items where charges are determined as a margin, this needs to be converted to a domestic currency price. If the

percentage margin is known, the agents' price for any given transaction (sale/purchase of a dwelling for a known price) can be computed by multiplying the value of the dwelling by the percentage margin, and the index can be constructed on the basis of estimates of both components.

10.151 The methodology chosen for estimating the percentage margin will depend upon an assessment of the variation in margins across and within individual agencies. In the most straightforward case, firms may operate with a single percentage margin applicable to all transactions regardless of value. In other words, at any point in time the percentage margins charged may vary by agency, but not by value of transaction within agency. In this case, what is required is an estimate, in each comparison period, of the average percentage margin charged by agencies. This can be achieved by collecting the percentage margins, exclusive of any taxes levied on agents' fees such as value added tax (VAT) or goods and services tax (GST), from a sample of agencies and deriving an average.

10.152 Percentage margins charged by individual agencies sometimes vary with transaction price (typically declining with increasing prices of dwellings). Where tariffs do vary within agencies, a more sophisticated estimation procedure may be required. Using data from a sample of transactions from a sample of agents, the relationship between the value of transaction and the percentage margin can be derived through econometric analysis. Empirical analysis will be required to determine the precise functional form for this relationship. For example, in the Australian case research has shown that ordinary least squares regression can be used to estimate this relationship and that the following functional form is adequate:

$$R=a+b_1(1/p)+b_2(1/p)^2$$

where: R = the commission rate, p = the house price, a = a constant, and b_1 and b_2 are parameters to be estimated.

10.153 Estimation of the current period value of transactions to which the percentage margin applies depends on whether real estate agency fees are classified as a cost of housing or as a separate financial service. If the former, the value of the current period transaction, relative to the value of the base period transaction, would reflect changes in house prices. If the latter, where the purchase of a dwelling is regarded as forgone consumption, the current period value would reflect changes in the CPI itself.

10.154 If a single percentage margin is assumed to operate, then only a single current period transaction is required, i.e., an estimate of the average value of base period transactions at comparison period prices. For example, if real estate agency fees are classified as a housing cost, then the base period price is calculated by applying the average base period percentage margin to the average house price in the base period, with any VAT or GST then added. The comparison period price is calculated by indexing forward the average base period house price, applying the average comparison period percentage margin and adding GST or VAT.

10.155 If a single percentage margin is not assumed to operate, then a sample of representative base period transactions is required. The monetary value of the margin on each representative transaction is then calculated from published tariffs or from an estimated functional relationship, such as that described above. Comparison period prices are likewise estimated by first indexing forward each of the base period representative transactions and then applying the same model. Note that, in this case, there is no need to exclude any GST or VAT from the initial margins data.

Property insurance services

10.156 The construction of reliable price indices for insurance can be difficult to achieve in practice. This section is restricted to a discussion of property insurance, as this type of insurance can be assumed to operate in similar ways across countries. It nevertheless provides only an

illustration of the issues that index compilers face, with each sector raising specific conceptual and measurement difficulties. For example, in the case of life insurance, insurance policies are often bundled with a long-term investment service yielding a financial payout when insured persons survive the policy term. Separation of the service charges relating to the insurance and investment elements within a single premium poses significant problems for index compilers.

10.157 For the purposes of the discussion below, property insurance is defined to include:

- dwelling insurance;
- household contents insurance;
- motor vehicle insurance.

10.158 The common feature of these policies is that for a fee (premium), households receive financial compensation if a nominated event results in the loss of, or damage to, designated property. The alternative to purchasing insurance is for the household to self-insure. For households as a group, the service received is represented by the elimination of the risk of a financial loss. The appropriate treatment of property insurance in the CPI depends on whether the CPI is constructed using the acquisitions, use or payments approach.

Payments

10.159 Under the *payments* approach, each of the above policy types is in scope. In thinking about how this property insurance should be included in the CPI, it is necessary to consider both the gross premiums payable and the claims receivable by households. The definitions of gross premiums payable and claims receivable are straightforward. It is possible, however, to treat claims receivable in a number of ways, which will have an impact on either the weight assigned to insurance or the weight assigned to the items insured. Spending on insurance can be weighted on either a gross basis (i.e., valued using gross premiums payable) or on a net basis (i.e., valued using gross premiums payable *less* claims receivable). Likewise, items which are insured against loss may also be weighted gross or net (in the latter case, excluding purchases explicitly financed by insurance claims receivable). Taken together, this suggests three plausible alternative treatments:

- gross premiums, net expenditures;
- net premiums, gross expenditures;
- gross premiums, gross expenditures.

10.160 *Gross premiums, net expenditures.* It may be argued that calculating expenditures net of purchases financed by insurance claims avoids double counting of that portion of gross premiums which funds the claims. There are some problems with this approach. First, it is necessary to assume that all proceeds from insurance claims are used to purchase replacement items or to repair damaged items. In some cases, claims receivable may be to compensate for damage or destruction to the property of agents beyond the scope of the index (e.g., businesses, government or even other households where the CPI reference group covers only some subset of households). Households may also choose to use the proceeds for entirely different purposes. Thus the estimation of the net expenditure weights is likely to involve some arbitrary choices. More generally, because money is fungible, attempts to restrict coverage only to those expenditures made from selected sources of funds are questionable. Finally, the potential distortion of weights for these items may reduce the usefulness of sub-indices for other purposes.

10.161 *Net premiums, gross expenditures.* Within a payments index, the 'net premiums, gross expenditures' approach is based on the view that claims receivable should be regarded as negative expenditure on insurance. This may be seen as an attempt to avoid the double counting of expenditures on items financed by claims receivable and already included in gross expenditures on other items elsewhere in the index. The net premiums approach is much less problematic than the net expenditures approach (as at least the impact is restricted to the weights for insurance). It may, however, be argued that the net premiums approach is inconsistent with approaches adopted for other items in a payments index, in particular mortgage interest and consumer credit charges,

where weights are based on gross payments. Any allowance for interest receipts would be likely to yield negative weights since households are generally net savers overall.

10.162 The fact that the net premiums approach effectively measures the value of the insurance service as required for indices constructed according to both the acquisitions and use approaches is incidental. The task here is to determine the appropriate treatment for a payments-based index.

10.163 *Gross premiums, gross expenditures.* The 'gross premiums, gross expenditures' approach is based on the view that the claims receivable by households simply represent one of the sources of funds from which expenditures are made. This is the most appealing approach for a payments index, as it recognizes the fungible nature of money and provides a consistent means of identifying both the item coverage of the index and the relative weights by reference only to the actual outlays of households.

Use

10.164 Under the *use* approach, dwelling insurance is out of scope as an input cost of the notional landlord. The weights should relate to the value of the insurance service consumed by households. This is defined as being equal to: gross insurance premiums payable by households, *plus* premium supplements, *less* provisions for claims, *less* changes in actuarial reserves.

10.165 It is not possible to estimate the nominal value of the net insurance service from household expenditure surveys alone. For weighting purposes, the most appealing approach is to obtain data from a sample of insurance providers, permitting estimation of the ratio of net insurance services to gross premiums, and to apply this ratio to the estimated value of gross premiums obtained from household expenditure surveys. However, it has not been possible to devise a corresponding price measure that is conceptually sound. For this reason, those countries that have adopted the net concept for weighting purposes are using movements in gross insurance premiums as a proxy price measure.

Acquisitions

10.166 Under the *acquisitions* approach, all three items are in scope. Because the objective is to measure price inflation for the household sector, the expenditures required for weighting purposes should reflect the insurance companies' contribution to the inflationary process, which equates to the value of the insurance service as per the use approach.

Pricing gross insurance premiums

10.167 The gross insurance premium payable by households in any one period is determined by the conditions of the policy, the administration costs and profit objectives of the insurance provider, the risk of a claim being made and any relevant taxes. For any single policy, the principal quality-determining characteristics (generally specified in the conditions of the policy) can be summarized as being:

- the type of property being covered (dwellings, motor vehicles, etc.);
- the type of cover provided (physical damage, liability, etc.);
- the nature of the compensation (replacement cost, current market value, etc.);
- any limits on the amount claimable;
- the location of the property;
- amount of any excess payable by the insured;
- risks (or events) covered.

10.168 While it is clear that pricing to constant quality requires these conditions to be held fixed, there is also a question about whether the risk of a claim being made should be held constant. In other words, if the incidence of, say, vehicle theft increases, should this be regarded as a quality improvement or simply a price change? If, on the one hand, it is argued that as the consumers' decision to insure is based on their assessment of the likelihood of suffering a loss compared to the

premium charged, the risk factors should be held constant. On the other hand, it may be argued that, once insured, the consumer simply expects to be compensated for any loss. From the perspective of the consumer, any increase in risk simply represents an increase in the insurer's cost base (which may or may not be passed on to the consumer by way of a price change). Obtaining data of sufficient reliability to make quality adjustments in response to changes in risk is problematic, so in practice most indices reflect changes in risk as a price change.

10.169 In pricing insurance policies, the approach should be to select a sample of policies representative of those policies held in the base period and to reprice these in subsequent periods. Taking dwelling insurance as an example, base period insurance policies would be taken out to insure dwellings of various values and types (e.g., timber or brick) in different locations. The price samples should therefore consist of specifications that aim to cover, in aggregate, as many combinations of these variables as is reasonable. While the conditions of the policy, the dwelling type and location should be held constant over time, the value of the dwelling should be updated each period to reflect changes in house prices (i.e., the underlying real quantity needs to be preserved). It is important to note that, as the premiums will be related in some way to the value of the insured property, the price index for insurance can change without there being any change in premium schedules.

10.170 Every effort should be made to identify any changes in the conditions applying to selected policies in order to facilitate appropriate quality adjustments. Examples would include cessation of coverage for specific conditions and changing the excess (or deductible) paid by the consumer when a claim is made. Estimates of the value of such changes may be based on the insurance company's own assessments of their likely impact on the value of total claims payable. If it is assumed that the change in the aggregate value of claims can be equated to the change in service to the consumer (compared to the service that would have been provided prior to policy renewal), then an appropriate adjustment can be made to the premium to provide a (qualityadjusted) movement in price. For example, consider the case where the excess on a policy is doubled and advice from the company is that this will result in a 3 per cent drop in the aggregate value of claims payable. This could be considered as equivalent to a 3 per cent increase in price.

Using gross premiums as a proxy for the net insurance service

10.171 The net insurance service charge captures the administration costs and profits of the insurance provider along with any taxes. The problem is that taxes on insurance are normally levied on the gross premiums. Therefore, if the gross insurance premiums are subject to a high rate of tax, then the taxes will account for an even higher proportion of the net insurance service charge. Simply using the gross insurance premium inclusive of taxes as the price measure understates the real effect of any increase in the tax rates. This is best illustrated by way of an example.

10.172 For the sake of simplicity, assume that there are no premium supplements and no actuarial reserves. Then the insurance service charge is given by gross premiums less provisions for claims. Suppose the only change between two periods is a change in the tax rate - from 5 per cent of gross premiums to 20 per cent. Then the values in Table 10.10 are likely to be observed. Under this scenario it is clear that the insurance service charge has increased from $45 to $60 (an increase of 33.3 per cent), yet gross premiums have only increased by 14.3 per cent.

Table 10.10. Illustration of the Impact of Taxes on Measures of Insurance Services ($)

Period	Premiums before Tax	Tax	Gross Premiums	Claims	Insurance Service
1	100	5	105	60	45
2	100	20	120	60	60

10.173 Given that changes in the tax rates on gross insurance premiums are often subject to significant variation, this is a non-trivial problem. A practical solution is to decompose insurance service into two components - insurance service before tax (or net of tax) and tax on insurance services. The price measure for the first is constructed by reference to movements in gross premiums net of tax, and the price measure for the second is given by changes in taxes on gross premiums. Further research is required to develop a workable methodology for directly measuring changes in prices of insurance services before tax.

Appendix 10.1 Calculation of a Price Index for a Deposit Product

(a) Base period sample account. Only a single month's data is used in this example. In practice, many accounts would be sampled with each account containing data for a full year.

Taxes

Date (1)	Debit (D) or Credit (C) (2)	Transaction (3)	Transaction Value ($) (4)	Tax ($) (5)	Balance ($) (6)
					456.23
2 Jan	D	Over the counter withdrawal	107.05	0.70	348.48
12 Jan	C	Deposit	4,000.00	2.40	4,346.08
13 Jan	D	EFTPOS1 transaction	50.62	0.30	4,295.16
13 Jan	D	Over the counter withdrawal	371.00	0.70	3,923.46
14 Jan	D	Own ATM2 cash	300.00	0.70	3,622.76
14 Jan	D	Own ATM cash	100.00	0.70	3,522.06
16 Jan	D	Own ATM cash	100.00	0.70	3,421.36
16 Jan	D	Over the counter withdrawal	371.00	0.70	3,049.66
16 Jan	D	Cheque	90.00	0.30	2,959.36
19 Jan	D	Own ATM cash	100.00	0.70	2,858.66
19 Jan	D	Own ATM cash	100.00	0.70	2,757.96
19 Jan	C	Deposit	4,000.00	2.40	6,755.56
19 Jan	D	Cheque	740.00	1.50	6,014.06
20 Jan	D	EFTPOS transaction	76.42	0.30	5,937.34
21 Jan	D	Other ATM cash	20.00	0.30	5,917.04
21 Jan	D	Cheque	100.00	0.70	5,816.34
22 Jan	D	Cheque	43.40	0.30	5,772.64
22 Jan	D	Cheque	302.00	0.70	5,469.94
22 Jan	D	Cheque	37.00	0.30	5,432.64
23 Jan	D	Over the counter withdrawal	371.00	0.70	5,060.94
23 Jan	D	Cheque	72.00	0.30	4,988.64
27 Jan	D	Own ATM cash	150.00	0.70	4,837.94
27 Jan	D	Cheque	73.50	0.30	4,764.14
27 Jan	D	Cheque	260.00	0.70	4,503.44
27 Jan	D	EFTPOS transaction	51.45	0.30	4,451.69
28 Jan	D	Over the counter withdrawal	19.95	0.30	4,431.44
28 Jan	D	Cheque	150.00	0.70	4,280.74
29 Jan	D	Cheque	140.00	0.70	4,140.04
30 Jan	D	Over the counter withdrawal	371.00	0.70	3,768.34
30 Jan	D	Cheque	8.00	0.30	3,760.04
30 Jan	D	Cheque	60.00	0.30	3,699.74
Total Taxes				21.10	

[1]EFTPOS (Electronic Funds Transfer Point of Sale).
[2]ATM (Automatic Teller Machine).

Fees

Activity (1)	Total No. (2)	No. Charged (3)	Amount ($) (4)
Over the counter withdrawal	6	2	6.00
EFTPOS transaction	3	0	0.00
Own ATM cash	6	0	0.00
Own ATM cash	1	1	1.20
Cheque	13	3	3.00
Deposit	2	2	0.00
Total fees			**10.20**

Fees and taxes are calculated using data in tables (b) and (c), respectively.
Source: Woolford [2001]

(b) Fee schedule. This is a summary of the information typically available from financial institutions. For each period, the table includes the number of free transactions and the per transaction charge for additional transactions. A zero number free indicates that no transactions are free and a zero charge indicates that all transactions are free.

Description	Base period		Current period	
(1)	No. free (2)	Charge ($) (3)	No. free (4)	Charge ($) (5)
Over the counter withdrawal	4	3.00	4	3.00
EFTPOS transaction	10	0.50	9	0.50
Own ATM cash	10	0.50	9	0.50
Other ATM cash	0	1.20	0	1.20
Cheque	10	1.00	9	1.00
Deposit	0	0.00	0	0.00

Source: Woolford [2001].

(c) Tax schedule. This is a table of tax rates of the type that used to be employed in Australia. The debits tax is levied on all debit transactions to eligible accounts, with the amount charged being set for ranges of transaction values (i.e., using a step function). Financial institutions duty is levied on all deposits, the amount being determined as a percentage of the value of the deposit.

Bank accounts debit tax

Transaction value ($)		Tax ($)	
Min. (1)	Max. (2)	Base period (3)	Current period (4)
0	1	0.00	0.00
1	100	0.30	0.30
100	500	0.70	0.70
500	5,000	1.50	1.50
5,000	10,000	3.00	3.00
10,000+		4.00	4.00

Financial institutions duty (%)

Base period	Current period
0.06	0.06

Source: Woolford [2001].

(d) Interest data. The table presents, in summary form, the balances and annualized interest flows derived by taking moving averages of data reported by financial institutions. Interest rates and margins are calculated from the balances and flows.

	Base period				Current period			
(1)	Balance ($ million) (2)	Interest ($ million) (3)	Interest rate (%) (4)	Margin (%) (5)	Balance ($ million) (6)	Interest ($ million) (7)	Interest rate (%) (8)	Margin (%) (9)
Deposit products Personal accounts	22,000	740	3.3636	2.4937	23,600	775	3.2839	2.3971
Current accounts	6,000	68	1.1333	4.7241	6,600	75	1.1364	4.5446
Other accounts	16,000	672	4.2000	1.6574	17,000	700	4.1176	1.5634
Business accounts	25,000	920	3.6800	2.1774	28,000	1,000	3.5714	2.1096
Total deposit accounts	47,000	1,660	3.5319	2.3255	51,600	1,775	3.4399	2.2411
Loan products Personal accounts	42,000	3,188	7.5905	1.7331	46,000	3,400	7.3913	1.7103
Business accounts	28,000	2,540	9.0714	3.2140	31,000	2,700	8.7097	3.0287
Total loan accounts	70,000	5,728	8.1829	2.3255	77,000	6,100	7.9221	2.2411
Reference rate			5.8574				5.6810	

Source: Woolford [2001].

(e) CPI data. The table presents data required to derive the indexation factor. This example follows the Australian practice of a quarterly CPI. If a monthly CPI is produced, 12-term moving averages would be required.

(1)	t_5 (2)	t_4 (3)	t_3 (4)	t_2 (5)	t_1 (6)
All groups	117.5	121.2	123.4	127.6	129.1
4-term moving average				122.4	125.3
Indexation factor (movement)					1.0237

Source: Woolford [2001].

(f) Projected current period sample account. The opening balance and transaction values are derived by applying the indexation factor to the base period amounts. The tax payable is determined by reference to the data in table (c). Fees payable are determined by reference to the data in table (b).

Taxes

Date (1)	Debit (D) or Credit (C) (2)	Transaction (3)	Transaction Value ($) (4)	Tax ($) (5)	Balance ($) (6)
					467.04
2 Jan	D	Over the counter withdrawal	109.59	0.70	356.75
12 Jan	C	Deposit	4,094.75	2.46	4,449.05
13 Jan	D	EFTPOS transaction	51.82	0.30	4,396.93
13 Jan	D	Over the counter withdrawal	379.79	0.70	4,016.44
14 Jan	D	Own ATM cash	307.11	0.70	3,708.63
14 Jan	D	Own ATM cash	102.37	0.70	3,605.56
16 Jan	D	Own ATM cash	102.37	0.70	3,502.50
16 Jan	D	Over the counter withdrawal	379.79	0.70	3,122.01
16 Jan	D	Cheque	92.13	0.30	3,029.57
19 Jan	D	Own ATM cash	102.37	0.70	2,926.51
19 Jan	D	Own ATM cash	102.37	0.70	2,823.44
19 Jan	C	Deposit	4,094.75	2.46	6,915.73
19 Jan	D	Cheque	757.53	1.50	6,156.70
20 Jan	D	EFTPOS transaction	78.23	0.30	6,078.17
21 Jan	D	Other ATM cash	20.47	0.30	6,057.40
21 Jan	D	Cheque	102.37	0.70	5,954.33
22 Jan	D	Cheque	44.43	0.30	5,909.60
22 Jan	D	Cheque	309.15	0.70	5,599.75
22 Jan	D	Cheque	37.88	0.30	5,561.57
23 Jan	D	Over the counter withdrawal	379.79	0.70	5,181.08
23 Jan	D	Cheque	73.71	0.30	5,107.08
27 Jan	D	Own ATM cash	153.55	0.70	4,952.83
27 Jan	D	Cheque	75.24	0.30	4,877.28
27 Jan	D	Cheque	266.16	0.70	4,610.43
27 Jan	D	EFTPOS transaction	52.67	0.30	4,557.46
28 Jan	D	Over the counter withdrawal	20.42	0.30	4,536.73
28 Jan	D	Cheque	153.55	0.70	4,382.48
29 Jan	D	Cheque	143.32	0.70	4,238.46
30 Jan	D	Over the counter withdrawal	379.79	0.70	3,857.98
30 Jan	D	Cheque	8.19	0.30	3,849.49
30 Jan	D	Cheque	61.42	0.30	3,787.77
Total taxes					21.21

Fees

Activity (1)	Total No. (2)	No. Charged (3)	Amount ($) (4)
Over the counter withdrawal	6	2	6.00
EFTPOS transaction	3	0	0.00
Own ATM cash	6	0	0.00
Own ATM cash	1	1	1.20
Cheque	13	4	4.00
Deposit	2	2	0.00
Total fees			11.20

Source: Woolford [2001].

(g) Indices for current accounts. This table brings the results together. The current period value aggregates are derived as follows. For margins - the base period aggregate is multiplied by the product of the indexation factor (e) and the ratio of the current and base period margins for current accounts (d). For fees - the base period aggregate is multiplied by the ratio of total fees payable on the sample account in the current period (f) and the base period (a). For taxes - the same procedure is followed as for fees.

Component	Base period		Current period	
(1)	Value aggregate ($) (2)	Index (3)	Value aggregate ($) (4)	Index (5)
Margins	28,344	100.0	27,913	98.5
Fees	11,904	100.0	13,071	109.8
Taxes	14,739	100.0	14,818	100.5
Total	54,987	100.0	55,803	101.5

Source: Woolford [2001].

annex 3
RESOLUTION II
RESOLUTION CONCERNING CONSUMER PRICE INDICES

Preamble

The Seventeenth International Conference of Labour Statisticians,

Having been convened at Geneva by the Governing Body of the ILO and having met from 24 November to 3 December 2003,

Recalling the resolution adopted by the Fourteenth International Conference of Labour Statisticians concerning consumer price indices and recognizing the continuing validity of the basic principles recommended therein and, in particular, the fact that the consumer price index (CPI) is designed primarily to measure the changes over time in the general level of prices of goods and services that a reference population acquires, uses or pays for,

Recognizing the need to modify and broaden the existing standards in the light of recent methodological and computational developments to enhance the usefulness of the international standards in the provision of technical guidelines to all countries,

Recognizing the usefulness of such standards in enhancing the international comparability of the statistics,

Recognizing that the CPI is used for a wide variety of purposes and that governments should be encouraged to identify the (priority) purposes a CPI is to serve, to provide adequate resources for its compilation, and to guarantee the professional independence of its compilers,

Recognizing that the (priority) objectives and uses of CPI differ among countries and that, therefore, a single standard could not be applied universally,

Recognizing that the CPI needs to be credible to observers and users, both national and international, and that better understanding of the principles and procedures used to compile the index will enhance the users' confidence in the index,

Agrees that the principles and methods used in constructing a CPI should be based on the guidelines and methods that are generally accepted as constituting good statistical practices;

Adopts, this third day of December 2003, the following resolution which replaces the previous one adopted in 1987:

The nature and meaning of a consumer price index

1. The CPI is a current social and economic indicator that is constructed to measure changes over time in the general level of prices of consumer goods and services that households acquire, use or pay for consumption.

2. The index aims to measure the change in consumer prices over time. This may be done by measuring the cost of purchasing a fixed basket of consumer goods and services of constant quality and similar characteristics, with the products in the basket being selected to be representative of households' expenditure during a year or other specified period. Such an index is called a fixed-basket price index.

3. The index may also aim to measure the effects of price changes on the cost of achieving a constant standard of living (i.e., level of utility or welfare). This concept is called a cost-of-living

index (COLI). A fixed basket price index, or another appropriate design, may be employed as an approximation to a COLI.

The uses of a consumer price index

4. The CPI is used for a wide variety of purposes, the two most common ones being: (i) to adjust wages as well as social security and other benefits to compensate, partly or completely, for changes in the cost of living or in consumer prices; and (ii) to provide an average measure of price inflation for the household sector as a whole, for use as a macro-economic indicator. CPI subindices are also used to deflate components of household final consumption expenditure in the national accounts and the value of retail sales to obtain estimates of changes in their volume.

5. CPIs are also used for other purposes, such as monitoring the overall rate of price inflation for all sectors of the economy, the adjustment of government fees and charges, the adjustment of payments in commercial contracts, and for formulating and assessing fiscal and monetary policies and trade and exchange rate policies. In these types of cases, the CPI is used as more appropriate measures do not exist at present, or because other characteristics of the CPI (e.g., high profile, wide acceptance, predictable publication schedule, etc.) are seen to outweigh any conceptual or technical deficiencies.

6. Given that the CPI may be used for many purposes, it is unlikely that one index can perform equally satisfactorily in all applications. It may therefore be appropriate to construct a number of alternative price indices for specific purposes, if the requirements of the users justify the extra expense. Each index should be properly defined and named to avoid confusion and a 'headline' CPI measure should be explicitly identified.

7. Where only one index is compiled, it is the main use that should determine the type of index compiled, the range of goods and services covered, its geographic coverage, the households it relates to, as well as to the concept of price and the formula used. If there are several major uses, it is likely that compromises may have to be made with regard to how the CPI is constructed. Users should be informed of the compromises made and of the limitations of such an index.

Scope of the index

8. The scope of the index depends on the main use for which it is intended, and should be defined in terms of the type of households, geographic areas, and the categories of consumer goods and services acquired, used or paid for by the reference population.

9. If the primary use of the CPI is for adjusting money incomes, a relevant group of households, such as wage and salary earners, may be the appropriate target population. For this use, all consumption expenditures by these households, at home and abroad, may be covered. If the primary use of the CPI is to measure inflation in the domestic economy, it may be appropriate to cover consumption expenditures made within the country, rather than the expenditures of households resident within the country.

10. In general, the reference population for a national index should be defined very widely. If any income groups, types of households or particular geographic areas are excluded, for example, for cost or practical considerations, then this should be explicitly stated.

11. The geographic scope refers to the geographic coverage of price collection and of consumption expenditures of the reference population and both should be defined as widely

as possible, and preferably consistently. If price collection is restricted to particular areas due to resource constraints, then this should be specified. The geographic coverage of the consumption expenditure may be defined either as covering consumption expenditure of the resident population (resident consumption) or consumption expenditure within the country (domestic consumption).

12. Significant differences in the expenditure patterns and/or price movements between specific population groups or regions may exist, and care should be taken to ensure that they are represented in the index. Separate indices for these population groups or regions may be computed if there is sufficient demand to justify the additional cost.

13. In accordance with its main purpose, the CPI should conceptually cover all types of consumer goods and services of significance to the reference population, without any omission of those that may not be legally available or may be considered socially undesirable. Where appropriate, special aggregates may be constructed to assist those users who may wish to exclude certain categories of goods or services for particular applications or for analysis. Whenever certain goods or services have been excluded from the index, this should be clearly documented.

14. Goods and services purchased for business purposes, expenditures on assets such as works of art, financial investment (as distinct from financial services), and payments of income taxes, social security contributions and fines are not considered to be consumer goods or services and should be excluded from the coverage of the index. Some countries regard expenditures on the purchase of houses entirely as a capital investment and, as such, exclude them from the index.

Acquisition, use or payment

15. In determining the scope of the index, the time of recording and valuation of consumption, it is important to consider whether the purposes for which the index is used are best satisfied by defining consumption in terms of 'acquisition', 'use', or 'payment'.[1] The "acquisition" approach is often used when the primary purpose of the index is to serve as a macroeconomic indicator. The 'payment' approach is often used when the primary purpose of the index is for the adjustment of compensation or income. Where the aim of the index is to measure changes in the cost of living, the 'use' approach may be most suitable. The decision regarding the approach to follow for a particular group of products should in principle be based on the purpose of the index, as well as on the costs and the acceptability of the decision to the users who should be informed of the approach followed for different products. Because of the practical difficulties in uniformly defining consumption and estimating the flow of services provided by other durable goods in terms of 'use', it may be necessary to adopt a mixed approach, e.g., 'use' for owner-occupied housing and 'acquisition' or 'payments' basis for other consumer durables.

16. The differences between the three approaches are most pronounced in dealing with products for which the times of acquisition, use and payment do not coincide, such as owner-occupied housing, durable goods and products acquired on credit.

17. The most complex and important of the products mentioned above is owner-occupied housing. In most countries, a significant proportion of households are owner-occupiers of their housing, with the housing being characterized by

[1] See Annex 1.

a long useful life and a high purchase outlay (price). Under the 'acquisition' approach, the value of the new dwellings acquired in the weights reference period may be used for deriving the weight (and the full price of the dwelling is included in the CPI at the time of acquisition, regardless of when the consumption is taking place). Under the 'payment' approach, the weights reflect the amounts actually paid out for housing (and the prices enter the CPI in the period(s) when the prices are paid). Under the 'use' approach the weights are based on the value of the flow of housing services consumed during the weights reference period estimated using an implicit or notional cost (and prices or estimated opportunity costs enter the CPI when the consumption is taking place).

18. Own-account consumption, remuneration in kind and/or goods and services provided without charge or subsidized by governments and non-profit institutions serving households may be important in some countries where the purpose of the index is best satisfied by defining consumption in terms of 'use' or 'acquisition' (under the payment approach these are out of scope). The inclusion of these products will require special valuation and pricing techniques.

Basket and weights

19. Decisions on the composition of the basket and the weights follow directly from the scope, as well as from the choice between the 'acquisition', 'use' or 'payment' approaches.

20. Once defined, the expenditures that fall within the scope of the index should be grouped into similar categories in a hierarchical classification system, e.g., divisions/groups/classes, for compilation as well as analytical purposes. There should be consistency between the classification used for index compilation and the one used for household expenditure statistics. The CPI classification should meet the needs of users for special subindices. For the purposes of international comparisons, the classification should also be reconcilable with the most recent version of the UN *Classification of Individual Consumption According to Purpose* (COICOP), at least at its division level.[2]

21. In order to facilitate the analysis and interpretation of the results of the index, it may be desirable to classify goods and services according to various supplementary classifications, e.g., source of origin, durability and seasonality. Calculation of the CPI by using various classifications should generate the same overall results as the original index.

22. The classification should also provide a framework for the allocation of exp enditure weights. Expenditures at the lowest level of the classification system, expressed as a proportion of the total expenditure, determine the weights to be used at this level. When the weights are to remain fixed for several years, the objective should be to adopt weights that are representative of the contemporary household behaviour.

23. The two main sources for deriving the weights are the results from household expenditure surveys (HESs) and national accounts estimates on household consumption expenditure. The results from an HES are appropriate for an index defined to cover the consump tion expenditures of reference population groups resident within the country, while national account estimates are suitable for an index defined to cover consumption expenditures within the country. The decision about what source or

[2] See Annex 4.

sources to use and how they should be used depends on the main purpose of the index and on the availability and quality of appropriate data.

24. The information from the main source (HESs or national accounts) should be supplemented with all other available information on the expenditure pattern. Sources of such information that can be used for disaggregating the expenditures are surveys of sales in retail outlets, point-of-purchase surveys, surveys of production, export and import data and administrative sources. Based on these data the weights for certain products may be further disaggregated by region and type of outlet. Where the data obtained from different sources relate to different periods, it is important to ensure, before weights are allocated, that expenditures are adjusted so that they have the same reference period.

25. Where the weight reference period differs significantly from the price reference period, the weights should be price updated to take account of price changes between the weights reference period and price reference period. Where it is likely that price updated weights are less representative of the consumption pattern in the price reference period this procedure may be omitted.

26. Weights should be reviewed and if appropriate revised as often as accurate and reliable data are available for this to be done, but at least once every five years. Revisions are important to reduce the impact on the index of product substitutions and to ensure the basket of goods and services and their weights remain representative.[3] For some categories, it may be necessary to update the weights more frequently as such weights are likely to become out of date more quickly than higher-level weights. In periods of high inflation, the weights should be updated frequently.

27. When a new basket (structure or weights) replaces the old, a continuous CPI series should be created by linking[4] together the index numbers based on the new basket of goods and services to those based on the earlier basket. The particular procedure used to link index number series will depend on the particular index compilation technique used. The objective is to ensure that the technique used to introduce a new basket does not, of itself, alter the level of the index.

28. Completely new types of goods and services (i.e., goods and services that cannot be classified to any of the existing elementary aggregates) should normally be considered for inclusion only during one of the periodic review and reweighting exercises. A new model or variety of an existing product that can be fitted within an existing elementary aggregate should be included at the time it is assessed as having a significant and sustainable market share. If a quality change is detected an appropriate quality adjustment should be made.[5]

29. Some products such as seasonal products, insurance, second-hand goods, expenditure abroad, interest, own production, expenditures on purchase and construction of dwellings, etc., may need special treatment when constructing their weights. The way these products are dealt with should be determined by the main purpose of the index, national circumstances and the practicalities of compilation.

30. Seasonal products should be included in the basket. It is possible to use: (i) a fixedweight approach which uses the same weight for the seasonal product in all months using an imputed price in the out-of-season months; or (ii) a variable weights approach where a changing weight is attached to the product in various months. The decision on the approach should be based on national circumstances.

[3] See Annex 1.
[4] See Annex 2.
[5] See Annex 2.

31. The expenditure weights for second-hand goods should be based either on the net expenditure of the reference population on such goods, or the gross expenditure, depending on the purpose of the index.

32. When consumption from own production is within the scope of the index, the weights should be based on the value of quantities consumed from own production. Valuation of consumption from own production should be made on the basis of prices prevailing on the market, unless there is some reason to conclude that market prices are not relevant or cannot be reliably observed, or there is no interest in using hypothetically imputed prices. In this case the expenditures and prices for the inputs into the production of these goods and services could be used instead. The third option is to valuate it by using quality adjusted market prices.

Sampling for price collection

33. A CPI is an estimate based on a sample of households to estimate weights, and a sample of zones within regions, a sample of outlets, a sample of goods and services and a sample of time periods for price observation.

34. The sample size and sample selection methods for both outlets and the goods and services for which price movements over time are to be observed should ensure that the prices collected are representative and sufficient to meet the requirements for the accuracy of the index, but also that the collection process is cost-effective. The sample of prices should reflect the importance, in terms of relative expenditures, of the goods and services available for purchase by consumers in the reference period, the number, types and geographic spread of outlets that are relevant for each good and service, and the dispersion of prices and price changes across outlets.

35. Probability sampling techniques are the preferred methods, in principle, as they permit sound statistical inference and control over the representativity of the sample. In addition, they permit estimation of sampling variation (errors). However, they may be costly to implement and can result in the selection of products that are very difficult to price to constant quality.

36. In cases where appropriate sampling frames are lacking and it is too costly to obtain them, samples of outlets and products have to be obtained by non-probability methods. Statisticians should use available information and apply their best judgement to ensure that representative samples are selected. The possibility of applying cut-off or detailed quota sampling[6] strategy may be considered, especially where the sample size is small. A mixture of probability and non-probability sampling techniques may be used.

37. Efficient and representative sampling, whether random or purposive, requires comprehensive and up-to-date sampling frames for outlets and products. Sample selection can be done either by head office from centrally held sampling frames, or in the field by price collectors, or by a mixture of the two. In the first case, price collectors should be given precise instructions on which outlets to visit and which products to price. In the second case, price collectors should be given detailed and unambiguous guidelines on the local sampling procedures to be adopted. Statistical business registers, business telephone directories, results from the point-of-purchase surveys or from surveys of sales in different types of outlets, and lists of Internet sellers may be used as sampling frames for the central selection of outlets. Catalogues or other product lists drawn up by major manufacturers, wholesalers or trade associations, or lists of products that are specific to individual outlets such as large supermarkets might be used as the sampling frame for selection

[6] See Annex 1.

of products. Data scanned by bar-code readers at the cashier's desk (electronic databases) can be particularly helpful in the selection of goods and services.

38. The sample of outlets and of goods and services should be reviewed periodically and updated where necessary to maintain its representativeness.

Index calculation

39. The compilation of a CPI consists of collecting and processing price and expenditure data according to specified concepts, definitions, methods and practices. The detailed procedures that are applied will depend on particular circumstances.

40. CPIs are calculated in steps. In the first step, the elementary aggregate indices are calculated. In the subsequent steps, higher level indices are calculated by aggregating the elementary aggregate indices.

Elementary aggregate indices

41. The elementary aggregate is the smallest and relatively homogeneous set of goods or services for which expenditure data are defined (used) for CPI purposes. It is the only aggregate for which an index number is constructed without any explicit expenditure weights, although other kinds of weights might be explicitly or implicitly introduced into the calculation. The set of goods or services covered by an elementary aggregate should be similar in their end-uses and are expected to have similar price movements. They may be defined not only in terms of their characteristics but also in terms of the type of location and outlet in which they are sold. The degree of homogeneity achieved in practice will depend on the availability of corresponding expenditure data.

42. An elementary index is a price index for an elementary aggregate. As expenditure weights usually cannot be attached to the prices or price relatives for the sampled products within the elementary aggregate, an elementary index is usually calculated as an unweighted average of the prices or price relatives. When some information on weights is available, this should be taken into account when compiling the elementary indices.

43. There are several ways in which the prices, or the price relatives, might be averaged. The three most commonly used formulae are the ratio of arithmetic mean prices (RAP), the geometric mean (GM) and the arithmetic mean of price relatives (APR). The choice of formula depends on the purpose of the index, the sample design and the mathematical properties of the formula. It is possible to use different formulae for different elementary aggregates within the same CPI. It is recommended that the GM formula be used, particularly where there is a need to reflect substitution within the elementary aggregate or where the dispersion in prices or price changes within the elementary aggregate is large. The GM has many advantages because of its mathematical properties. The RAP may be used for elementary aggregates that are homogeneous and where consumers have only limited opportunity to substitute or where substitution is not to be reflected in the index. The APR formula should be avoided in its chained form, as it is known to result in biased estimates of the elementary indices.

44. The elementary index may be computed by using either a chained or direct form of the formula chosen. The use of a chained form may make the estimation of missing prices and the introduction of replacement products easier.

Upper level indices

45. These price indices are constructed as weighted averages of elementary aggregate indices. Several types of formulae can be used to

average the elementary aggregate indices. In order to compile a timely index, the practical option is to use a formula that relies on the weights relating to some past period. One such formula is the Laspeyres-type index, the formula used by most national statistical agencies.

46. For some purposes it may be appropriate to calculate the index retrospectively by using an index number formula that employs both base-period weights and current-period weights, such as the Fisher, Törnqvist or Walsh index. Comparing the difference between the index of this type and the Laspeyres-type index can give some indication of the combined impact of income changes, preference changes and substitution effects over the period in question, providing important information for producers and users of the CPI.

47. Where the change in an upper level index between two consecutive periods such as t-1 and t is calculated as the weighted average of the individual indices between t-1 and t, care should be taken to ensure that the weights are updated to take account of the price changes between the price reference period 0 and the preceding period t-1. Failure to do so may result in a biased index.

Price observations

48. The number and quality of the prices collected are critical determinants of the reliability of the index, along with the specifications of the products priced. Standard methods for collecting and processing price information should be developed and procedures put in place for collecting them systematically and accurately at regular intervals. Price collectors should be well trained and well supervised, and should be provided with a comprehensive manual explaining the procedures they have to follow.

Collection

49. An important consideration is whether the index or parts of the index should relate to monthly (or quarterly) average prices or to prices for a specific period of time (e.g., a single day or week in a month). This decision is related to a number of issues, which include the use of an index, the practicalities of carrying out price collection and the pattern of price movements. When point-in-time pricing is adopted, prices should be collected over a very small number of days each month (or quarter). The interval between price observations should be uniform for each product. Since the length of the month (or quarter) varies, this uniformity needs to be defined carefully. When the aim is monthly (or quarterly) average prices, the prices collected should be representative of the period to which they refer.

50. Attention should also be paid to the time of day selected for price observation. For example, in the case of perishable goods, price observations may need to be collected at the same time on the same day of the week and not just before closing time, when stocks may be low, or sold cheaply to minimize wastage.

51. Price collection should be carried out in such a way as to be representative of all geographical areas within the scope of the index. Special care should be taken where significant differences in price movements between areas may be expected.

52. Prices should be collected in all types of outlets that are important, including Internet sellers, open-air markets and informal markets, and in free markets as well as price-controlled markets. Where more than one type of outlet is important for a particular type of product, this

should be reflected in the initial sample design and an appropriately weighted average should be used in the calculation of the index.

53. Specifications should be provided detailing the variety and size of the products for which price information is to be collected. These should be precise enough to identify all the pricedetermining characteristics that are necessary to ensure that, as far as possible, the same goods and services are priced in successive periods in the same outlet. The specifications should include, for example, make, model, size, terms of payment, conditions of delivery, type of guarantees and type of outlet. This information could be used in the procedures used for replacement and for quality adjustment.

54. Prices to be collected are actual transaction prices, including indirect taxes and nonconditional discounts, that would be paid, agreed or costed (accepted) by the reference population. Where prices are not displayed or have to be negotiated, where quantity units are poorly defined or where actual purchase prices may deviate from listed or fixed prices, it may be necessary for the price collectors to purchase products in order to determine the transaction prices. A budget may be provided for any such purchases. When this is not possible, consideration may be given to interviewing customers about the prices actually paid. Tips for services, where compulsory, should be treated as part of the price paid.

55. Exceptional prices charged for stale, shop-soiled, damaged or otherwise imperfect goods sold at clearance prices should be excluded, unless the sale of such products is a permanent and widespread phenomenon. Sale prices, discounts, cut prices and special offers should be included when applicable to all customers without there being significant limits to the quantities that can be purchased by each customer.

56. In periods of price control or rationing, where limited supplies are available at prices which are held at a low level by measures such as subsidies to the sellers, government procurement, price control, etc., such prices as well as those charged on any significant unrestricted markets should be collected. The different price observations should be combined in a way that uses the best information available with respect to the actual prices paid and the relative importance of the different types of sales.

57. For each type of product, different alternatives for collecting prices should be carefully investigated, to ensure that the price observations could be made reliably and effectively. Means of collection could include visits to outlets with paper forms or hand-held devices, interviews with customers, computer-assisted telephone interviews, mail-out questionnaires, brochures, price lists provided by large or monopoly suppliers of services, scanner data and prices posted on the Internet. For each alternative, the possible cost advantages need to be balanced against an assessment of the reliability and timeliness of each of the alternatives.

58. Where centrally regulated or centrally fixed prices are collected from the regulatory authorities, checks should be made to ascertain whether the goods and services in question are actually sold and whether these prices are in fact paid. For goods and services where the prices paid are determined by combinations of subscription fees and piece rates (e.g., for newspapers, journals, public transport, electricity and telecommunications) care must be taken to ensure that a representative range of price offers are observed. Care must also be taken to ensure that prices

charged to different types of consumers are observed,. e.g. those linked to the age of the purchaser or to memberships of particular associations.

59. The collected price information should be reviewed for comparability and consistency with previous observations, the presence of replacements, unusual or large price changes and to ensure that price conversions of goods priced in multiple units or varying quantities are properly calculated. Extremely large or unusual price changes should be examined to determine whether they are genuine price changes or are due to changes in quality. Procedures should be put in place for checking the reliability of all price observations. This could include a programme of direct pricing and/or selective re-pricing of some products shortly after the initial observation was made.

60. Consistent procedures should be established for dealing with missing price observations because of, e.g., inability to contact the seller, non-response, observation rejected as unreliable or products temporarily unavailable. Prices of non-seasonal products that are temporarily unavailable should be estimated until they reappear or are replaced, by using appropriate estimation procedures, e.g., imputation on the basis of price changes of similar non-missing products. Carrying forward the last observed price should be avoided, especially in periods of high inflation.

Replacements

61. Replacement of a product will be necessary when it disappears permanently. Replacement should be made within the first three months (quarter) of the product becoming unavailable. It may also be necessary when the product is no longer available or sold in significant quantities or under normal sale conditions. Clear and precise rules should be developed for selecting the replacement product. Depending on the frequency of sampling and the potential for accurate quality adjustment, the most commonly used alternatives are to select: (i) the most similar to the replaced variety; (ii) the most popular variety among those that belong to the same elementary aggregate; and (iii) the variety most likely to be available in the future. Precise procedures should be laid down for price adjustments with respect to the difference in characteristics when replacements are necessary, so that the impact of changes in quality is excluded from the observed price.

62. Replacement of an outlet may be motivated if prices cannot be obtained, e.g., because it has closed permanently, because of a decline in representativeness or because the outlet no longer cooperates. Clear rules should be established on when to discontinue price observations from a selected outlet, on the criteria for selecting a replacement, as well as on the adjustments that may be required to price observations or weights. Such rules should be consistent with the objectives of the index and with the way in which the outlet sample has been determined.

63. Deletion of an entire elementary aggregate will be necessary if all products in that elementary aggregate disappear from most or all outlets and it is not possible to locate a sufficient number of price observations to continue to compile a reliable index for this elementary aggregate. In such situations, it is necessary to redistribute the weight assigned to the elementary aggregate among the other elementary aggregates included in the next level of aggregation.

Quality changes

64. The same product should be priced in each period as long as it is representative. However, in

practice, products that can be observed at different time periods may differ with respect to package sizes, weights, volumes, features and terms of sale, as well as other characteristics. Thus it is necessary to monitor the characteristics of the products being priced to ensure that the impact of any differences in price-relevant or utility-relevant characteristics can be excluded from the estimated price change.

65. Identifying changes in quality or utility is relatively more difficult for complex durable goods and services. It is necessary, therefore, to collect a considerable amount of information on the relevant characteristics of the products for which prices are collected. The most important information can be obtained in the course of collecting prices. Other sources of information on price-relevant or utility-relevant characteristics can be producers, importers or wholesalers of the goods included and the study of articles and advertisements in trade publications.

66. When a quality change is detected, an adjustment must be made to the price, so that the index reflects as nearly as possible the pure price change. If this is not done, the index will either record a price change that has not taken place or fail to record a price change that did happen. The choice of method for such adjustments will depend on the particular goods and services involved. Great care needs to be exercised because the accuracy of the resulting index depends on the quality of this process. To assume automatically that all price change is a reflection of the change in quality should be avoided, as should the automatic assumption that products with different qualities are essentially equivalent.

67. The methods for estimating quality-adjusted prices[7] may be:

(a) *Explicit (or direct) quality adjustment methods* that directly estimate the value of the quality difference between the old and new product and adjust one of the prices accordingly. Pure price change is then implicitly estimated as the difference in the adjusted prices.

(b) *Implicit (or indirect) quality adjustment methods* which estimate the pure price change component of the price difference between the old and new products based on the price changes observed for similar products. The difference between the estimate of pure price change and the observed price change is considered as change due to quality difference.

Some of these methods are complex, costly and difficult to apply. The methods used should as far as possible be based on objective criteria.

Accuracy

68. As with all statistics, CPI estimates are subject to errors that may arise from a variety of sources.[8] Compilers of CPIs need to be aware of the possible sources of error, and to take steps during the design of the index, its construction and compilation processes to minimize their impact, for which adequate resources should be allocated.

69. The following are some well-known sources of potential error, either in pricing or in index construction, that over time can lead to errors in the overall CPI: incorrect selection of products and incorrect observation and recording of their prices; incorrect selection of outlets and timing of price collection; failure to observe and adjust correctly for quality changes; appearance

[7] See Annex 2.
[8] See Annex 3.

of new goods and outlets; failure to adjust for product and outlet substitution or loss of representativity; the use of inappropriate formulae for computing elementary aggregate and upper level indices.

70. To reduce the index's potential for giving a misleading picture, it is in general essential to update weights and baskets regularly, to employ unbiased elementary aggregate formulae, to make appropriate adjustments for quality change, to allow adequately and correctly for new products, and to take proper account of substitution issues as well as quality control of the entire compilation process.

Dissemination

71. The CPI estimate should be computed and publicly released as quickly as possible after the end of the period to which it refers, and according to a pre-announced timetable. It should be made available to all users at the same time, in a convenient form, and should be accompanied by a short methodological explanation. Rules relating to its release should be made publicly available and strictly observed. In particular, they should include details of who has pre-release access to the results, why, under what conditions, and how long before the official release time.

72. The general CPI should be compiled and released monthly. Where there is no strong user demand for a monthly series or countries do not have the necessary resources, the CPI may be prepared and released quarterly. Depending on national circumstances, sub-indices may be released with a frequency that corresponds to users' needs.

73. When it is found that published index estimates have been seriously distorted because of errors or mistakes made in their compilation, corrections should be made and published. Such corrections should be made as soon as possible after detection according to publicly available policy for correction. Where the CPI is widely used for adjustment purposes for wages and contracts, retrospective revisions should be avoided to the extent possible.

74. The publication of the CPI results should show the index level from the index reference period. It is also useful to present derived indices, such as the one that shows changes in the major aggregates between: (i) the current month and the previous month; (ii) the current month and the same month of the previous year; and (iii) the average of the latest 12 months and the average of the previous 12 months. The indices should be presented in both seasonally adjusted and unadjusted terms, if seasonally adjusted data are available.

75. Comments and interpretation of the index should accompany its publication to assist users. An analysis of the contributions of various products or group of products to the overall change and an explanation of any unusual factors affecting the price changes of the major contributors to the overall change should be included.

76. Indices for the major expenditure groups should also be compiled and released. Consideration should be given to compiling indices for the divisions and groups of the COICOP.[9] Sub-indices for different regions or population groups, and alternative indices designed for

[9] See Annex 4.

analytical purposes, may be compiled and publicly released if there is a demand from users, they are judged to be reliable and their preparation is cost effective.

77. The index reference period may be chosen to coincide with the latest weights reference period or it could be established to coincide with the base period of other statistical series. It should be changed as frequently as necessary to ensure that the index numbers remain easy to present and understand.

78. Average prices and price ranges for important and reasonably homogeneous products may be estimated and published in order to support the research and analytical needs of users.

79. Countries should report national CPI results and methodological information to the International Labour Office as soon as possible after their national release.

80. Comparing national CPI movements across countries is difficult because of the different measurement approaches used by countries of certain products, particularly housing and financial services. The exclusion of housing (actual rents and either imputed rents or acquisition of new houses, and maintenance and repair of dwelling) and financial services from the all-items index will make the resulting estimates of price change for the remaining products more comparable across countries. Therefore, in addition to the all-items index, countries should, if possible, compile and provide for dissemination to the international community an index that excludes housing and financial services. It should be emphasized, though, that even for the remaining products in scope, there can still be difficulties when making international comparisons of changes in consumer prices.

Consultations and integrity

81. The compiling agency should have the professional independence, competence and resources necessary to support a high quality CPI programme. The UN *Fundamental Principles of Official Statistics*[10] and the ILO *Guidelines concerning dissemination practices for labour statistics*[11] should be respected.

82. The agency responsible for the index should consult representatives of users on issues of importance for the CPI, particularly during preparations for any changes to the methodology used in compiling the CPI. One way of organizing such consultations is through the establishment of advisory committee(s) on which social partners, as well as other users and independent experts, might be represented.

83. In order to ensure public confidence in the index, a full description of the data collection procedures and the index methodology should be prepared and made widely available. Reference to this description should be made when the CPI is published. The documentation should include an explanation of the main objectives of the index, details of the weights, the index number formulae used, and a discussion of the accuracy of the index estimates. The precise identities of the outlets and goods and services used for price collection should not be revealed.

[10] UN Economic and Social Council, 1994.
[11] Sixteenth International Conference of Labour Statisticians, 1998.

84. Users should be informed in advance of any changes that are going to be made to the scope, weights or methodology used to estimate the CPI.

85. Technical guidance on the compilation of consumer price indices is provided in the *Consumer price index manual: Theory and practice.*[12] This manual should be updated periodically in order to reflect current best practice.

ANNEX 1
TERMINOLOGY AND DEFINITIONS

(a) 'Consumer goods' are goods or services that are used by households for the satisfaction of individual needs or wants.

(b) 'Consumption expenditures' are expenditure on consumer goods and services and can be defined in terms of 'acquisition', 'use', or 'payment':

- 'acquisition'[13] indicates that it is the total value of the goods and services acquired during a given period that should be taken into account, irrespective of whether they were wholly paid for or used during the period. This approach could be extended to include the estimated values of own -account production and social transfers in kind received from government or non-profit institutions. The prices enter the CPI in the period when consumers accept or agree prices, as distinct from the time payment is made;

- 'use' indicates that it is the total value of all goods and services actually consumed during a given period that should be taken into account; for durable goods this approach requires valuing the services provided by these goods during the period. The prices (opportunity costs) enter the CPI in the period of consumption;

- 'payment' indicates that it is the total payment made for goods and services during a given period that should be taken into account, without regard to whether they were delivered or used during the period. The prices enter the CPI in the period or periods when the payment is made.

(c) 'Scope of the index' refers to the population groups, geographic areas, products and outlets for which the index is constructed.

(d) 'Coverage' of the index is the set of goods and services represented in the index. For practical reasons, coverage may have to be less than what corresponds to the defined scope of the index.

(e) 'Reference population' refers to that specific population group for which the index has been constructed.

(f) 'Weights' are the aggregate consumption expenditures on any set of goods and services expressed as a proportion of the total consumption expenditures on all goods and services within the scope of the index in the weight reference period. They are a set of numbers summing-up to unity.

(g) 'Price updating of weights' is a procedure that is used to bring the expenditure weights in line with the index or price reference period. The price updated weights are calculated by multiplying the weights from the weight reference period by elementary indices measuring the price changes between weight reference and price reference period and rescaling to sum to unity.

(h) 'Index reference period' is the period for which the value of the index is set at 100.0.

(i) 'Price reference period' is the period whose prices are compared with the prices in the current period. The period whose prices appear in the denominators of the price relatives.

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[12] *Consumer price index manual: Theory and practice* [International Labour Office, International Monetary Fund, Organisation for Economic Co-operation and Development, Statistical Office of the European Communities (EUROSTAT); United National Economic Commission for Europe and the World Bank, Geneva, 2004].

[13] This definition differs from the one adopted by the 14th ICLS [1987].

(j) The 'weight reference period' is the period, usually a year, whose estimates of the volume of consumption and its components are used to calculate the weights.

(k) 'Probability sampling' is the selection of a sample of units, such as outlets or products, in such a way that each unit in the universe has a known non-zero probability of selection.

(l) 'Cut-off sampling' is a sampling procedure in which a predetermined threshold is established with all units in the relevant population at or above the threshold being eligible for inclusion in the sample and all units below the threshold being excluded. The threshold is usually specified in terms of the size of some relevant variable (such as some percentage of total sales), the largest sampling units being included and the rest excluded.

(m) 'Quota sampling' is a non-probability method where the population is divided into certain strata. For each stratum, the number ('quota') of elements to be included in the sample is specified. The price collector simply 'fills the quotas', which means, in the case of outlet sampling, that the selection of the outlets is based on the judgement of the price collectors and the specified criteria.

(n) 'Imputed expenditures' are the expenditures assigned to a product that has not been purchased, such as a product that has been produced by the household for its own consumption (including housing services produced by owner-occupiers), a product received as payment in kind or as a free transfer from government or non-profit institutions.

(o) 'Imputed price' refers to the estimated price of a product whose price during a particular period has not been observed and is therefore missing. It is also the price assigned to a product for which the expenditures have been imputed, see (n).

(p) 'Outlet' indicates a shop, market stall, service establishment, internet seller or other place where goods and/or services are sold or provided to consumers for non-business use.

(q) 'Linking' means joining together two consecutive sequences of price observations, or price indices, that overlap in one or more periods, by rescaling one of them so that the value in the overlap period is the same in both sequences, thus combining them into a single continuous series.

(r) 'Price' is defined as the value of one unit of a product, for which the quantities are perfectly homogeneous not only in a physical sense but also in respect of a number of other characteristics.

(s) 'Pure price change' is that change in the price of a good or service which is not due to any change in its quality. When the quality does change, the pure price change is the price change remaining after eliminating the estimated contribution of the change in quality to the observed price change.

(t) 'Quality adjustment' refers to the process of adjusting the observed prices of a product to remove the effect of any changes in the quality of that product over time so that pure price change may be identified.

(u) 'Consumer substitution' occurs when, faced with changes in relative price, consumers buy more of the good that has become relatively cheaper and less of the good that has become relatively more expensive. It may occur between varieties of the same product or between different expenditure categories.

ANNEX 2
QUALITY ADJUSTMENT METHODS
IMPLICIT QUALITY ADJUSTMENT METHODS

1. The 'overlap' method assumes that the entire price difference at a common point in time between the disappearing product and its replacement is due to a difference in quality.

2. The 'overall mean imputation' method first calculates the average price change for an aggregate without the disappearing product and its replacement, and then uses that rate of price change to impute a price change for the disappearing product. It assumes that the pure price difference between the disappearing product and its replacement is equal to the average price changes for continuing (non-missing) products.

3. The 'class mean imputation' method is a variant of the overall mean imputation method. The only difference is in the source of the imputed rate of price change to period $t+1$ for the disappearing product. Rather than using the average index change for all the non-missing products in the aggregate, the imputed rate of price change is estimated using only those price changes of the products that were judged essentially equivalent or were directly quality-adjusted.

EXPLICIT QUALITY ADJUSTMENT METHODS

4. The 'expert's adjustment' method relies on the judgement of one or more industry experts, commodity specialists, price statisticians or price collectors on the value of any quality difference between the old and replacement product. None, some, or all of the price difference may be attributed to the improved quality.

5. The 'differences in production costs' approach relies on the information provided by the manufacturers on the production costs of new features of the replacements (new models), to which retail mark-ups and associated indirect taxes are then added. This approach is most practicable in markets with a relatively small number of producers, with infrequent and predictable model updates. However, it should be used with caution as it is possible for new production techniques to reduce costs while simultaneously improving quality.

6. The 'quantity adjustment' method is applicable to products for which the replacement product is of a different size to the previously available one. It should only be used if the differences in quantities do not have an impact on the quality of the good.

7. The 'option cost' method adjusts the price of the replacements for the value of the new observable characteristics. An example of this is the addition of a feature that earlier has been a priced option as standard to a new automobile model.

8. A 'hedonic' regression method estimates the price of a product as a function of the characteristics it possesses. The relationship between the prices and all relevant and observable price-determining characteristics is first estimated and then results are used in the estimation of the index.

ANNEX 3
TYPES OF ERRORS

* 'Quality change error' is the error that can occur as a result of the index's failure to make proper allowance for changes in the quality of goods and services.

* 'New goods error' is the failure to reflect either price changes in new products not yet sampled, or given a COLI objective, the welfare gain to consumers when those products appear.

* 'Outlet substitution error' can occur when consumers shift their purchases among outlets for the same product without proper reflection of this shift in the data collection for the index.

* 'New outlets error' is conceptually identical to new goods error. It arises because of the failure to reflect either price changes in new outlets not yet sampled, or the welfare gain to consumers when the new outlets appear.

* 'Upper level substitution error' arises when the index does not reflect consumer substitution among the basic categories of consumption owing to the use of an inappropriate method for aggregating elementary aggregates in the construction of the overall index value. Only relevant to a COLI, although an equivalent (representativity error) may be defined from the perspective of the pure price index.

* 'Elementary index error' arises from the use of an inappropriate method for aggregating price quotations at the very lowest level of aggregation. The elementary index error can take two forms: formula error and lower level substitution error. The index suffers from formula error if, as a result of the properties of the formula, the result produced is biased relative to what would have been the result if a pure price change could have been estimated. The index suffers from lower level substitution error if it does not reflect consumer substitution among the products contained in the elementary aggregate.

* 'Selection error' arises when the sample of price observations is not fully representative of the intended population of outlets or products. The first four types of errors listed above can be seen as special cases of this type of error.

ANNEX 4

Classification of Individual Consumption According to Purpose (COICOP)[14] (breakdown of individual consumption expenditure of households by division and group)

01 Food and non-alcoholic beverages
- 01.1 Food
- 01.2 Non-alcoholic beverages

02 Alcoholic beverages, tobacco and narcotics
- 02.1 Alcoholic beverages
- 02.2 Tobacco
- 02.3 Narcotics

03 Clothing and footwear
- 03.1 Clothing
- 03.2 Footwear

04 Housing, water, electricity, gas and other fuels
- 04.1 Actual rentals for housing
- 04.2 Imputed rentals for housing
- 04.3 Maintenance and repair of the dwelling
- 04.4 Water supply and miscellaneous services related to the dwelling
- 04.5 Electricity, gas and other fuels

05 Furnishings, household equipment and routine household maintenance
- 05.1 Furniture and furnishings, carpets and other floor coverings
- 05.2 Household textiles
- 05.3 Household appliances
- 05.4 Glassware, tableware and household utensils
- 05.5 Tools and equipment for house and garden
- 05.6 Goods and services for routine household maintenance

06 Health
- 06.1 Medical products, appliances and equipment
- 06.2 Outpatient services
- 06.3 Hospital services

07 Transport
- 07.1 Purchase of vehicles
- 07.2 Operation of personal transport equipment
- 07.3 Transport services

08 Communication
- 08.1 Postal services
- 08.2 Telephone and telefax equipment
- 08.3 Telephone and telefax services

09 Recreation and culture
- 09.1 Audio-visual, photographic and information processing equipment
- 09.2 Other major durables for recreation and culture
- 09.3 Other recreational products and equipment, gardens and pets
- 09.4 Recreational and cultural services
- 09.5 Newspapers, books and stationery
- 09.6 Package holidays

10 Education
- 10.1 Pre-primary and primary education
- 10.2 Secondary education
- 10.3 Post-secondary non-tertiary education
- 10.4 Tertiary education
- 10.5 Education not definable by level

11 Restaurants and hotels
- 11.1 Catering services
- 11.2 Accommodation services

12 Miscellaneous goods and services
- 12.1 Personal care
- 12.2 Prostitution
- 12.3 Personal effects n.e.c.
- 12.4 Social protection
- 12.5 Insurance
- 12.6 Financial services n.e.c.
- 12.7 Other services n.e.c.

[14] Explanatory notes are available on http://unstats.un.org/unsd/cr/registry/.

annex 4
SPATIAL COMPARISONS OF CONSUMER PRICES, PURCHASING POWER PARITIES AND THE INTERNATIONAL COMPARISON PROGRAM

1 Introduction

This annex deals with the problem of comparing price levels across different areas or regions within a country, as well as across countries. Even though international price comparisons are required to handle differences in currencies in different countries, the index number problems involved in price comparisons across countries mirror those encountered in comparisons over time. There is a large body of literature on cross-country comparisons of prices and real income undertaken under the auspices of the International Comparison Program (ICP). While not providing an exhaustive account of the related problems and relevant aggregation methods, this annex aims to achieve a degree of completeness in the coverage of the problem of consumer price comparisons in the manual by adding the spatial and international dimensions to the temporal comparisons dealt with in various chapters of the manual. The annex also attempts to identify possible avenues for a closer integration between spatial and temporal comparisons of consumer prices.

The main objectives of the annex are: (i) to provide a brief summary of the index number problems encountered in the process of international and inter-area price comparisons and to highlight the need for the development and use of specialized aggregation methods; (ii) to describe a few aggregation methods used in deriving purchasing power parities (PPPs) and spatial measures of price levels; (iii) to examine the relationship between the ICP and PPPs for cross-country comparisons with the CPI; and (iv) to explore the feasibility of integrating the ICP activities with the streamlined activities of national statistical offices for the compilation of the CPI.

The annex is also designed to provide an introduction for the statisticians in various national statistical offices who may currently be involved in consumer price index (CPI) compilation to the issues and methods involved in spatial comparisons of consumer prices. The annex outlines some of the principal differences in the approaches to spatial comparisons. Countries embarking on inter-area or regional consumer price comparisons, as well as those countries that may participate in the ICP in the near future, may find the contents of the annex useful.

2 Differences between temporal and spatial comparisons

There are several major qualitative differences in the nature of price comparisons involved in the standard CPI comparisons over time and price comparisons over space involving regions or countries. These differences highlight the need for specialized methods for aggregating price data in deriving summary measures of price levels, as well as specific types of data requirements associated with cross-country and inter-area comparisons.

The foremost difference is the absence of a natural ordering of price and quantity observations in the context of cross-country or inter-area comparisons. The CPI framework and methods are devised to measure changes over time. Therefore, the price observations appear in a chronological order. The presence of a natural ordering of price observations makes it possible to examine the feasibility and relative merits of the fixed and chain index numbers. For example, in the context of constructing price comparisons across countries within the OECD, or across states

within the United States, it is impossible to arrive at an ordering which facilitates chained comparisons.

The multilateral nature of spatial comparisons is a distinguishing feature of price comparisons across regions and countries. When price levels of goods and services across different countries are compared, it is essential that such comparisons are undertaken for every pair of regions being considered. If the World Bank is interested in comparisons of real income in different countries, it is necessary for the Bank to be able to make comparisons between all pairs of countries involved. This multilateral nature of comparisons creates several problems. First, the number of comparisons (one for each pair) can be quite large, and presentation and use of such results may be quite unwieldy. For example, if a particular comparison exercise involves 20 countries, then it requires 190 (20 x 19/2) separate binary comparisons involving distinct pairs of countries. Second, results from such a large tableau of binary comparisons require a degree of consistency. This requirement translates into the 'transitivity' condition described below.

The uses and applications of inter-area price comparisons may differ significantly from general consumer price indices. The CPI is probably the most significant economic statistic produced in any country. It is not only used as a general measure of price changes over time, but often in assessing and calibrating monetary policy. Despite the conceptual similarities in price comparisons over time and across space, spatial price comparisons are useful in comparisons of standards of living and wellbeing in different regions of a country or across countries. Such comparisons are essential in assessing development and in ensuring more balanced growth in different regions. There is considerable demand for measures of CPI across different cities and different states and regions (rural versus urban) within countries. However, there are very few countries where inter-area price level comparisons are readily available. Kokoski *et al.* [1999] demonstrate the feasibility of deriving meaningful inter-area price comparisons within the United States using the price data collected across different states.

International comparisons of prices, in the form of PPPs from the ICP, are used by international organizations and individual researchers in assessing growth and productivity performance of countries, and also in making meaningful comparisons of various national income aggregates (including government expenditure) across different countries. Currently, consensus is emerging among researchers and practitioners that price comparisons and PPPs are necessary in assessing the nature and extent of global poverty and its distribution across countries and regions of the world. Several recent research papers by Ward [2001], Prennushi [2001], Astin [2001] and Dwyer *et al.* [2001], presented at the joint World Bank-OECD Seminar on Purchasing Power Parities, 30 January to 2 February 2001, highlight a number of important applications of PPPs derived from international comparisons of prices under the ICP. Eurostat has recently embarked on a programme to extend the current ICP for its EU Member States to cover regional comparisons within different countries.

In recognition of the major analytical differences between the standard CPI comparisons over time and spatial and cross-country comparisons of consumer prices and PPPs, considerable research efforts have focused on the development of the data and methods necessary for spatial comparisons of prices. A brief summary of the results of this research is given below.

3 Data requirements for spatial comparisons

The basic data requirements for spatial comparisons are very similar to the data required for standard CPI calculation. The main components are the data on prices of a large range of products representative of the consumption baskets of households and information on weights associated with various product categories reflecting the importance attached to different products. Within the CPI, it is common practice to collect price quotations from different outlets scattered throughout the country. The selection of the outlets and areas from which prices are collected is based on complex multistage sampling designs. The expenditure weights are based on a classification of goods and services using a standard system such as the Classification of Individual Consumption according to Purpose (COICOP) or a similar national classification. The lowest level of product classification at which expenditure weights are available is used in identifying the elementary indices and higher-level indices at progressively higher levels of aggregation, leading ultimately to the total household expenditure level.

Spatial comparisons pose several problems in terms of identifying products that are to be priced from different areas, regions or countries involved in a comparison exercise. This problem is less severe when fairly similar or homogeneous areas are being compared. In cases where comparisons involve areas that are fairly heterogeneous, two problems arise. The first arises from major differences in the consumption baskets. For example, when comparisons are made between two states, say Minnesota and Florida, there may be major differences in the consumption baskets at the detailed level, even though the major expenditure categories may be identical. This problem is somewhat similar to the treatment of disappearing and new goods in the context of the CPI, but is more serious when cross-country comparisons are being attempted. The second problem arises from major differences in the quality of items. The quality differences may be measured through several product characteristics, with allowances and adjustments being made at the appropriate stage of index number calculation. Kokoski *et al.* [1999] demonstrate the feasibility of making inter-area price comparisons for heterogeneous goods.

Changes in quality are likely to be more gradual in the case of temporal comparisons, but can be a serious problem when comparisons across countries are attempted. The ICP follows the principle of identity in dealing with the problem of quality differences across countries. A comprehensive list of products with detailed product specifications is developed at the planning stages of any cross-country comparison exercise. These items are priced in different countries from various outlets distributed across the country, a procedure very similar to that used in the CPI. Development of the product listing is, however, a difficult step, with the degree of difficulty depending upon the size and heterogeneity of the group of countries involved. The use of a product listing, based on the identity principle, can have serious implications for the representativeness of the product list of the consumption baskets in different countries. There are several operational procedures used by international organizations in handling these problems relating to the compilation of price data. A more detailed account of the problems and recommended solutions can be found in *ICP Handbook* [United Nations, 1992] and the recent publication by OECD [1999] on its international comparison work.

Once the price data are compiled, the next stage in the CPI compilation is the aggregation of item-specific price changes to measure price

movements for various categories of consumption expenditure. At this stage, it is necessary to have information on consumption patterns. This information is usually drawn from household expenditure surveys. These surveys are regularly conducted in most countries by the respective national statistical organizations. For purposes of making inter-area comparisons of consumer prices, the corresponding requirement is the availability of household expenditure survey data specific to each area included in the comparisons. In many cases, for reasons relating to sampling and statistical reliability, detailed expenditure pattern data may not be available for all the regions.

Spatial comparisons of consumer prices pose specific problems because of the non-overlapping nature of the consumption baskets, major differences in the quality of items priced in different regions and countries, and the non-availability of crucial data on region-specific expenditure patterns. These problems require the development of new analytical techniques that can handle major differences in quality. National statistical offices may need additional financial resources in order to provide reliable and meaningful price comparisons between different cities, areas and regions within countries, and to compile reliable data for the more difficult task of inter-country comparisons of prices and real consumption.

4 Aggregation methods for spatial comparisons

This section briefly describes the types of aggregation methods that are commonly used in cross-country comparisons of prices. Since most of these methods have been developed in the context of the ICP, and are equally valid for inter-area or regional comparisons, the discussion below uses countries as spatial entities. This section is further divided into three parts. The first deals with the notation and conceptual framework necessary to deal with multilateral spatial comparisons. The second describes the construction of elementary indices for aggregation of prices when no quantity or expenditure information is available. Finally, a small selection of index number methods used in spatial price comparisons are presented.

4.1 Notation and conceptual framework

Consider the case involving comparisons across M countries, and price and quantity data on N commodities. These commodities refer to goods and services that are priced in all the countries. If the commodities refer to items below the elementary level at which no quantity or expenditure share data are available, we make use of only the price data. At this stage, all the problems relating to non-overlapping commodity lists and existence of quality differences are set aside so that the main focus is just on the aggregation issues. Let $p^j = [p_1^j, ...p_N^j]$ and $q^j = [q_1^j, ...q_N^j]$ represent the price and quantity vectors from country j (j=1, 2, . . . , M). In the case of international comparisons, all the prices are expressed in the respective national currency units. As in the case of the CPI computation, the problem is one of decomposing the differences in the value aggregates

$$V^j = \sum_{i=1}^{N} p_i^j q_i^j \qquad \text{(A4:1)}$$

into measures of price and real expenditure components. Since there are M sets of price and quantity vectors and, therefore, $M(M\text{-}1)/2$ binary comparisons between all distinct pairs of countries, a simpler notation is used in this annex in the place of the notation generally used in the manual. Let I_{jk} denote the (consumer) price index number for country k with country j as the base. If j and k are, respectively, the United States and

India, and if I_{jk}=22.50, then the index is interpreted to mean that 22.50 Indian rupees have the same purchasing power as one US dollar for the goods and services covered in computing the index. Thus the index can also be interpreted as the PPP between the currencies of j and k. This interpretation is consistent with the meaning accorded to the CPI. Since currency denominations are involved here, a proper measure of relative price level differences can be obtained if the PPP is compared to the exchange rate prevailing at the time when comparisons are made.

Because of the multilateral nature of spatial comparisons, when M countries are involved, it is necessary to provide comparisons between all pairs of countries. Thus, it becomes necessary to compute each and every entry in the following matrix of binary comparisons:

$$I = \begin{bmatrix} I_{11} & I_{12} & I_{1k} & I_{1M} \\ I_{21} & I_{22} & I_{2k} & I_{2M} \\ I_{j1} & I_{j2} & I_{jk} & I_{jM} \\ I_{M1} & I_{M2} & I_{Mk} & I_{MM} \end{bmatrix} \qquad \text{(A4.2)}$$

Several points concerning the matrix, I, are worth noting. First, the matrix can be large if the number of countries (or regions) involved is large. Second, the results recorded in the matrix need to be internally consistent. All the index number issues and various approaches discussed in the manual apply directly to each binary comparison involving two countries. Diewert [1986, 1999b] provides a summary of the microeconomic theoretical and test approaches to cross-country comparisons. Thus, it is possible to apply Fisher, Törnqvist, Walsh or other index number formulae described in the manual.

In order to ensure meaningful interpretation of the results from multilateral cross-country comparisons, the index number methods applied need to satisfy a number of basic requirements, only the most important of which are discussed below. Kravis *et al.* [1982], OECD [1999] and United Nations [1992] provide a complete list of these requirements.

Transitivity. An index number formula I_{jk} is said to satisfy the transitivity property if and only if for all choices of j, k and l (j, k, l=1, 2,..., M), the index satisfies

$$I_{jk} = I_{jl} I_{lk} \qquad \text{(A4.3)}$$

Equation (A4.3) requires that the application of a formula to make a direct comparison, I_{jk}, should result in the same numerical measure as an indirect comparison between j and k through a link country l. Note that the transitivity property ensures internal consistency of index numbers in the matrix given in equation (A4.2). It guarantees that the PPP for two currencies, say A and B, is the same whether it is derived through a direct comparison of A and B or through an indirect comparison that compares A with Cand Cwith B, which are then combined to provide an indirect PPP for A and B. This requirement arises mainly from the spatial nature of the comparisons where no natural ordering of the countries involved could be imposed without a value judgement. Most of the commonly used index number procedures do not satisfy this requirement. The following result is useful in constructing transitive index numbers.

An index number formula I_{jk} satisfies the transitivity property in (A4.3) if and only if there exist M positive real numbers $\lambda_1, \lambda_2, ..., \lambda_M$, such that

$$I_{jk} = \frac{\lambda_k}{\lambda_j} \qquad \text{(A4.4)}$$

for all j and k. The proof of this result is straightforward [Rao and Banerjee, 1984]. The result is important since it shows that, when the transitivity property is satisfied, all that is necessary is to measure M real numbers $\lambda_1, \lambda_2, ..., \lambda_M$, and then all the necessary indices in (A4.2) can be calculated using these M numbers, thus reducing the dimension of the problem involved. Two important points may be noted. First, the numbers λ_j in equation (A4.4) are not unique, since any scalar multiplication of a vector of λ_j can also lead to the same matrix of index numbers as that derived from the original λ_j. Therefore, these λ_j need to be determined (in any empirical exercise) up to a factor of proportionality. Second, these λ_j can be interpreted as the PPP of currencies involved. This particular result formed the basis of the work of statisticians such as Geary [1958] and Khamis [1970], who proposed aggregation methods designed to compute PPPs directly from the price and quantity data without invoking the index number literature.

Base invariance. An index number formula is said to be base invariant if a comparison between a given pair of countries (j, k) is invariant to the order in which the countries are listed. This implies that multilateral comparisons should be invariant to all possible permutations of the data set. For example, consider a set of transitive comparisons derived using a particular country (say the United States) as a star country. Under this scheme, price comparison between any pair of countries, say A and B, is effected through the United States which serves as a link country. Therefore,

$$PPP_{A,B} = PPP_{A,USA} \times PPP_{USA,B}$$

This scheme is inadmissible under the base invariance criterion since the choice of the star country clearly affects the PPP of currencies of countries A and B. Further, the United States is accorded a special status, in the form of a link country, in deriving transitive multilateral comparisons.

Characteristicity. This is a requirement outlined in Drechsler [1973]. This property requires that any set of multilateral comparisons satisfying the transitivity property should retain the essential features of the binary comparisons constructed without the transitivity requirement. Since condition (A4.3) implies that a transitive comparison between a pair of countries j and k is necessarily influenced by the price and quantity data for all the other countries, the characteristicity property requires that distortions resulting from adherence to the transitivity property should be kept at a minimum. Balk [2001] shows that a complete adherence to the characteristicity principle in its extreme (complete preservation of all binary comparisons) would imply that price indices, and hence PPPs, cannot depend upon any quantity or expenditure share weights. This is an extreme result, which is to be avoided in all index number comparisons. The Elteto-Koves-Szulc (EKS) method for multilateral comparisons, discussed below, has its origins in the characteristicity property.

4.2 Index number methods for spatial comparisons

Spatial price comparisons in general, and international comparisons in particular, use index number methods for aggregating price and quantity data at two different levels. The first is the basic heading level. This is normally the lowest level of aggregation at which expenditure data and weights are available. These basic headings usually consist of a fairly homogeneous group of items that are priced in different outlets in the countries. The subsequent levels of

aggregation lead to indices for broad expenditure categories, and finally to the whole consumption basket.

4.2.1 Aggregation below the basic heading level

Two commonly used index number methods are described below. These procedures explicitly allow for the possibility that price data may not be available for all items in the product list constructed for a given international comparison exercise. Such a situation is possible in the case of temporal comparisons, but is usually limited to a small number of commodities that are either disappearing or new goods.

The Elteto-Koves-Szulc (EKS) Method. A variant of the original method proposed in Elteto and Koves [1964] and Szulc [1964] is generally used in aggregating price data below the basic heading level. The EKS method involves two stages. In the first stage, binary comparisons are constructed using price relatives of those commodities for which prices are available in both countries. If n_{jk} is the number of commodities that are priced in both countries, then the current practice within ICP constructs a binary elementary index using the following formula:

$$I_{jk} = \prod_{i=1}^{n_{jk}} \left[\frac{p_i^k}{p_i^j} \right]^{1/n_{jk}} \qquad \text{(A4.5)}$$

Obviously, these indices are not transitive, since each index is based on prices of a different set of commodities. The EKS procedure is then used in deriving a transitive set of indices. The resulting formula for the construction of elementary indices for spatial comparisons is given by

$$I_{jk}^{EKS} = \prod_{i=1}^{M} [I_{ji} I_{ik}]^{1/M} \qquad \text{(A4.6)}$$

The elementary index number formula in (A4.5) is similar to the formula used in the construction of the CPI. The principal difference results from the fact that not all commodities are priced in all countries and that there is a need for transitivity at all stages of aggregation. The properties of these indices are discussed in Chapter 20 (not included here) of the manual.

The OECD [1999] uses a slightly modified variant of the binary indices shown in equation (A4.5). A formula that mimics the standard Fisher index is used, but without the use of any expenditure shares since the aggregation is below the basic heading level. This procedure tries to account for the fact that not all commodities for which prices are collected are really characteristic or important in one or both of the countries. The procedure takes explicit account of those commodities which are starred, indicating that the item is important in a given country. The modified EKS method uses the same formula as above, but the binary index on the right-hand side is replaced by:

$$I_{js} = \left\{ \prod_{i \in M(s)} \left[\frac{p_i^s}{p_i^j} \right]^{\frac{1}{n(s)}} \prod_{i \in M(j)} \left[\frac{p_i^s}{p_i^j} \right]^{\frac{1}{n(j)}} \right\}^{\frac{1}{2}} \qquad \text{(A4.7)}$$

where $n(s)$ and $n(j)$ are, respectively, the number of starred items in countries s and j; $M(s)$ and $M(j)$ are, respectively, the sets of commodities that are starred (considered representative) in different countries.

Use of equations (A4.5) and (A4.6) for the construction of spatial CPI numbers at the basic heading level has its problems. The most important problem is that these formulae do not take into consideration whether or not the commodities priced in different countries are 'representative' of the consumption in different

countries within the basic heading. A related problem is whether or not the coverage of the commodities, priced with respect to the basic heading to which they belong, is adequate. These issues are currently being researched, and Rao [2001b] offers a modified approach that attaches weights proportional to coverage and representativeness.

While there has been much research on the properties of index number formulae for the construction of elementary indices within the CPI framework..., there has been very little research on the properties of elementary indices within the context of international comparisons.

The Country-Product-Dummy (CPD) Method. The CPD method was originally proposed by Summers [1973] as a tool to deal with missing price observations. The method is a simple statistical device that can be used in deriving the PPPs for a particular basic heading by simply regressing the logarithm of observed prices against a set of dummy variables, defined with respect to commodities and countries. Thus the procedure involves the model:

$$\ln \; p_i^j = \eta_1 D_1 + \eta_2 D_2 + \ldots + \eta_n D_n + \pi_1 D_1^* + \pi_2 D_2^* + \ldots + \pi_M D_M + u_i^j \qquad \text{(A4.8)}$$

where D_i (I=1,2, . . . , n) and D^*_j (j=1, 2, . . . ,M) are, respectively, dummy variables for the N commodities in the basic heading and M countries involved in the comparisons.

Once this regression equation is estimated, the PPP for currency of country k with country j as base can be obtained by

$$PPP^j = \exp(\hat{\pi}_j)) \qquad \text{(A4.9)}$$

where $\hat{\pi}_j$ is the estimator of π_j in equation (A4.8). Then the desired index at the basic heading level is given by

$$I_{jk} = \frac{PPP_k}{PPP_j}. \qquad \text{(A4.10)}$$

The exponential of the difference in the estimates of π_j and π_k obtained from the regression equation provides the necessary index number.

The CPD model offers a number of generalizations that can explicitly account for a number of data-related problems. The model can be easily generalized to account for differences in quality measured through a set of product characteristics. The feasibility of this approach to inter-area comparisons of consumer prices within the United States was demonstrated in Kokoski *et al.* [1999]. Rao and Timmer [2000] examined the feasibility of using a generalized CPD model to incorporate various measures of reliability in the context of aggregating unit value ratios to provide comparisons at the manufacturing branch level. Rao [2001b] discusses a few model specifications that are appropriate for aggregation below the basic heading level within the context of the ICP.

The EKS method, described in equations (A4.6)-(A4.8), is the procedure that is currently used by all the international organizations for purposes of aggregation below the basic heading level. The CPD and EKS methods yield identical basic heading parities when all the commodities are priced in all the countries. Ferrari and Riani [1998] and Ferrari *et al.* [1996] present a number of analytical results relating to these methods. While the sampling issues relating to the selection and distribution of outlets and the frequency of price quotations are considered important for the construction of the elementary indices within the CPI, issues that are crucial for the construction of PPPs below the basic heading for inter-country

comparisons are quite different. Issues of quality differences and non-availability of goods and services in all the comparison countries are far more important in spatial comparisons of consumer prices.

4.2.2 Aggregation above the basic heading level

This section presents a small selection of the range of aggregation methods used in the context of spatial comparisons. A more comprehensive analysis of these spatial aggregation methods developed over the past three decades is presented by Balk [2001].

This level of aggregation is similar to the stage where elementary indices are aggregated to derive the overall CPI. In the case of temporal comparisons involving two time periods, all the methods and approaches described in the manual are appropriate, and in most cases the national statistical offices use the Laspeyres, Fisher or some variants of these formulae for CPI construction. However, the multilateral nature of spatial comparisons necessitates slightly different approaches to their construction.

A number of index number methods for aggregation above the basic heading level have been developed over the past three decades but, in the interest of brevity, only the principal methods are discussed below. These are the Geary-Khamis and EKS methods for international comparisons, the principal aggregation methods used in various international comparison exercises by the ICP, the OECD, Eurostat and FAO.

Several approaches to the construction of multilateral index numbers that satisfy transitivity and base invariance properties are discussed below. Four distinct approaches emerged during ICP work carried out between 1970 and the early 2000s. The first and most straightforward is the EKS approach, which uses binary results as building-blocks for multilateral comparisons. The second is the Geary-Khamis approach, which provides a methodology for computing PPPs of currencies and international average prices of commodities, using the price-quantity data at the basic heading level. The third is the stochastic approach based on the CPD method and its generalizations that can be used in econometrically estimating the PPPs using a regression framework. The fourth and the last approach discussed here is the linking approach to the construction of chained comparisons based on the concept of the minimum spanning tree. This is generating considerable interest and is explored further in the last section of this annex. These four approaches are by no means exhaustive, but they represent major strands of research and development in this area.

The EKS Method. The EKS system is a simple method of generating transitive multilateral index numbers from a system of binary index numbers, with the property that the resulting multilateral indices deviate the least (according to a specific criterion) from the binary indices. Since the seminal paper by Drechsler [1973], it has been well recognized that (transitive) multilateral systems necessarily deviate from their binary counterparts and therefore result in a loss of 'characteristicity'. The EKS system is designed to minimize such loss of characteristicity. The original EKS system uses the Fisher binary indices, but the work of Caves, Christensen and Diewert [1982b] and Rao and Banerjee [1984] recognizes that other binary indices could be used in conjunction with the EKS technique. For any pair of countries j and k, if F_{jk} represents the Fisher binary index, then

$$EKS_{jk} = \prod_{l=1}^{M} [F_{jl} \cdot F_{lk}]^{1/M} \quad \text{(A4.11)}$$

provides the EKS index.

There are several notable features of the EKS technique. First, it is based on the premise that direct binary comparisons, derived using any chosen formula, provide the best comparison between pairs of countries. Second, even though the EKS index in equation (A4.11) is defined using the Fisher index, this approach can be applied in conjunction with any other index number formula. For example, the Fisher index in equation (A4.11) may be replaced by another superlative index, such as the Törnqvist index. Caves, Christensen and Diewert [1982b] suggest the use of a Törnqvist-based EKS formula for spatial comparisons. Third, the EKS index in equation (A4.11) is the multilateral index that deviates the least from the matrix of non-transitive binary indices, when the deviations are measured using a logarithmic distance function. Finally, the EKS index can be interpreted as a simple geometric mean of all indirect comparisons between *j* and *k* through all possible link countries.

The simple unweighted nature of the EKS index has attracted attention in recent years. Since different binary comparisons have different levels of reliability, measured using various criteria, it is necessary to reflect these differences in defining weighted EKS index numbers. Rao and Timmer [2000], Rao *et al.* [2000] and Rao [2001b] provide illustrations of how weighted EKS indices can be generated in order to account for various data-related problems.

The Geary-Khamis (GK) Method. The GK method was originally proposed by Geary [1958] and subsequently developed by Khamis [1970, 1972 and 1984]. The GK method has been the principal aggregation method in most of the ICP phases to date. Since 1996, the OECD has produced and published international comparisons based on both the EKS and GK methods.

The GK method provides a way of calculating PPPs of currencies of different countries from the observed price and quantity data (applied at the basic heading level). The concept of PPP is applicable even when the currency unit is the same in several areas of a country. The GK method simultaneously determines international average prices of different countries. Let P_i denote the international average price of ith commodity. The GK method is defined through the following system of interrelated equations, defined for each country j and each commodity *i*,

$$P_i = \frac{\sum_{j=1}^{M} p_i^j q_i^j / PPP_j}{\sum_{j=1}^{M} q_i^j} \quad \text{and} \quad PPP_j = \frac{\sum_{i=1}^{N} p_i^j q_i^j}{\sum_{i=1}^{N} P_i q_i^j} \quad \text{(A4.12)}$$

These simultaneous equations are then solved to yield numerical values of PPPs and *P*s, after selecting one of the currencies as a numeraire. Once the PPPs are solved, the spatial price index numbers are simply defined as

$$I_{jk} = \frac{PPP_k}{PPP_j} \quad \text{(A4.13)}$$

One of the main reasons for the continued use of the GK method is 'additivity'. Additivity requires that aggregates, such as real domestic product, derived by converting national aggregates using PPPs, should be equal to aggregates derived through valuation of quantities at international prices. Thus additivity requires

$$\sum_{i=1}^{n} p_i^j q_i^j / PPP_j = \sum_{i=1}^{n} P_i q_i^j \quad \text{(A4.14)}$$

This requirement is satisfied automatically by the PPPs and Ps derived from the GK system defined in equation (A4.12). The GK system is also useful in analysing the structure of real GDP and shares of different components across different countries. This system provides a framework within which internationally comparable national accounts could be constructed. However, the GK system is not rooted in standard economic theory and fails several test properties [Diewert, 1986]. There has been considerable debate among practitioners concerning the average prices resulting from the GK system. The system has the potential to reflect the price structure of the richer countries, and therefore has the tendency to overstate the real income of the poorer countries.

Weighted Country-Product-Dummy (CPD) Method. It is possible to generalize the CPD method discussed in the context of aggregation below the basic heading level. Rao [1995] has generalized the CPD method by incorporating quantity and value data directly into the CPD method described in equation (A4.8). The basic idea behind this generalization comes from the fact that the standard CPD regression model attempts to track the logarithm of the observed prices using an unweighted residual sum of squares. In the spirit of the standard index number approach, where price index numbers are required to track price changes of more important commodities more closely, a more appropriate procedure would be to find estimates of the parameters that are likely to track important commodities more closely. This is achieved by minimizing a weighted residual sum of squares, with each observation weighted according to the expenditure share of the commodity in a given country. Thus the generalized CPD method suggests that estimation of the equation

$$\ln p_{ij} = \pi_1 D_1 + \pi_2 D_2 + \ldots + \pi_M D_M + \eta_1 D_1^* + \eta_2 D_2^* + \ldots + \eta_n D_n^* + u_{ij} \quad \text{(A4.15)}$$

be conducted after weighting each observation according to its value share. This is equivalent to the application of ordinary least squares to the following transformed equation obtained by premultiplying equation (A4.15) by $\sqrt{w_{ij}}$. The resulting equation is:

$$\sqrt{w_{ij}} \ln p_{ij} = \pi_1 \sqrt{w_{ij}} D_1 + \pi_2 \sqrt{w_{ij}} D_2 + \ldots + \pi_M \sqrt{w_{ij}} D_M + \eta_1 \sqrt{w_{ij}} D_1^* + \ldots + \eta_n \sqrt{w_{ij}} D_n^* + v_{ij} \quad \text{(A4.16)}$$

where $w_{ij} = p_{ij}q_{ij} / \sum_{i=1}^{N} p_{ij}q_{ij}$ is the value share of the *i*th basic heading in the *j*th country.

Rao [1995] has shown that the international prices and PPPs resulting from the estimates of parameters in equation (A4.13) are identical to those derived using the Rao method for international comparisons, described in Rao [1990]. Thus the weighted CPD method may be considered as a bridge between the GK approach to international comparisons and the standard stochastic approach to index numbers.

Kokoski *et al.* [1999] outline a procedure which makes use of the CPD method to adjust for differences in quality characteristics of various consumer items for the construction of inter-area CPIs using United States data. Estimates derived from the CPD method are subsequently used in the application of the multilateral Törnqvist index derived after imposing the transitivity condition. Hence the approach used in Kokoski *et al.* [1999] may be described as a mixed stochastic and index number approach to multilateral spatial comparisons of CPI numbers.

Spatial linking and chaining approach. In recent years, a new approach to inter-area and inter-country comparisons of prices has been given serious consideration. This approach advocates spatial chaining of binary comparisons where links are identified using a procedure based on a measure of distance or reliability of binary comparisons involved. This approach is in sharp contrast to the general approach to multilateral comparisons, where either all the binary comparisons are used, as in the case of the EKS method, or all the price and quantity data are simultaneously used, as in the case of the GK and CPD approaches.

Using the graphical theoretical concept of minimum spanning trees, Hill [1999c, 1999d] proposed a method of deriving a system of transitive multilateral comparisons from a matrix of binary comparisons. The Hill approach is based on the fact that direct binary comparisons may not always be the best.

For any pair of countries *j* and *k*, Hill suggests a measure of distance (indicating the reliability of the binary comparison) using the Laspeyres-Paasche spread defined as

$$D(j,k) = \left| \ln\left(\frac{L(j,k)}{P(j,k)}\right)\right| \qquad \text{(A4.17)}$$

where $L(j, k)$ and $P(j, k)$ are, respectively, binary Laspeyres and Paasche price index numbers. Note that the same distance function emerges if price index numbers are replaced by quantity index numbers. $D(j, k)$ is equal to zero if the price structures or quantity structures are identical in countries, *j* and *k*. Thus, this distance function serves as an indicator of similarity of price and quantity structures in these countries.

Using a matrix of distances calculated for all pairs of countries, Hill [1999c, 1999d] suggests that a minimum spanning tree (MST) be extracted and used in constructing chained links between all pairs of countries. The MST has the property that a chained comparison between any pair of countries has the least distance, and therefore can be considered as the most reliable. It also has the property that the sum of the distances between all the links, in the MST, is the least when compared to all possible tree-configurations. For purposes of illustrating the concepts involved, Figure A4.1.1 shows the MST for Europe constructed using ICP data for Europe for the 1985 benchmark year.

It is evident from the MST presented here that a comparison between Germany and Portugal is through a chain involving Ireland, Luxembourg and Spain. This chained comparison is deemed to be better than a direct comparison between these two countries. There are a number of issues yet to be resolved regarding the use of the MST. Nonetheless, an MST provides a formalization of a somewhat intuitive notion of linking dissimilar countries using a chain of similar countries. Once the MST is identified, a transitive comparison between a given pair of countries in a particular exercise is constructed using binary indices calculated using a chosen formula, such as the Fisher or Törnqvist index, and the links indicated in the MST. Thus, if a comparison between Sweden and Denmark is needed, then the MST approach suggests the following index for this comparison:

$$I^{MST}_{Sweden,Denmark} = F_{Sweden,Finland} \times F_{Finland,Denmark}$$

where *F* denotes the Fisher index. Since the MST provides a unique chain of links between any two countries, comparisons are uniquely defined. The spanning trees are, however, sensitive to the countries included, and the types of measures used in assessing the degree of reliability or

comparability of any two countries. Aten *et al.* [2001] examine the sensitivity of the spanning trees and the resulting comparisons based on a range of measures including some similarity indices. Rao *et al.* [2000] applied the spanning tree approach to the construction of multilateral, agricultural input, output and productivity indices, using United States state-level agricultural production data.

Figure A4.1 A Minimum Spanning Tree: Europe

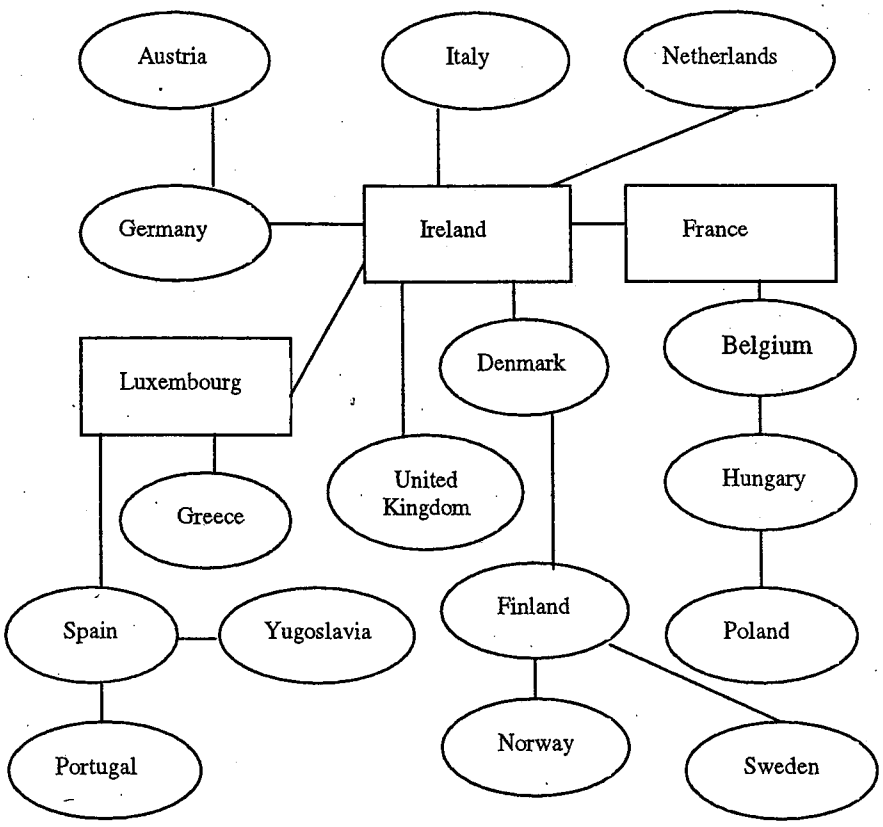


Figure A4.1 A minimum spanning tree: Europe Italy Netherlands Austria Germany Ireland France Luxembourg Denmark Belgium United Kingdom Hungary Greece Finland Poland Spain Yugoslavia Norway Portugal Sweden

5 Integration of the CPI and inter-area and international comparisons

The best available inter-area and international price comparisons for consumer goods and services use data from the national statistical offices compiling CPIs. In recent critical reviews of the ICP by Ryten [1998], and of the OECD-Eurostat PPPs by Castles [1997], the accuracy and reliability of international comparisons have been assessed as being less than adequate. Castles notes the difficulties encountered in comparing like goods from country to country, and Ryten argues for the need to secure greater support from national statistical offices in compiling price data.

for the ICP. Both reviews recommended examination of the feasibility of integrating ICP work with that of the normal CPI work undertaken by the national statistical offices. Since this annex deals with spatial and international comparisons, it is appropriate now to examine and identify possible steps involved in a more integrated approach to the CPI and ICP activities.

This section first provides an assessment of potential benefits that could flow from the integration of CPI and ICP activities with statistical systems in general, and price statistics in particular, at both global and national levels. It is useful to note here that the ICP provides cross-country comparisons of prices of goods and services that enter private consumption, government consumption and investment. Thus ICP encompasses all components of gross domestic product (GDP). In contrast, the CPI focuses mainly on movements in prices of consumer goods and services. The nature and scope of the CPI and ICP activities and the limits on the extent of an integrated approach are discussed briefly. The final subsection identifies a number of useful initiatives that could provide a framework for a practical, more integrated approach to these important activities involving inter-temporal, inter-area and international comparisons of consumer prices and the ICP.

5.1 Benefits from CPI and ICP integration

Globalization and the resulting expansion in international trade and financial flows have led to an everincreasing demand for internationally comparable statistics that can be used in assessing the economic performance of nations. The ICP plays a major role in meeting this demand by providing internationally comparable national income aggregates, such as private and government consumption and capital formation. The ICP has also provided valuable information on relative international prices of goods and services, at a reasonably disaggregated level, which is used by researchers around the world. The most popular by-products of the international comparisons are the Penn World Tables and the World Development Indicators, which are considered invaluable sources of data for research on global inequality, poverty and econometric analysis of productivity growth, and the study of catch-up and convergence among nations.

The potential benefits of the ICP are somewhat diminished by the long lags in making international comparisons available to potential users. The coverage of the ICP is not extensive and the number of countries covered varies across regions. The limited coverage of ICP in some regions reflects the resource needs associated with the compilation of price data specifically for the purpose of the ICP. It is in this area where significant benefits can be derived if the ICP activities can be integrated with the CPI work of the national statistical offices.

At the global level, the potential benefits are many and varied. A few are listed below:

* increased country coverage, leading to a better framework for extrapolations;
* improved quality of the estimates resulting from the use of extensive price data collected for CPI purposes, rather than basing comparisons on products with specifications that may not be representative of the consumption baskets of the countries involved;
* benefits from research on methods for quality adjustment. Such methods are necessary to make adjustments for differences in product quality across countries;
* the development of regional PPPs, which are likely to make ICP results more consistent with domestic price movements and more acceptable to national governments;

* construction of internationally comparable national accounts, in a common currency unit, complementing the existing national accounts in national currency units. Such accounts will be a useful addition to the international statistical data bases that will enable global-level research on country and regional economic performance, and long-term catch-up, and convergence among countries;
* reliable estimates of PPPs along with domestic rates of inflation, providing a complete matrix of temporal- spatial price differences that can be used to better understand the factors in.uencing national price levels and exchange rate movements.

Several benefits may also be derived by the national statistical offices from an integrated approach to the compilation of CPI and PPPs. The nature of benefits derived will, however, vary depending on the stage of development of the countries involved. For more developed countries with well-established statistical agencies and programmes, the benefits derived are through the synergies arising out of a joint approach to spatial and temporal comparisons. These are as follows:

* Recent work on CPI and ICP manuals addresses the important issue of quality change over time and quality differences across countries. Efforts are being channelled into finding suitable statistical methods that can be used in the measurement of price-level changes leading to reductions in potential biases.
* The treatment of new and disappearing products within the CPI is also an important problem associated with increased globalization, the expansion of free trade and the removal of tariff barriers. Thus national statistical offices, especially in developed countries, are often confronted with the problem of accounting for new goods, and goods subject to rapid quality changes.
* The regular compilation of the national accounts statistics and the measurement of price change through the CPI, and extending to inter-area and international comparisons, can provide information needed to assess the levels of, and movements in, real income.

In the case of developing countries with inadequate statistical infrastructure, benefits from an integrated approach could be significant and aid statistical capacity building in such countries. These benefits include:

* strengthening statistical infrastructure and institution building. Efforts to implement the CPI manual and its recommendations, along with participation in the ICP activity, are likely to identify deficiencies in a country's infrastructure and the lack of institutional capacity. In some countries, it may be necessary to strengthen management and planning functions, recruit new staff, and provide training to conduct household expenditure and other general price surveys;
* strengthening of data collection, processing systems and dissemination. Designing and conducting sample surveys to international standards is a lengthy and demanding exercise. It may be necessary to develop a systematic plan to improve survey designs to coordinate surveys of economic and business entities, and to conduct periodic censuses of economic activity. Computerization of data-processing activities may also be required;
* improvement in the measurement of income inequality and poverty. Improved price and expenditure data can be used to improve national and international estimates of poverty;

* improved regional comparisons. PPPs compiled for regions and for neighbouring countries can provide useful insights into the dynamics of regional development, and help identify the regions with special needs and required assistance. Comparisons with neighbouring countries, in terms of relative price differences and real income changes, can provide powerful incentives to pursue policies for growth and low inflation.

There are many potential applications of the PPPs from the ICP. Several papers [by Astin, 2001], Ward [2001] and Prennushi [2001], in particular) at the recent OECD-World Bank [2001] seminar dealt with some important applications of PPPs at Eurostat and the OECD, and at the global level in the assessment of poverty and inequality.

5.2 Salient features of CPI and ICP integration

In order to identify strategies for closer integration of temporal CPI compilation with wider inter-area and cross-country comparisons of consumer prices and PPPs at the level of GDP, it is necessary to examine the main features and the context in which such an integration will occur. The important issues are the scope and coverage of these two endeavours from the perspective of national statistical offices, and a general framework of price comparisons within which both these activities are placed. This section deals with these two aspects.

The scope and coverage of the CPI and ICP are vastly different. The CPI is a measure of changes, over time, in prices of goods and services that belong to the consumption baskets of households in a given country. In contrast, the ICP provides a measure of price-level differences across countries, covering all components of the expenditure side of the national accounts. The main components of GDP used in ICP comparisons are household consumption, government consumption, capital formation and net exports. In line with the *SNA 1993,* the ICP merges the portion of government expenditure that provides goods and services to households with private consumption to form household consumption. Thus, the scope and coverage of goods and services in the ICP is much wider than that of the CPI. The household consumption concept used is, however, almost identical to that used in constructing the CPI. Any integration of CPI and ICP work will necessarily be confined to the household consumption aggregate of the national accounts.

Within the ICP, price quotations from different countries are obtained for a large number of goods and services with very well-defined product specifications. This approach, described as the 'tight specification' approach, is used in the ICP. The tight specification approach requires a sufficient description of the product so that it is uniquely defined in the 'law of one price' sense, and so that it can be recognized in a range of localities and time periods wherever and whenever it is available. The product listing is determined on the basis of the group of countries included in an international comparison exercise. While this approach provides a solution to the problem of quality variations across countries, the commodities priced for ICP purposes may not be representative of the consumption baskets in respective countries. Thus, commodities priced may not be representative of the items consumed in the countries, which usually make up the bundle of goods and services for the construction of the CPI.

The degree of success of integrating ICP activity with the CPI compilation depends upon the extent to which these two activities can draw on a common pool of data and information available at the national level. The intersection of data sets for the CPI and the ICP is represented in figure A4.2.

The following marked areas are of particular significance:

(1) Common set of goods and services between the CPI and ICP lists. These price data can be used directly in an integrated approach to these two activities.

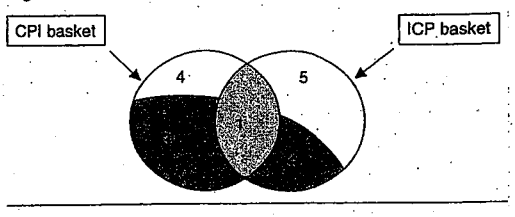
(2) and (3) Subset of ICP goods and services for which prices can be derived after making quality adjustments to products listed in the CPI basket. These are the goods and services that are not identical, but close enough for quality adjustments to be made based on the characteristics of the goods and services.

(4) Set of goods and services in the CPI basket that has no direct component in the ICP basket.

(5) ICP basket of goods and services under headings of the expenditure side of the national accounts that has no direct relevance or correspondence with CPI.

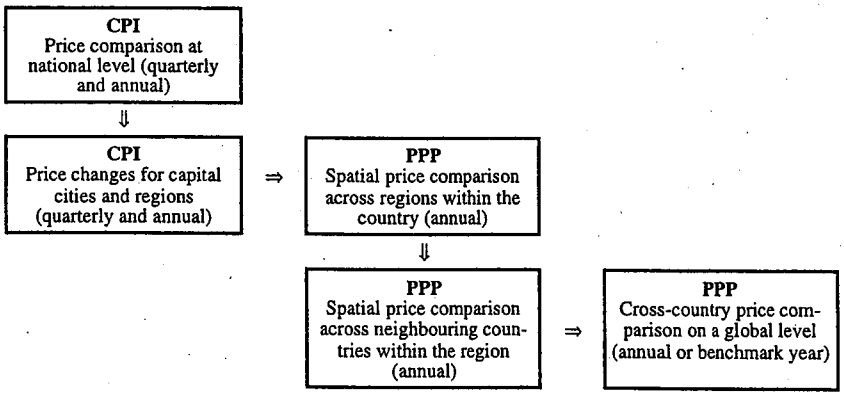
Figure A4.2 shows that if the integration between the ICP and the CPI is to be successful, the ICP comparisons should necessarily be restricted to country groupings where the basket of goods and services representing household consumption within the ICP has a significant overlap with the country-specific CPI baskets. Such an overlap can be achieved only when country groupings within the ICP comparisons exhibit similarities in their CPI consumption baskets. This has implications for the ICP and its regionalization programme.

Figure A4.2 Price data for CPI and ICP activities



In examining the CPI and ICP activities, it is also necessary to consider a range of temporal and spatial price comparisons of interest to national statistical offices in the course of providing a comprehensive set of economic statistics for policy-makers and other analysts. It is possible to consider these activities in a sequence indicating the progression involved in these price comparison activities (figure A4.3).

Figure A4.3 A sequence of price comparisons



The schematic diagram uses the standard CPI activity of estimating annual or quarterly price changes for the nation as a whole. In most countries, national CPI figures are supplemented by area-specific CPI estimates for either capital cities or regions within the country. A natural progression, where data permit, is to undertake spatial comparisons of prices. At present, very few countries appear to produce such indices on a regular basis. A fairly significant jump from this level is to undertake price comparisons, on a bilateral or multilateral basis, with geographically

contiguous countries or countries within a political or economic grouping. The last element in this chain is the participation of the national statistical offices in a global price comparison exercise such as the ICP. At present, national statistical offices are mostly involved at the two extreme ends of this spectrum. The general level of involvement of national statistical offices in the ICP is likely to be more enthusiastic, however, when they gain experience from their participation in inter-area comparisons within the country and intra-regional comparisons involving countries in geographical proximity.

5.3 Two core strategies for CPI and ICP integration

Based on the brief discussion of the CPI and ICP activities undertaken by participating national statistical offices, it is possible to identify two major strategies that will result in a level of integration between these two activities that can benefit both programmes and the systems of economic statistics in the participating countries. Both of these strategies emerge from the need to maximize the flow of data from the CPI and ICP, and at the same time provide a framework for improving temporal and inter-area consumer price comparisons within a country.

Use of characteristics approach. This approach was proposed in Zieschang *et al.* [2001] and alluded to in Rao [2001a]. The characteristics approach begins with a market study by a national statistical office analyst to determine a set of price-determining characteristics. These product characteristics, such as size, features, nature of the sale transaction, type of outlet, and so on, are determined according to the available information about the impact of the detailed characteristic on price at a point in time or over a specified reference period, such as a year. Under this approach, product prices are collected and at the same time the product characteristics are also recorded.

In the standard CPI context, the product listing remains fairly constant, except in cases where an old variety or product is replaced by a new one. When spatial comparisons are undertaken, however, the overlap in products may be limited. In such cases, the characteristics approach becomes useful. This approach is in direct contrast with pricing very specific products in all the countries, or in areas within a country, thus limiting the overlap and the usefulness of the resulting CPIs.

The characteristics approach requires price and characteristics data for a sufficiently wide variety of detailed commodities or specifications in the item group to estimate a regression model of price on characteristics. Such models are known as hedonic regression models, where the logarithm of price is regressed on various characteristics. For spatial comparisons, this approach is very similar to the country-product-dummy (CPD) method discussed above in this annex. Kokoski *et al.* [1999] describe a method of producing 'exact', characteristics-adjusted, economic index number comparisons between areas that allow for hedonic equation parameters to differ from one area to another. This method can be classified as a variant of the weighted CPD method along with a multilateral Törnqvist index number.

The main advantages of the characteristics approach is that it is not critically based on the overlap in commodity bundles for different areas or countries, but on the sample size and number of commodities for which prices and quality characteristics are collected. The sample size needs to be large enough to enable efficient estimation of the parameters involved.

In order to facilitate cooperation with the ICP, in addition to having a well-structured database for the CPI that is extended to cover characteristics, the interests of national statistical offices are ultimately best served by implementing product and characteristic classification schemes consistent with internationally agreed standards. In order to make this approach operational, it is necessary that such classification schemes are established by making use of some of the existing classifications, for example the Central Product Classification (CPC) or the Classification of Individual Consumption according to Purpose (COICOP). These product classifications need to be extended to include a core set of standard characteristics for each category within the classification.

Notwithstanding the benefits of the characteristics approach, implementing a scheme of product characteristics classification requires all the countries or parties involved to agree to a specific standard and to allocate the necessary resources for such an endeavour. Until comprehensive data sets with price and characteristics of products become available, it may be necessary to explore other possible approaches that can be used in conjunction with the present 'tight specification' approach used in ICP exercises.

Linking approach to international comparisons. If maximizing the overlap with the CPI is one of the principal objectives of the ICP, then multilateral cross-country comparisons need to be built up from bilateral comparisons, where pairs of countries are identified on the basis of the maximum overlap in their national CPI baskets. Once such pairs of countries are identified, then multilateral comparisons can be built using chains constructed on the basis of links. This approach is somewhat similar to the MST approach proposed by Hill. While the basic criterion in Hill's approach uses variability in price relatives, measured using the Laspeyres -Paasche spread, the approach suggested here requires measures of overlap of price data as the principal criterion.

The linking approach needs a multi-stage framework. In the first stage, it is necessary to identify groups of countries to form regions or clusters. The principal criteria that should be used are, first, the extent of overlap that can be achieved between pairs of countries within the group and some measures of similarity in the expenditure patterns. In the second stage, an MST approach should be used to identify the exact links within a regional cluster of countries. Once multilateral regional PPPs are constructed, and PPPs for the GDP and its major components are derived, then the next stage will involve linking various regional comparisons to derive a set of global comparisons and PPPs.

Application of the chaining procedure represents a major shift from the present approach to ICP work. Currently, comparisons within the ICP are based essentially on a top-down approach, where a commodity listing based on the ''tight specification'' approach is determined in the first instance, and then price data from different countries are collected. Where the ICP work is regionalized, regions are essentially determined on geographical considerations and not on any data-based considerations. If cross-country comparisons are to be based on nationally available CPI data, it is necessary to use a bottom-up approach, where all the operational procedures, including the determination of clusters and links, need to be built with the data available from the national sources provided by the national statistical offices. The application of spatial linking procedures will minimize the need for quality adjustments of the type described under the characteristics approach to price data collection.

The integration of spatial and temporal comparisons has the potential to provide a consistent set of temporal, inter-area and inter-country comparisons, and at the same time improve the quality of the underlying comparisons. It is an exciting prospect, but several challenges need to be met before a truly integrated approach to spatial and temporal consumer price comparisons can be achieved.

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STATISTICAL SUPPLEMENT

This statistical supplement provides information relating to Education in India, drawn from the following sources:

(A) Selected Educational Statistics 1990-91, Planning, Monitoring and Statistics Division, Department of Secondary & Higher Education, Ministry of Human Resource Development, Government of India, New Delhi.

(B) Selected Educational Statistics 2003-2004, Planning, Monitoring and Statistics Division, Department of Secondary & Higher Education, Ministry of Human Resource Development, Government of India, New Delhi.

(C) Analysis of Budgeted Expenditure on Education 1998-99 to 2000-01, Government of India, Ministry of Human Resource Development, (Department of Secondary & Higher Education), Planning & Monitoring Unit, New Delhi.

(D) Analysis of Budgeted Expenditure on Education 2002-03 to 2004-05, Government of India, Ministry of Human Resource Development, (Department of Secondary & Higher Education), Planning & Monitoring Unit, New Delhi.

STATISTICAL SUPPLEMENT

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Table 1. Number of Institutions 1990-91

State/Union Territory	Univer-sities	Inst Deemed as Univer-sities	Inst.of National Impor-tance	Board of Interme-diate/ Secondary Education	Research Insti-tutions	Arts, Sc., Com., Colleges	Eng. and Techno-logy Colleges	Medical Colleges (MBBS only)	Teacher Training Colleges	Inter-mediate/ Junior Colleges	Higher Secon-dary (10+2) New Pattern	High/ Post Basic School	Middle/ Senior Basic School	Primary/ Junior Basic Schools	Pre-Primary pre-basic School	Teacher Training Schools	Poly-technic Institute	Tech-nical Indus-trial Arts and Crafts School
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Andhra Pradesh	13	3	1	2	-	403*	27*	10*	45	813*	48	5834	6118	48731	34	25	83	264
Arunachal Pradesh	1	-	-	-	-	4	-	-	-	-	45	68	254	1122	249	-	2	2
Assam	3	-	-	2	-	213	3	3	9	11	367	3065	5703	28876	482	32	7	27
Bihar*	9	2	-	2	4	557	6	10	15	105	206	3786	13170	53252	3	94	22	51
Goa	1	-	-	1	-	15	2	1	1	-	43	329	112	1014	-	1	3	16
Gujarat	9	1	-	1	11	230	11	6	42	-	1472	3603	17084	13174	2400	78	27	978
Haryana	3	1	-	1	-	119	3	1	18	-	247	2019	1321	4922	7	1	15	133
Himachal Pradesh*	3	-	-	1	-	39	1	1	2	-	162	875	1101	7522	10	6	4	31
Jammu & Kashmir†	3	-	-	1	1	27	4	2	3	-	203	894	2320	8712	-	14	2	20
Karnataka	8	1	-	2	2	403*	50*	18*	64*	317*	823	3970	16318	23539	5219	128	173	117
Kerala	5	-	1	1	1	133	7	5	19	79	38	2451	2911	6772	261	101	25	183
Madhya Pradesh	12	-	-	2	-	448	11	6	20	-	2278	1695	13977	66849	634	52	24	63
Maharashtra	12	5	1	1	20	582	90	17	88	498	1670	8206	18849	39121	881	200	185	1120
Manipur	1	-	-	1	-	31	-	1	3	10	30	400	693	3226	1	2	1	19
Meghalaya	1	-	-	1	-	23	-	-	1	-	-	303	693	4163	1165	10	1	3
Mizoram	-	-	-	-	-	13	-	-	1	3	-	202	544	1109	-	2	1	1
Nagaland	-	-	-	1	-	15	-	-	1	1	-	147	341	1287	-	3	1	3

(Contd.)

Table 1. *(Concld.)*

State/Union Territory	Univer-sities	Inst. Deemed as Univer-sities	Inst of National Impor-tance	Board of Interme-diate/ Secondary Education	Research Insti-tutions	Arts, Sc., Com., Colleges	Eng. and Techno-logy Colleges	Medical Colleges (MBBS only)	Teacher Training Colleges	Inter-mediate/ Junior Colleges	Higher Secon-dary (10+2) New Pattern	High/ Post Basic School	Middle/ Senior Basic School	Primary/ Junior Basic Schools	Pre-Primary pre-basic School	Teacher Training Schools	Poly-technic Institute	Tech-nical Indus-trial Arts and Crafts School
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Orissa	5	-	-	2	-	244	6	3	11	270	181	4475	9405	40033	-	67	4	26
Punjab*	3	1	-	1	-	171	3	5	18	-	496	2247	1425	12372	2	16	10	97
Rajasthan	6	3	-	2	-	159	3	5	33	-	947	2786	8629	30231	33	41	20	68
Sikkim	-	-	-	-	-	1	-	-	-	-	18	57	122	510	528	1	-	1
Tamil Nadu	12	2	1	5	1	214	37	13	21	-	2022	3136	5624	29979	22	100	132	175
Tripura	1	-	-	1	-	13	1	-	1	-	148	306	436	2083	2513	2	1	3
Uttar Pradesh	20	4	1	1	2	418	3	8	13	3550	-	2449	14582	76545	45	121	77	111
West Bengal†	9	-	2	2	6	302	9	10	43	-	1147	5657	4179	50827	192	58	46	160
A.&N. Islands	-	-	-	-	-	2	-	-	1	-	37	29	41	186	21	1	2	1
Chandigarh	1	-	1	-	-	12	2	-	-	-	16	52	27	54	137	-	2	2
Dadra & Nagar Haveli	-	-	-	-	-	-	-	-	-	-	3	8	41	120	-	-	-	-
Daman & Diu	-	-	-	-	-	1	-	-	-	-	2	17	20	46	10	-	1	2
Delhi	4	5	2	1	1	63	2	4	-	-	814	316	485	1655	569	11	5	15
Lakshadweep	-	-	-	-	-	-	-	-	-	2	-	9	4	19	9	-	-	-
Pondicherry	1	-	-	-	-	7	1	1	1	1	28	77	107	341	-	-	3	1
INDIA	146	28	10	35	49	4862	281	130	474	5660	13491	59468	146636	558,392	15427	1167	879	3693

* Figure relates to 1989-90
† Figure relates to 1988-89

Table 2. Number of Institutions 2003-04

Sr. No.	States/Uts	University*	Institution Deemed to be University*	Institutions of National Importance*	Research Institutions	Arts, Science & Commerce Colleges	Engg., Tech., & Arch., Colleges	Medical Colleges (Allo/ Ayur/ Homeo/ Unani/	Teacher Training Colleges	Others (Includes Law, Management, MCA/IT, Agriculture etc.)	Total Higher Education Institutions (col.7to11)
1	2	3	4	5	6	7	8	9	10	11	12
1.	Andhra Pradesh	18	5	0	5	1330	238	53	87	93	1801
2.	Arunachal Pradesh	1	0	0	3	10	1	1	2	0	14
3.	Assam	5	1	1	0	317	3	7	40	21	388
4.	Bihar	11	1	0	11	743	7	23	15	63	851
5.	Chhattisgarh	9	0	0	0	213	2	2	1	32	250
6.	Goa	1	0	0	0	24	4	7	2	5	42
7.	Gujarat	10	2	0	16	422	32	41	51	111	657
8.	Haryana	4	3	0	0	163	41	8	24	35	271
9.	Himachal Pradesh	4	1	0	2	69	2	7	7	24	109
10.	Jammu & Kashmir	5	0	0	0	73	4	6	8	34	125
11.	Jharkhand	4	2	0	1	146	5	8	9	14	182
12.	Karnataka	13	6	0	1	930	120	172	70	214	1506
13.	Kerala	7	1	1	1	186	66	40	21	82	395
14.	Madhya Pradesh	14	3	0	0	513	56	28	21	209	827
15.	Maharashtra	19	13	1	21	1208	177	116	251	128	1880
16.	Manipur	2	0	0	0	58	1	1	3	1	64
17.	Meghalaya	1	0	0	0	48	0	0	2	0	50
18.	Mizoram	1	0	0	0	26	0	0	2	2	30
19.	Nagaland	1	0	0	0	36	0	0	2	18	56
20.	Orissa	8	1	0	0	567	19	16	16	153	771
21.	Punjab	5	2	1	0	209	16	42	23	53	343
22.	Rajasthan	9	6	0	0	456	39	24	51	96	666
23.	Sikkim	1	0	0	1	2	1	1	1	1	6
24.	Tamil Nadu	16	9	2	1	441	96	97	22	184	840
25.	Tripura	1	0	0	0	14	1	1	1	5	22
26.	Uttar Pradesh	22	7	1	10	733	69	34	121	273	1230
27.	Uttaranchal	4	2	1	0	47	2	1	1	28	79
28.	West Bengal	14	1	2	11	354	43	19	26	46	488
29.	A&N Islands	0	0	0	0	2	0	0	1	1	4
30.	Chandigarh	1	0	1	0	12	2	4	3	3	24
31.	D&N Haveli	0	0	0	0	0	0	0	0	0	0
32.	Daman & Diu	0	0	0	0	1	0	0	1	0	2
33.	Delhi	5	8	2	1	63	16	18	10	56	163
34.	Lakshadweep	0	0	0	0	0	0	0	0	0	0
35.	Pondicherry	1	0	0	0	11	5	6	5	6	33
	INDIA	217	74	13	85	9427	1068	783	900	1991	14169

(Contd.)

Table 2. *(Concld.)*

Sr. No.	States/Uts	Teacher Training Schools	Polytech. Institutes	Technical/ Industrial/Arts & Craft Schools*	Board of Intermediate Secondary Education	Pre-Degree Junior Colleges/ Higher Sec.	High/Post Basic Schools	Middle/ Sr Basic Schools	Primary/Jr Basic Schools	Pre-Primary/ Pre Basic Schools
1	2	13	14	15	16	17	18	19	20	21
1.	Andhra Pradesh	25	104	556	2	3267	13160	15215	63897	25
2.	Arunachal Pradesh	0	1	2	0	74	130	449	1364	18
3.	Assam	1	8	27	2	731	4607	8143	30068	199
4.	Bihar	58	13	47	2	685	2939	9922	40337	1
5.	Chhattisgarh	13	1	134	1	1439	1227	9350	32556	820
6.	Goa	1	5	15	2	80	363	79	1009	0
7.	Gujarat	168	52	254	1	2427	5214	30646	7233	3589
8.	Haryana	37	31	105	1	1776	3344	2171	11500	27
9.	Himachal Pradesh	7	6	63	1	820	1309	2076	11013	10
10.	Jammu & Kashmir	14	12	38	2	406	1550	3613	12256	0
11.	Jharkhand	22	10	33	2	122	966	4324	16417	0
12.	Karnataka	134	186	588	1	2237	9012	25612	26163	0
13.	Kerala	102	56	549	1	1286	2871	2975	6717	0
14.	Madhya Pradesh	27	44	166	1	4211	4495	30592	66648	0
15.	Maharashtra	286	164	613	1	4212	13773	26033	41258	52000
16.	Manipur	1	1	7	2	112	540	832	2552	1
17.	Meghalaya	7	1	7	1	80	575	1559	5851	0
18.	Mizoram	2	2	1	1	71	443	908	1504	0
19.	Nagaland	1	2	3	1	52	331	480	1495	0
20.	Orissa	67	27	177	2	744	6938	11510	42104	0
21.	Punjab	26	19	158	1	1695	2282	2493	13265	2
22.	Rajasthan	46	17	123	1	3159	6224	23942	55757	66
23.	Sikkim	1	2	1	0	41	82	126	497	740
24.	Tamil Nadu	82	165	681	2	4136	4859	6825	32242	0
25.	Tripura	2	1	4	1	242	409	453	2075	5127
26.	Uttar Pradesh	70	81	307	1	7369	5018	35427	119404	43
27.	Uttaranchal	9	18	72	1	1071	768	3557	14304	0
28.	West Bengal	58	40	64	2	2868	4948	1984	49865	0
29.	A&N Islands	1	2	1	0	49	45	56	209	24
30.	Chandigarh	1	2	2	0	52	70	9	24	0
31.	D&N Haveli	0	1	1	0	9	13	91	127	0
32.	Daman & Diu	1	1	2	0	6	22	24	53	22
33.	Delhi	23	25	61	3	1212	466	681	2126	52
34.	Lakshadweep	0	0	1	0	4	9	4	20	9
35.	Pondicherry	10	5	14	0	77	138	125	329	392
	INDIA	1303	1105	4877	39	46822	99140	262286	712239	63167

As per Association of Indian Universities(AIU) as on January 2003.
Source: Annual Report Ministry of Labour.

Table 3. Number of Institutions by Management 2003-04

Sr. No.	STATES/UTS	Pre-Degree/Junior Colleges / Higher Sec. School*								
		Govt.		Local Bodies		Private Aided		Private Unaided		Total
(1)	(2)	Number (3)	%age (4)	Number (5)	%age (6)	Number (7)	%age (8)	Number (9)	%age (10)	(11)
1	Andhra Pradesh	745	22.80	0	0.00	451	13.80	2,071	63.39	3,267
2	Arunachal Pradesh	67	90.54	0	0.00	5	6.76	2	2.70	74
3	Assam	646	88.37	0	0.00	25	3.42	60	8.21	731
4	Bihar	672	98.10	0	0.00	4	0.58	9	1.31	685
5	Chhattisgarh	832	57.82	20	1.39	80	5.56	507	35.23	1,439
6	Goa	13	16.25	0	0.00	67	83.75	0	0.00	80
7	Gujarat	109	4.49	77	3.17	1,801	74.21	440	18.13	2,427
8	Haryana	1,025	57.71	0	0.00	156	8.78	595	33.50	1,776
9	Himachal Pradesh	588	71.71	0	0.00	23	2.80	209	25.49	820
10	Jammu & Kashmir	341	83.99	0	0.00	0	0.00	65	16.01	406
11	Jharkhand	122	100.00	0	0.00	0	0.00	0	0.00	122
12	Karnataka	760	33.97	0	0.00	575	25.70	902	40.32	2,237
13	Kerala	427	33.20	0	0.00	507	39.42	352	27.37	1,286
14	Madhya Pradesh	2,028	48.16	18	0.43	235	5.58	1,930	45.83	4,211
15	Maharashtra	101	2.40	168	3.99	3,642	86.47	301	7.15	4,212
16	Manipur	55	49.11	0	0.00	57	50.89	0	0.00	112
17	Meghalaya	22	27.50	0	0.00	40	50.00	18	22.50	80
18	Mizoram	27	38.03	0	0.00	3	4.23	41	57.75	71
19	Nagaland	26	50.00	0	0.00	26	50.00	0	0.00	52
20	Orissa	744	100.00	0	0.00	0	0.00	0	0.00	744
21	Punjab	1,289	76.05	9	0.53	174	10.27	223	13.16	1,695
22	Rajasthan	2,077	65.75	0	0.00	185	5.86	897	28.40	3,159
23	Sikkim	37	90.24	0	0.00	4	9.76	0	0.00	41
24	Tamil Nadu	1,547	37.40	92	2.22	909	21.98	1,588	38.39	4,136
25	Tripura	212	87.60	0	0.00	25	10.33	5	2.07	242
26	Uttar Pradesh	295	4.00	123	167.00	2,486	33.74	4,465	60.59	7,369
27	Uttaranchal	727	6,788.00	0	0.00	227	21.20	117	10.92	1,071
28	West Bengal	32	1.12	0	0.00	2,739	95.50	97	3.38	2,868
29	A&N Islands	45	91.84	0	0.00	2	4.08	2	4.08	49
30	Chandigarh	28	53.85	0	0.00	6	11.54	18	34.62	52
31	D&N Haveli	6	66.67	0	0.00	0	0.00	3	33.33	9
32	Daman & Diu	4	66.67	0	0.00	1	16.67	1	16.67	6
33	Delhi	688	56.77	6	0.50	167	13.78	351	28.96	1,212
34	Lakshadweep	4	100.00	0	0.00	0	0.00	0	0.00	4
35	Pondicherry	47	61.04	0	0.00	7	9.09	23	29.87	77
	INDIA	16,388	35.00	513	1.10	14,629	31.24	15,292	32.66	46,822

(Contd.)

Table 3. *(Contd.)*

Sr. No.	STATES/UTS	High/Post Basic School*								
		Govt.		Local Bodies		Private Aided		Private Unaided		Total
		Number	%age	Number	%age	Number	%age	Number	%age	
(1)	(2)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1	Andhra Pradesh	1,233	9.37	7,060	53.65	871	6.62	3,996	30.36	13,160
2	Arunachal Pradesh	103	79.23	0	0.00	11	8.46	16	12.31	130
3	Assam	2,787	60.49	0	0.00	637	13.83	1,183	25.68	4,607
4	Bihar	2,836	96.50	0	0.00	46	1.57	57	1.94	2,939
5	Chhattisgarh	778	63.41	0	0.00	0	0.00	449	36.59	1,227
6	Goa	74	20.39	0	0.00	281	77.41	8	2.20	363
7	Gujarat	174	3.34	194	3.72	3,629	69.60	1,217	23.34	5,214
8	Haryana	1,787	53.44	0	0.00	52	1.56	1,505	45.01	3,344
9	Himachal Pradesh	952	72.73	1	0.08	24	1.83	332	25.36	1,309
10	Jammu & Kashmir	1,027	66.26	0	0.00	0	0.00	523	33.74	1,550
11	Jharkhand	966	100.00	0	0.00	0	0.00	0	0.00	966
12	Karnataka	3,029	33.61	0	0.00	2,621	29.08	3,362	37.31	9,012
13	Kerala	993	34.59	0	0.00	1,422	49.53	456	15.88	2,871
14	Madhya Pradesh	2,234	49.70	3	0.07	64	1.42	2,194	48.81	4,495
15	Maharashtra	357	2.59	701	5.09	8,694	63.12	4,021	29.19	13,773
16	Manipur	184	34.07	0	0.00	102	18.89	254	47.04	540
17	Meghalaya	81	14.09	0	0.00	328	57.04	166	28.87	575
18	Mizoram	198	44.70	85	19.19	42	9.48	118	26.64	443
19	Nagaland	125	37.76	0	0.00	150	45.32	56	16.92	331
20	Orissa	3,622	52.21	0	0.00	665	9.58	2,651	38.21	6,938
21	Punjab	1,759	77.08	6	0.26	208	9.11	309	13.54	2,282
22	Rajasthan	3,346	53.76	0	0.00	40	0.64	2,838	45.60	6,224
23	Sikkim	80	97.56	0	0.00	2	2.44	0	0.00	82
24	Tamil Nadu	1,962	40.38	111	2.28	646	13.29	2,140	44.04	4,859
25	Tripura	388	94.87	0	0.00	8	1.96	13	3.18	409
26	Uttar Pradesh	258	5.14	73	1.45	1,927	38.40	2,760	55.00	5,018
27	Uttaranchal	539	70.18	0	0.00	54	7.03	175	22.79	768
28	West Bengal	9	0.18	0	0.00	4,637	93.71	302	6.10	4,948
29	A&N Islands	42	93.33	1	2.22	0	0.00	2	4.44	45
30	Chandigarh	49	70.00	0	0.00	1	1.43	20	28.57	70
31	D&N Haveli	9	69.23	0	0.00	0	0.00	4	30.77	13
32	Daman & Diu	16	72.73	0	0.00	5	22.73	1	4.55	22
33	Delhi	189	40.56	9	1.93	26	5.58	242	51.93	466
34	Lakshadweep	9	100.00	0	0.00	0	0.00	0	0.00	9
35	Pondicherry	70	50.72	0	0.00	22	15.94	46	33.33	138
	INDIA	32,265	32.54	8,244	8.32	27,215	27.45	31,416	31.69	99,140

(Contd.)

Table 3. *(Contd.)*

Sr. No.	STATES/UTS	Middle/Senior Basic Schools								
		Govt.		Local Bodies		Private Aided		Private Unaided		Total
(1)	(2)	Number (21)	%age (22)	Number (23)	%age (24)	Number (25)	%age (26)	Number (27)	%age (28)	(29)
1	Andhra Pradesh	505	3.32	10,195	67.01	491	3.23	4,024	26.45	15,215
2	Arunachal Pradesh	400	89.09	0	0.00	5	1.11	44	9.80	449
3	Assam	6,128	75.25	0	0.00	0	0.00	2,015	24.75	8,143
4	Bihar	9,858	99.35	0	0.00	54	0.54	10	0.10	9,922
5	Chhattisgarh	8,159	87.26	0	0.00	62	0.66	1,129	12.07	9,350
6	Goa	63	79.75	0	0.00	12	15.19	4	5.06	79
7	Gujarat	4	0.01	25,353	82.73	519	1.69	4,770	15.56	30,646
8	Haryana	1,332	61.35	0	0.00	3	0.14	836	38.51	2,171
9	Himachal Pradesh	1,807	87.04	1	0.05	7	0.34	261	12.57	2,076
10	Jammu & Kashmir	2,766	76.56	0	0.00	0	0.00	847	23.44	3,613
11	Jharkhand	4,324	100.00	0	0.00	0	0.00	0	0.00	4,324
12	Karnataka	19,120	74.65	0	0.00	2,110	8.24	4,382	17.11	25,612
13	Kerala	956	32.13	0	0.00	1,872	62.92	147	4.94	2,975
14	Madhya Pradesh	20,626	67.42	18	0.06	267	0.87	9,681	31.65	30,592
15	Maharashtra	260	1.00	22,128	85.00	2,343	9.00	1,302	5.00	26,033
16	Manipur	307	36.90	0	0.00	94	11.30	431	51.80	832
17	Meghalaya	56	3.59	0	0.00	980	62.86	523	33.55	1,559
18	Mizoram	589	64.87	41	4.52	61	6.72	217	23.90	908
19	Nagaland	268	55.83	0	0.00	100	20.83	112	23.33	480
20	Orissa	10,126	87.98	6	0.00	711	6.18	673	5.85	11,510
21	Punjab	2,348	94.18	1	0.04	30	1.20	114	4.57	2,493
22	Rajasthan	12,586	52.57	0	0.00	218	0.91	11,138	46.52	23,942
23	Sikkim	126	100.00	0	0.00	0	0.00	0	0.00	126
24	Tamil Nadu	317	4.64	4,630	67.84	1,656	24.26	222	3.25	6,825
25	Tripura	439	96.91	0	0.00	4	0.88	10	2.21	453
26	Uttar Pradesh	321	0.91	20,586	58.11	3,710	10.47	10,810	30.51	35,427
27	Uttaranchal	96	2.70	2,436	68.48	201	5.65	824	23.17	3,557
28	West Bengal	1	0.05	0	0.00	1,983	99.95	0	0.00	1,984
29	A&N Islands	49	87.50	0	0.00	0	0.00	7	12.50	56
30	Chandigarh	3	33.33	0	0.00	0	0.00	6	66.67	9
31	D&N Haveli	85	93.41	0	0.00	4	4.40	2	2.20	91
32	Daman & Diu	22	91.67	0	0.00	0	0.00	2	8.33	24
33	Delhi	137	20.12	13	1.91	24	3.52	507	74.45	681
34	Lakshadweep	4	100.00	0	0.00	0	0.00	0	0.00	4
35	Pondicherry	67	53.60	0	0.00	1	0.80	57	45.60	125
	INDIA	104,255	39.75	85,402	32.56	17,522	6.68	55,107	21.01	262,286

(Contd.)

Table 3. *(Contd.)*

Sr. No.	STATES/UTS	Primary/Junior Banic Schools								
		Govt.		Local Bodies		Private Aided		Private Unaided		Total
		Number	%age	Number	%age	Number	%age	Number	%age	
(1)	(2)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)
1	Andhra Pradesh	5,617	8.79	51,486	80.58	2,275	3.56	4,519	7.07	63,897
2	Arunachal Pradesh	1,257	92.16	0	0.00	2	0.15	105	7.70	1,364
3	Assam	30,068	100.00	0	0.00	0	0.00	0	0.00	30,068
4	Bihar	40,317	99.95	0	0.00	12	0.03	8	0.02	40,337
5	Chhattisgarh	30,481	93.63	0	0.00	183	0.56	1,892	5.81	32,556
6	Goa	900	89.20	0	0.00	41	4.06	68	6.74	1,009
7	Guiarat	2	0 .03	5,984	82.73	123	1.70	1,124	15.54	7,233
8	Haryana	8,669	75.38	4	0.03	252	2.19	2,575	22.39	11,500
9	Himachal Pradesh	10,612	96.36	2	0.02	8	0.07	391	3.55	11,013
10	Jammu & Kashmir	10,891	88.86	0	0.00	0	0.00	1,365	11.14	12,256
11	Jharkhand	16,417	100.00	0	0.00	0	0.00	0	0.00	16,417
12	Karnataka	24,019	91.81	0	0.00	342	1.31	1,802	6.89	26,163
13	Kerala	2,551	37.98	0	0.00	3,993	59.45	173	2.58	6,717
14	Madhya Pradesh	54,907	82.38	346	0.52	902	1.35	10,493	15.74	66,648
15	Maharashtra	165	0.40	36,555	88.60	2,475	6.00	2,063	5.00	41,258
16	Manipur	2,002	78.45	0	0.00	408	15.99	142	5.56	2,552
17	Meghalaya	2,539	43.39	0	0.00	2,475	42.30	837	14.31	5,851
18	Mizoram	1,105	73.47	0	0.00	0	0.00	399	26.53	1,504
19	Nagaland	1,305	87.29	0	0.00	0	0.00	190	12.71	1,495
20	Orissa	41,620	98.85	0	0.00	218	0.52	266	0.63	42,104
21	Punjab	12,255	92.39	12	0.09	71	0.54	927	6.99	13,265
22	Rajasthan	2,126	3.81	49,928	89.55	284	0.51	3,419	6.13	55,757
23	Sikkim	497	100.00	0	0.00	0	0.00	0	0.00	497
24	Tamil Nadu	1,598	4.96	25,214	78.20	5,102	15.82	328	1.02	32,242
25	Tripura	687	33.11	1,363	65.69	12	0.58	13	0.63	2,075
26	Uttar Pradesh	123	0.10	108,021	90.47	1,088	0.91	10,172	8.52	119,404
27	Uttaranchal	9	0.06	11,504	80.43	0	0.00	2,791	19.51	14,304
28	West Bengal	0	0.00	49,865	100.00	0	0.00	0	0.00	49,865
29	A&N Islands	188	89.95	7	3.35	0	0.00	14	6.70	209
30	Chandigarh	22	91.67	0	0.00	0	0.00	2	8.33	24
31	D&N Haveli	113	88.98	0	0.00	13	10.24	1	0.79	127
32	Daman & Diu	48	90.57	0	0.00	0	0.00	5	9.43	53
33	Delhi	0	0.00	2,126	100.00	0	0.00	0	0.00	2,126
34	Lakshadweep	20	100.00	0	0.00	0	0.00	0	0.00	20
35	Pondicherry	254	77.20	0	0.00	4	1.22	71	21.58	329
	INDIA	303,384	42.60	342,417	48.08	20,283	2.85	46,155	6.48	712,239

(Contd.)

Table 3. *(Concld.)*

Sr. No.	STATES/UTS	Pre-Primary/Pre Basic Schools								
		Govt.		Local Bodies		Private Aided		Private Unaided		Total
(1)	(2)	Number (39)	%age (40)	Number (41)	%age (42)	Number (43)	%age (44)	Number (45)	%age (46)	(47)
1	Andhra Pradesh	2	8.00	17	68.00	3	12.00	3	12.00	25
2	Arunachal Pradesh	0	0.00	0	0.00	0	0.00	18	100.00	18
3	Assam	199	100.00	0	0.00	0	0.00	0	0.00	199
4	Bihar	1	100.00	0	0.00	0	0.00	0	0.00	1
5	Chhattisgarh	0	0.00	0	0.00	0	0.00	820	100.00	820
6	Goa	0	0.00	0	0.00	0	0.00	0	-	0
7	Gujarat	0	0.00	0	0.00	1,189	33.13	2,400	66.87	3,589
8	Haryana	27	100.00	0	0.00	0	0.00	0	0.00	27
9	Himachal Pradesh	10	100.00	0	0.00	0	0.00	0	0.00	10
10	Jammu & Kashmir	0	0.00	0	0.00	0	0.00	0	-	0
11	Jharkhand	0	0.00	0	0.00	0	0.00	0	-	0
12	Karnataka	0	0.00	0	0.00	0	0.00	0	-	0
13	Kerala	0	0.00	0	0.00	0	0.00	0	-	0
14	Madhya Pradesh	0	0.00	0	0.00	0	0.00	0	-	0
15	Maharashtra	28,080	54.00	18,200	35.00	3,120	6.00	2,600	5.00	52,000
16	Manipur	1	100.00	0	0.00	0	0.00	0	0.00	1
17	Meghalaya	0	0.00	0	0.00	0	0.00	0	-	0
18	Mizoram	0	0.00	0	0.00	0	0.00	0	-	0
19	Nagaland	0	0.00	0	0.00	0	0.00	0	0.00	0
20	Orissa	0	0.00	0	0.00	0	0.00	0	0.00	0
21	Punjab	2	100.00	0	0.00	0	0.00	0	-	2
22	Rajasthan	45	66.18	0	0.00	21	31.82	0	0.00	66
23	Sikkim	740	100.00	0	0.00	0	0.00	0	0.00	740
24	Tamil Nadu	0	0.00	0	0.00	0	0.00	0	-	0
25	Tripura	5,127	100.00	0	0.00	0	0.00	0	0.00	5,127
26	Uttar Pradesh	1	2.33	6	13.95	26	60.47	10	23.26	43
27	Uttaranchal	0	0.00	0	0.00	0	0.00	0	-	0
28	West Bengal	0	0.00	0	0.00	0	0.00	0	-	0
29	A&N Islands	0	0.00	3	12.50	0	0.00	21	87.50	24
30	Chandigarh	0	0.00	0	0.00	0	0.00	0	-	0
31	D&N Haveli	0	0.00	0	0.00	0	0.00	0	-	0
32	Daman & Diu	13	59.09	0	0.00	0	0.00	9	40.91	22
33	Delhi	0	0.00	52	100.00	0	0.00	0	0.00	52
34	Lakshadweep	9	100.00	0	0.00	0	0.00	0	0.00	9
35	Pondicherry	172	43.88	0	0.00	0	0.00	220	56.12	392
	INDIA	34,429	54.50	18,278	28.94	4,359	6.90	6,101	9.66	63,167

Table 4. Enrolment by Stages/Classes 1990-91

State/Union Territory	Ph.D./D.Sc./D. Phill			M.A.			M.Sc.			M.Com			B.A./B.A.(Hons.)		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Andhra Pradesh	1,330	366	1,696	6,222	2,074	8,296	3,871	1,442	5,313	2,442	393	2,835	53,568	26,749	80,317
Arunachal Pradesh	-	-	-	50	9	59	-	-	-	-	-	-	1,093	282	1,375
Assam	145	81	226	1,311	1,369	2,680	818	396	1,214	517	15	532	44,886	26,483	71,369
Bihar*	578	153	731	7,910	2,771	10,681	2,254	567	2,821	10,826	3,372	14,198	121,672	34,648	156,320
Goa	93	78	171	98	164	262	121	113	234	145	100	245	940	1,973	2,913
Gujarat	700	350	1,050	5,700	5,300	11,000	2,800	1,200	4,000	4,500	2,500	7,000	49,500	55,000	104,500
Haryana	708	271	979	2,469	1,483	3,952	879	504	1,383	216	145	361	24,851	18,222	43,073
Himachal Pradesh*	475	304	779	608	400	1,008	155	104	259	105	27	132	3,876	2,040	5,916
Jammu&Kashmir†	225	180	405	790	840	1,630	550	220	770	230	60	290	4,460	5,700	10,160
Karnataka	400	120	520	6,979	3,91	10,170	2,053	378	2,431	851	117	968	60,026	33,220	93,246
Kerala	773	546	1,319	2, 205	3,017	5,222	1,551	3,162	4,713	825	608	1,433	22,929	29,282	52,211
Madhya Pradesh	7,372	885	8,257	9,802	7,672	17,474	5,762	2,799	8,561	8,307	1,499	9,806	54,201	37,207	91,408
Maharashtra	340	193	533	10,764	5,468	16,232	2,298	1,657	3,955	17,618	3,493	21,111	91,792	64,658	156,450
Manipur	58	20	78	319	325	644	290	163	453	45	31	76	7,560	5,700	13,260
Meghalaya	46	32	78	354	242	596	99	58	157	18	6	24	2,344	1,937	4,281
Mizoram	-	-	-	17	19	36	-	-	-	-	-	-	965	768	1,733
Nagaland	-	-	-	9	11	20	14	4	18	5	1	6	1,436	871	2,307

(Contd.)

Table 4. *(Contd.)*

State/Union Territory	Ph.D./D.Sc./D. Phill			M.A.			M.Sc.			M Com			B.A./B.A.(Hons.)		
(1)	Boys (2)	Girls (3)	Total (4)	Boys (5)	Girls (6)	Total (7)	Boys (8)	Girls (9)	Total (10)	Boys (11)	Girls (12)	Total (13)	Boys (14)	Girls (15)	Total (16)
Orissa	260	70	330	3,870	2,045	5,915	1,701	750	2,451	1,191	95	1,286	23,045	11,040	34,085
Punjab*	314	418	732	3,583	4,784	8,367	573	661	1,234	63	90	153	24,042	24,090	48,132
Rajasthan	90	65	155	4,420	1,943	6,363	1,230	602	1,832	2,360	326	2,686	19,402	11,007	30,409
Sikkim	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tamil Nadu	125	59	184	4,348	3,104	7,452	5,093	3,529	8,622	2,354	841	3,195	31,337	24,842	56,179
Tripura	-	-	-	101	136	237	63	31	94	96	-	96	3,405	2,801	6,206
Uttar Pradesh	5,946	2,102	8,048	45,114	20,746	65,860	11,597	3,498	15,095	8,785	296	9,081	176,634	67,525	244,159
West Bengal†	872	411	1,283	5,125	5,642	10,767	2,612	1,302	3,914	2,145	205	2,350	60,033	92,204	152,237
A.&N. Islands	-	-	-	34	29	63	8	3	11	-	-	-	665	549	1,214
Chandigarh	-	-	-	637	900	1,537	136	186	322	29	25	54	3,009	3,285	6,294
Dadra & Nagar Haveli	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Daman & Diu	-	-	-	-	-	-	-	-	-	-	-	-	148	92	240
Delhi	3,119	1,795	4,914	3,063	3,165	6,228	947	925	1,872	765	785	1,550	30,335	32,428	62,763
Lakshadweep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pondicherry	-	-	-	33	47	80	67	95	162	13	13	26	801	790	1,591
INDIA	23,969	8,499	32,468	125,935	76,896	202,831	47,542	24,349	71,891	64,451	15,043	79,494	918,955	615,393	1534,348

* Figure relates to 1989-90
† Figure relates to 1988-89

(Contd.)

Table 4. *(Contd.)*

State/Union Territory	B.Sc./B.Sc. (Hons.)			B. Com/B. Com (Hons.)			B.E./B.Sc. (Eng.)/B. Arch.			B.Ed./B.T.			M.B.B.S.		
(1)	Boys (17)	Girls (18)	Total (19)	Boys (20)	Girls (21)	Total (22)	Boys (23)	Girls (24)	Total (25)	Boys (26)	Girls (27)	Total (28)	Boys (29)	Girls (30)	Total (31)
Andhra Pradesh	39,207	19,635	58,842	52,598	19,664	72,262	20,630	1,608	22,238	4,293	3,062	7,355	4,892	2,817	7,709*
Arunachal Pradesh	49	9	58	83	7	90	-	-	-	18	5	23	-	-	-
Assam	18,401	2,840	21,241	7,498	1,024	8,522	2,561	164	2,725	824	355	1,179	1,430	566	1,996
Bihar*	50,089	7,137	57,226	197,952	43,424	241,376	5,937	326	6,263	1,324	897	2,221	3,190	899	4,089
Goa	702	822	1,524	3,017	2,256	5,273	524	158	682	27	85	112	161	144	305
Gujarat	19,325	12,675	32,000	57,500	32,000	89,500	12,000	1,300	13,300	3,000	2,000	5,000	4,000	2,000	6,000
Haryana	5,796	4,067	9,863	6,549	2,425	8,974	1,680	158	1,838	2,104	1,924	4,028	399	276	675
Himachal Pradesh*	1,542	591	2,133	388	63	451	188	18	206	146	33	179	261	81	342
Jammu&Kashmir†	5,610	2,520	8,130	1,340	400	1,740	1,960	205	2,165	530	610	1,140	925	403	1,328
Karnataka	20,881	12,815	33,696	31,945	19,294	51,239	46,050	3,150	49,200	4,250	2,729	7,079	5,324	1,964	7,288
Kerala	22,021	32,261	54,282	12,135	6,898	19,033	11,955	8,898	20,853	1,178	3,113	4,291	2,486	1,532	4,018
Madhya Pradesh	35,563	13,772	49,335	42,160	4,081	46,241	2,391	220	2,611	3,026	2,412	5,438	3,105	1,370	4,475
Maharashtra	56,098	79,528	135,626	153,096	75,386	228,482	50,514	3,215	54,029	8,539	4,077	12,616	8,789	5,996	14,785
Manipur	3,620	1,820	5,440	500	180	680	-	-	-	-	-	-	308	100	408
Meghalaya	820	340	1,160	432	81	513	-	-	-	272	195	467	-	-	-
Mizoram	107	79	186	90	22	112	-	-	-	102	30	132	-	-	-
Nagaland	194	57	251	366	42	408	-	-	-	48	21	69	-	-	-

(Contd.)

Table 4. *(Contd.)*

State/Union Territory	B.Sc./B.Sc. (Hons.)			B. Com/B. Com (Hons.)			B.E./B.Sc. (Eng.)/B. Arch.			B.Ed./B.T.			M.B.B.S.		
(1)	Boys (17)	Girls (18)	Total (19)	Boys (20)	Girls (21)	Total (22)	Boys (23)	Girls (24)	Total (25)	Boys (26)	Girls (27)	Total (28)	Boys (29)	Girls (30)	Total (31)
Orissa	9,185	2,023	11,213	6,501	464	6,965	2,460	93	2,553	985	380	1,365	1,290	528	1,818
Punjab*	5,322	3,749	9,071	4,873	1,738	6,611	1,623	108	1,431	793	2,328	3,121	1,363	944	2,307
Rajasthan	13,900	4,027	17,927	22,168	3,230	25,398	4,425	126	4,551	3,744	2,287	6,031	2,607	1,410	4,017
Sikkim	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tamil Nadu	55,134	35,946	91,080	22,554	12,863	35,417	23,530	3,890	27,420	1,214	1,650	2,864	4,223	3,312	7,535
Tripura	1,372	376	1,748	1,689	61	1,750	460	40	500	144	60	204	-	-	-
Uttar Pradesh	52,473	12,692	65,165	36,754	1,656	38,410	13,702	514	14,216	9,432	7,280	16,712	5,310	1,589	6,899
West Bengal†	48,203	23,206	71,409	62,915	6,712	69,627	7,292	395	7,687	5,020	4,213	9,233	2,812	958	3,770
A.&N. Islands	142	122	264	88	25	113	-	-	-	25	50	75	-	-	-
Chandigarh	1,260	854	2,114	724	324	1,048	1,260	854	2,114	44	437	481	-	-	-
Dadra & Nagar Haveli	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Daman & Diu	16	9	25	38	67	105	-	-	-	-	-	-	-	-	-
Delhi	7,958	6,283	14,241	25,263	8,270	33,533	3,509	399	3,908	271	531	802	2,238	1,848	4,086
Lakshadweep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pondicherry	871	775	1,646	380	279	659	430	148	578	-	-	-	369	174	543
INDIA	475,861	281,035	756,896	751,596	242,936	994,532	215,081	26,287	241,368	51,453	40,764	92,217	55,482	28,911	84,393

* Figure relates to 1989-90
† Figure relates to 1988-89

(Contd.)

Table 4. *(Contd.)*

State/Union Territory	Intermediate/Junior Colleges			Pre-Degree/Pre-University (Two Years Course)			Pre-University (One Yaer Course)			Hr. Secondary (10+2 New Pattern)			High/Post Basic (IX-X Classes		
(1)	Boys (32)	Girls (33)	Total (34)	Boys (35)	Girls (36)	Total (37)	Boys (38)	Girls (39)	Total (40)	Boys (41)	Girls (42)	Total (43)	Boys (44)	Girls (45)	Total (46)
Andhra Pradesh	286458	116057	402515	-	-	-	-	-	-	2887	1574	4461	625830	348745	974575
Arunachal Pradesh	-	-	-	-	-	-	-	-	-	3634	1291	4925	7054	3717	10771
Assam	1208	1018	2226	-	-	-	-	-	-	111129	57688	168817	228976	176752	405728
Bihar*	330714	62984	393698	-	-	-	-	-	-	18038	6871	24909	695218	182887	878105
Goa	-	-	-	-	-	-	-	-	-	9983	8042	18025	22251	18769	41020
Gujarat	-	-	-	-	-	-	-	-	-	201000	127000	328000	500000	301000	801000
Haryana	-	-	-	41891	17699	59590	-	-	-	41750	15964	57714	200265	92441	292706
Himachal Pradesh*	-	-	-	-	-	-	-	-	-	60409	29481	89890	110796	75697	186493
Jammu&Kashmir†	-	-	-	-	-	-	-	-	-	51320	21410	72730	71583	37000	108583
Karnataka	122900	32625	155525	-	-	-	-	-	-	122718	58621	181339	492749	286616	779365
Kerala	12259	10958	23217	427	108290	207717	-	-	-	1682	1344	3026	459693	468474	928167
Madhya Pradesh	-	-	-	-	-	-	-	-	-	215196	79805	295001	542973	168855	711828
Maharashtra	291043	136416	427459	-	-	-	-	-	-	541000	265000	806000	1136029	650167	1786196
Manipur	1200	2150	3350	8720	5900	14620	-	-	-	2750	1160	3910	26873	19827	46700
Meghalaya	-	-	-	5845	5126	10971	-	-	-	-	-	-	25592	22041	47633
Mizoram	121	95	216	3030	2132	5162	-	-	-	-	-	-	8289	7940	16229
Nagaland	29	15	44	2199	1509	3708	-	-	-	-	-	-	11413	9450	20863

(Contd.)

Table 4. *(Contd.)*

State/Union Territory	Intermediate/Junior Colleges			Pre-Degree/Pre-University (Two Years Course)			Pre-University (One Yaer Course)			Hr. Secondary (10+2 New Pattern)			High/Post Basic (IX-X Classes		
(1)	Boys (32)	Girls (33)	Total (34)	Boys (35)	Girls (36)	Total (37)	Boys (38)	Girls (39)	Total (40)	Boys (41)	Girls (42)	Total (43)	Boys (44)	Girls (45)	Total (46)
Orissa	103613	41090	144703	-	-	-	-	-	-	4373	2125	6498	507000	270000	777000
Punjab*	-	-	-	-	-	-	-	-	-	107239	71521	178760	255465	180094	435559
Rajasthan	-	-	-	-	-	-	-	-	-	178170	45360	223530	464113	107529	571642
Sikkim	-	-	-	-	-	-	-	-	-	1392	667	2059	3732	2921	6653
Tamil Nadu	-	-	-	-	-	-	-	-	-	279919	198633	478552	708230	449505	1157735
Tripura	-	-	-	-	-	-	-	-	-	10548	5248	15796	29249	20775	50024
Uttar Pradesh	670539	257353	927892	-	-	-	2912	903	3815	-	-	-	1595461	440647	2036108
West Bengal†	-	-	-	-	-	-	-	-	-	277243	147173	424416	781273	392927	1174200
A.&N. Islands	-	-	-	-	-	-	-	-	-	2212	1809	4021	4419	3774	8193
Chandigarh	-	-	-	6924	4524	11448	-	-	-	8212	6087	14299	7996	7413	15409
Dadra & Nagar Haveli	-	-	-	-	-	-	-	-	-	468	291	759	1058	614	1672
Daman & Diu	-	-	-	-	-	-	-	-	-	781	408	1189	3010	2096	5106
Delhi	-	-	-	-	-	-	-	-	-	75580	66750	142330	139817	103655	243472
Lakshadweep	-	-	-	306	183	489	-	-	-	-	-	-	775	470	1245
Pondicherry	239	111	350	300	290	590	-	-	-	4183	3476	7659	10696	8806	19502
INDIA	1820323	660872	2481195	168642	145653	314295	2912	903	3815	2333816	1224799	3558615	9677878	4861604	14539482

* Figure relates to 1989-90
† Figure relates to 1988-89

(Contd.)

Table 4. *(Concld.)*

State/Union Territory	Middle/Senior Basic Stage Classes VI-VIII			Primary Stage Classes I-V			Pre-Primary/Pre-Basic Stage			Teacher Training School			Polytechnic Institutes			Technical, Industrial Arts and Crafts School		
(1)	Boys (47)	Girls (48)	Total (49)	Boys (50)	Girls (51)	Total (52)	Boys (53)	Girls (54)	Total (55)	Boys (56)	Girls (57)	Total (58)	Boys (59)	Girls (60)	Total (61)	Boys (62)	Girls (63)	Total (64)
Andhra Pradesh	1343686	780407	2124093	4301744	3234834	7536578	15125	10255	25380	3341	1967	5308	22858	5312	28170*	26222	2782	29004*
Arunachal Pradesh	15956	10133	26089	65043	47154	112197	7328	5546	12874	-	-	-	-	-	-	164	90	254
Assam	640427	435770	1076197	1893197	1656888	3550085	8726	7594	16320	1751	483	2234	2745	215	2960	3373	345	3718
Bihar*	1559587	560989	2120576	5723453	2841810	8565263	28047	10256	38303	4977	5785	10762	4093	91	4184	10272	1076	11348
Goa	43464	37449	80913	71483	64373	135856	-	-	-	7	67	74	1280	180	1460	2531	370	2901
Gujarat	1138000	750000	1888000	3222000	2458000	5680000	87000	67000	154000	4700	5000	9700	14100	1700	15800	31000	21500	52500
Haryana	439601	251214	690815	954490	734917	1689407	3807	2848	6655	214	79	293	4619	613	5232	14893	3290	18183
Himachal Pradesh*	188667	146131	334798	371102	319123	690225	2800	2500	5300	596	414	1010	766	88	854	2083	1291	3374
Jammu&Kashmir†	190878	100860	291738	450374	288386	738760	8900	7100	16000	460	270	730	1307	50	1357	1109	980	2089
Karnataka	1015914	697952	1713866	3064914	2617318	5682232	177480	153000	330480	7558	7327	14885	34600	4400	39000	3163	455	3618
Kerala	961533	908127	1869660	1623059	1532817	3155878	7861	7112	149730	1838	5804	7642	8785	2691	1476	20798	6385	27183
Madhya Pradesh	1764639	889261	2653900	4863414	3131075	7994489	67531	54907	122438	5692	1307	6999	4176	89	4265	11739	1682	13421
Maharashtra	2292177	1602467	3894644	5397629	4624412	10022041	92101	72640	164741	12083	11331	23414	39364	2551	41915	87413	24334	111747
Manipur	42340	36360	78700	143515	121074	264589	335	246	581	-	-	-	285	39	324	150	520	670
Meghalaya	36909	32451	69360	124393	118177	242570	30359	29579	59938	335	310	645	244	21	265	154	110	264
Mizoram	19568	19509	39077	63183	57117	120300	-	-	-	295	30	325	167	58	225	142	90	232
Nagaland	28617	26904	55521	78810	66600	145410	34850	30747	65597	34	7	41	297	4	301	291	132	423

(Contd.)

Table 4. *(Concld.)*

State/Union Territory	Middle/Senior Basic Stage Classes VI-VIII			Primary Stage Classes I-V			Pre-Primary/Pre-Basic Stage			Teacher Training School			Polytechnic Institutes			Technical, Industrial Arts and Crafts School		
(1)	Boys (47)	Girls (48)	Total (49)	Boys (50)	Girls (51)	Total (52)	Boys (53)	Girls (54)	Total (55)	Boys (56)	Girls (57)	Total (58)	Boys (59)	Girls (60)	Total (61)	Boys (62)	Girls (63)	Total (64)
Orissa	548500	427300	975800	2174000	1446000	3620000	-	-	-	120	173	293	235	325	560	5775	25	5800
Punjab*	487970	364470	852440	1108729	947026	2055755	6274	5094	11368	192	1288	1480	4081	415	4496	12078	4368	16446
Rajasthan	1033336	285398	1318734	3141437	1371810	4513247	69291	56642	125933	5528	1809	7337	3316	1829	5145	7537	1752	9289
Sikkim	7776	7038	14814	38873	33625	72498	8198	6595	14793	49	29	78	-	-	-	40	3	43
Tamil Nadu	1814266	1344281	3158547	4182459	3581414	7763873	2166	2425	4591	2125	4805	6930	48946	7275	56221	21240	3016	24256
Tripura	68964	52502	121466	221084	181220	402304	79734	78061	157795	171	-	171	90	-	90	154	19	173
Uttar Pradesh	3240428	1229582	4470010	8889785	5050215	13940000	21224	14156	35380	3237	2058	5295	22257	1028	23285	44494	2275	46769
West Bengal†	1578095	1164672	2742767	5313432	3960689	3274121	19672	16310	35982	4225	6005	10230	18925	418	19343	5503	7052	12555
A.&N. Islands	9886	8022	17908	21042	18770	39812	1913	1770	3683	60	69	129	128	64	192	150	48	198
Chandigarh	13584	12362	25946	26382	23248	49630	5840	4485	10325	-	-	-	586	283	869	632	470	1102
Dadra & Nagar Haveli	2820	1598	4418	9821	6791	16612	-	-	-	-	-	-	-	-	-	-	-	-
Daman & Diu	4063	3438	7501	4992	4787	9779	127	94	221	-	-	-	42	13	55	222	14	236
Delhi	280346	225354	505700	490965	429868	920833	30180	34710	64890	125	1500	1625	2399	1399	3798	6481	1841	8322
Lakshadweep	1743	1409	3152	4518	3830	8348	443	477	920	-	-	-	-	-	-	-	-	-
Pondicherry	30551	25298	55849	55394	50236	105630	5500	5129	10629	-	-	-	454	354	808	279	9	288
INDIA	20844291	12438708	33282999	58094716	41023604	99118320	822812	687278	1510090	59713	57917	117630	241145	31505	272650	320082	86324	406406

* Figure relates to 1989-90
† Figure relates to 1988-89

Table 5. Enrolment by Stages 2003-04

Sr. No.	STATES/UTS	Ph.D/D.Sc./D.Phill.			M.A.			M.Sc.		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Andhra Pradesh	3,674	1,265	4,939	9,372	4,940	14,312	10,831	5,782	16,613
2	Arunachal Pradesh	17	5	22	255	165	420	28	18	46
3	Assam	429	323	752	4,164	3,367	7,531	2,670	1,324	3,994
4	Bihar	1,427	550	1,977	10,339	3,507	13,847	6,889	3,982	10,871
5	Chhattisgarh	3,098	1,857	4,955	8,865	4,594	13,459	2,112	1,263	3,376
6	Goa	46	42	88	50	212	262	138	209	347
7	Gujarat	1,143	666	1,808	13,667	16,582	30,250	4,304	3,658	7,962
8	Haryana	621	492	1,113	4,096	5,582	9,678	1,953	2,189	4,142
9	Himachal Pradesh	739	483	1,222	967	1,323	2,290	165	160	325
10	Jammu & Kashmir	181	173	354	1,062	1,096	2,158	773	819	1,592
11	Jharkhand	305	220	525	2,045	1,747	3,792	1,210	1,021	2,231
12	Karnataka	4,286	1,102	5,388	5,093	1,498	6,591	9,733	7,394	17,127
13	Kerala	213	123	336	1,837	5,327	7,164	1,558	5,395	6,953
14	Madhya Pradesh	6,328	6,320	12,656	17,700	14,706	32,406	11,486	7,862	19,348
15	Maharashtra	3,096	1,429	4,525	22,834	21,701	44,535	11,634	8,851	20,484
16	Manipur	95	87	182	220	374	594	310	280	590
17	Meghalaya	261	237	498	404	671	1,075	186	137	323
18	Mizoram	0	0	0	0	0	0	0	0	0
19	Nagaland	0	0	0	184	179	363	40	22	62
20	Orissa	947	509	1,456	7,448	6,685	14,133	3,225	2,299	5,524
21	Punjab	149	189	338	3,242	8,077	11,319	865	2,365	3,230
22	Rajasthan	183	140	323	6,348	6,550	12,898	1,756	1,801	3,557
23	Sikkim	0	0	0	0	0	0	13	23	36
24	Tamil Nadu	1,601	2,170	3,770	4,794	7,412	12,206	23,553	29,208	52,761
25	Tripura	14	1	15	416	440	856	131	110	241
26	Uttar Pradesh	4,327	1,656	5,982	70,549	55,885	126434	25,246	8,644	33,889
27	Uttaranchal	970	562	1,532	6,345	6,344	12,689	1,911	2,018	3,929
28	West Bengal	344	268	612	22,826	13,574	36,400	10,344	3,633	13,977
29	A&N Islands	0	0	0	23	57	80	28	39	67
30	Chandigarh	0	0	0	225	342	567	128	200	328
31	D&N Haveli	0	0	0	0	0	0	0	0	0
32	Daman Diu	0	0	0	0	0	0	0	0	0
33	Delhi	5,625	4,247	9,872	4,231	3,615	8,045	1,320	1,399	2,719
34	Lakshadweep	0	0	0	0	0	0	0	0	0
35	Pondieherry	157	127	284	406	474	880	400	395	795
	INDIA	40,275	25,260	66,525	230,008	197,226	427,234	134,939	102,499	237,439

(Contd.)

Table 5. *(Contd.)*

Sr. No.	STATES/UTS	M.Com			B.A./B.A.(Hons)			B.Sc./B.Sc.(Hons)		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1	Andhra Pradesh	4,100	1,979	6,079	111,236	60,087	171,323	136,439	67,710	224,149
2	Arunachal Pradesh	19	8	27	3,189	2,037	5,226	241	113	354
3	Assam	875	219	1,094	86,620	57,985	144,605	26,167	5,340	31,507
4	Bihar	5,552	1,771	7,323	137,821	71,680	209,701	90,482	10,804	101,286
5	Chhattisgarh	1,001	600	1,602	25,753	15,423	41,177	18,588	11,132	29,720
6	Goa	13	57	70	995	2,237	3,232	996	1,537	2,533
7	Gujarat	8,498	7,090	15,588	106,564	114,975	221,539	36,416	24,745	61,161
8	Haryana	472	1,554	2,026	70,985	59,886	130,871	11,968	10,215	22,163
9	Himachal Pradesh	256	213	469	26,842	26,950	53,792	9,175	7,262	16,437
10	Jammu & Kashmir	211	131	343	10,283	9,542	19,825	14,414	12,497	26,911
11	Jharkhand	662	468	1,130	81,518	30,993	112,511	22,689	15,457	38,146
12	Karnataka	4,357	1,267	5,624	98,532	86,622	185,155	33,065	37,563	70,628
13	Kerala	858	1,643	2,501	21,772	41,874	63,646	21,282	44,559	65,841
14	Madhya Pradesh	10,246	5,999	18,244	80,940	63,142	144,082	64,786	37,940	102,726
15	Maharashtra	13,130	6,357	19,487	291,627	236,277	527,903	80,710	57,518	138,229
16	Manipur	85	50	135	3,760	2,737	6,497	3,352	2,017	5,369
17	Meghalaya	47	37	84	6,804	7,310	14,114	1,526	1,275	2,801
18	Mizoram	0	0	0	2,624	2,376	5,000	300	226	526
19	Nagaland	11	3	14	4,683	4,013	8,696	520	259	779
20	Orissa	2,231	248	2,479	110,812	72,350	183,162	35,323	15,591	50,914
21	Punjab	237	868	1,105	60,504	71,767	132,271	8,861	10,847	19,708
22	Rajasthan	1,886	1,278	3,164	103,401	64,834	168,235	23,383	12,526	35,909
23	Sikkirn	0	0	0	1,350	1,459	2,809	289	170	459
24	Tamil Nadu	13,889	9,235	23,124	42,842	58,280	101,122	92,210	112,246	204,456
25	Tripura	89	12	101	7,971	6,955	14,926	1,936	870	2,806
26	Uttar Pradesh	17,566	4,256	21,822	385,070	280,476	665,546	146,725	61,626	208,352
27	Uttaranchal	2,036	871	2,907	32,311	27,250	59,561	9,922	7,250	17,172
28	West Bengal	5,220	1,221	6,441	179,211	166,086	345,297	70,822	34,963	105,785
29	A&N Islands	12	16	28	691	734	1,425	100	160	260
30	Chandigarh	32	147	179	6,648	7,989	14,637	1,486	2,460	3,946
31	D & N Haveli	0	0	0	0	0	0	0	0	0
32	Daman Diu	0	0	0	88	109	197	27	39	66
33	Delhi	172	368	540	26,643	36,926	63,569	9,703	10,353	20,055
34	Lakshadweep	0	0	0	0	0	0	0	0	0
35	Pondlcherry	90	134	225	1,052	2,129	3,181	1,002	1,891	2,894
	INDIA	93,864	48,100	141,954	2131,144	1693,689	3824,833	974,906	639,161	1614,067

(Contd.)

Table 5. *(Contd.)*

Sr. No.	STATES/UTS	B.Com./B.Com.(Hons)			B.E./B.Sc.(Engg)/B.Arch.			Medicine, Dentistry, Nursing, Pharmacy, Ayurvedic & Unani, Homeopathy, etc.		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(21)	(22)	(23)	(24)	(26)	(26)	(27)	(28)	(29)
1	Andhra Pradesh	101,812	68,357	170,169	102,785	45,375	148,160	6,493	6,060	12,553
2	Arunachal Pradesh	274	89	363	289	48	337	38	34	72
3	Assam	14,309	2,387	16,696	3,460	350	3,810	1,765	791	2,556
4	Bihar	96,438	24,213	120,652	8,739	400	9,139	7,094	928	8,022
5	Chhattisgarh	20,400	12,217	32,617	5,475	3,280	8,755	990	591	1,581
6	Goa	3,551	4,786	8,337	1,909	907	2,816	350	764	1,114
7	Gujarat	113,270	72,360	185,630	27,045	5,903	32,948	7,861	6,791	14,652
8	Haryana	14,320	12,287	26,607	25,334	5,853	31,187	1,867	704	2,571
9	Himachal Pradesh	4,241	2,114	6,355	1,399	271	1,670	954	789	1,743
10	Jammu & Kashmir	3,531	1,368	4,899	984	152	1,136	1,354	629	1,983
11	Jharkhand	24,510	14,574	39,084	3,077	220	3,297	158	315	473
12	Karnataka	36,924	37,660	74,584	79,812	27,350	107,162	36,767	19,472	56,239
13	Kerala	11,037	12,660	23,697	17,852	11,982	29,834	3,514	4,745	8,259
14	Madhya Pradesh	68,053	41,639	109,692	18,563	10,859	29,422	4,897	2,863	7,761
15	Maharashtra	170,363	135,841	306,204	105,085	28,059	133,144	21,521	20,422	41,943
16	Manipur	205	169	374	372	65	437	91	65	156
17	Meghalaya	1,482	574	2,056	0	0	0	0	0	0
18	Mizoram	139	89	228	0	0	0	0	0	0
19	Nagaland	785	334	1,119	0	0	0	0	0	0
20	Orissa	30,866	8,958	39,824	10,930	1,603	12,533	5,230	3,634	8,864
21	Punjab	9,508	7,982	17,490	11,348	2,936	14,284	2,458	4,247	6,705
22	Rajasthan	25,162	11,953	37,115	7,292	1,509	8,801	5,868	1,446	7,314
23	Sikkim	193	79	272	1,025	293	1,318	48	51	99
24	Tamil Nadu	51,900	50,722	102,622	83,836	12,789	96,626	5,839	7,425	13,264
25	Tripura	1,321	84	1,405	521	127	648	34	13	47
26	Uttar Pradesh	75,540	30,339	105,879	18,764	3,241	22,004	6,467	5,061	11,528
27	Uttaranchal	11,889	3,099	14,988	1,023	987	2,010	342	205	547
28	West Bengal	104,652	23,556	128,208	35,538	7,960	43,498	2,952	1,005	3,957
29	A&N Islands	188	125	313	0	0	0	0	0	0
30	Chandigarh	1,511	2,184	3,695	1,391	509	1,900	218	585	803
31	D & N Haveli	0	0	0	0	0	0	0	0	0
32	Daman Diu	91	69	160	0	0	0	0	0	0
33	Delhi	17,335	13,001	30,336	11,687	10,003	21,691	3,296	3,523	6,819
34	Lakshadweep	0	0	0	0	0	0	0	0	0
35	Pondicherry	619	1,084	1,703	3,254	1,103	4,356	937	672	1,610
	INDIA	1016,421	596,953	1613,374	588,790	184,134	772,923	129,404	93,831	223,235

(Contd.)

Table 5. *(Contd.)*

Sr. No.	STATES/UTS	B.Ed./B.T.			Others (not included in specified faculity)			Total Enrolment (Higher Education)		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)
1	Andhra Pradesh	6,509	4,939	11,448	9,191	8,921	18,112	502,442	295,415	797,857
2	Arurtachal Pradesh	45	15	60	44	16	60	4,439	2,548	6,987
3	Assam	1,430	957	2,387	5,729	1,649	7,378	147,618	74,692	222,310
4	Bihar	5,546	3,223	8,769	26,176	6,347	32,523	396,505	127,605	524,110
5	Chhattisgarh	1,353	811	2,164	10,450	5,519	15,969	98,086	57,288	155,374
6	Goa	34	167	201	1,462	1,644	3,106	9,544	12,562	22,106
7	Gujarat	1,494	849	2,343	14,513	11,668	26,181	334,775	265,287	600,062
8	Haryana	231	167	398	16,040	4,211	20,251	147,887	103,140	251,027
9	Himachal Pradesh	64	46	110	8,272	1,396	9,668	53,074	41,007	94,081
10	Jammu & Kashmir	1,245	1,731	2,976	2,927	4,104	7,031	36,965	32,242	69,207
11	Jharkhand	582	290	872	1,498	448	1,946	138,254	65,753	204,007
12	Karnataka	3,742	4,476	8,218	63,818	38,656	102,474	376,130	263,061	639,190
13	Kerala	634	2,664	3,298	36,697	49,167	85,864	117,254	180,139	297,393
14	Madhya Pradesh	3,576	2,771	6,347	52,176	4,829	57,005	338,752	198,938	537,690
15	Maharashtra	7,373	7,491	14,864	72,138	36,439	108,577	799,512	560,384	1359,896
16	Manipur	120	170	290	11,654	10,454	22,108	20,264	16,468	36,732
17	Meghalaya	87	204	291	5,382	3,525	8,907	16,179	13,970	30,149
18	Mizoram	81	81	162	3,173	2,484	5,657	6,317	5,256	11,573
19	Nagaland	78	86	164	1,609	373	1,982	7,910	5,269	13,179
20	Orissa	2,109	2,151	4,261	14,871	10,685	25,556	223,994	124,712	348,706
21	Punjab	1,018	2,853	3,871	30,891	24,417	55,306	129,081	136,548	265,629
22	Rajasthan	3,507	3,532	7,039	65,365	19,206	84,571	244,151	124,775	368,926
23	Sikkim	92	93	185	1,149	464	1,613	4,159	2,632	6,791
24	Tamil Nadu	1,158	2,088	3,246	92,356	54,188	146,544	413,977	345,762	759,739
25	Tripura	194	124	318	100	93	193	12,727	8,829	21,556
26	Uttar Pradesh	7,962	5,722	13,684	60,878	17,210	78,086	819,093	474,116	1293,209
27	Uttaranchal	2,256	1,870	4,126	3,312	2,337	5,649	72,317	52,794	12,5111
28	West Bengal	3,950	4,338	8,288	4,967	1,474	6,441	440,826	258,078	698,904
29	A&N Islands	32	87	119	68	84	152	1,142	1,302	2,444
30	Chandigarh	49	514	563	6,302	4,570	10,872	17,990	19,500	37,490
31	D & N Haveli	0	0	0	0	0	0	0	0	0
32	Daman Diu	22	38	60	85	20	105	313	275	588
33	Delhi	536	1,821	2,357	15,935	5,765	21,700	96,483	91,221	187,704
34	Lakshadweep	0	0	0	149	79	228	149	79	228
35	Pondicherry	364	838	1,202	1,139	913	2,052	9,421	9,761	19,182
	INDIA	57,473	57,208	114,681	640,517	333,356	973,873	6037,730	3971,407	10009,137

(Contd.)

Table 5. *(Contd.)*

Sr. No.	STATES/UTS	Polytechnic Institutes			Teacher Training Schools			Tech. Indus., Arts & Crafts School *		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(39)	(40)	(41)	(42)	(43)	(44)	(46)	(46)	(47)
1	Andhra Pradesh	10,991	5,415	16,406	2,282	1,804	4,086	105,153	3,600	108,753
2	Arunachal Pradesh	88	44	132	0	0	0	368	0	368
3	Assam	3,995	505	4,500	70	71	141	3,798	762	4,560
4	Bihar	3,187	460	3,647	460	340	800	12,952	592	13,544
5	Chhattisgarh	185	70	255	395	368	763	14,076	580	14,656
6	Goa	1,872	392	2,264	12	150	162	3,072	0	3,072
7	Gujarat	32,548	6,943	39,491	5,740	6,298	12,038	82,776	2,238	85,014
8	Haryana	13,850	2,983	16,833	2,250	1,280	3,530	12,243	2,486	14,729
9	Himachal Pradesh	1,205	336	1,541	110	83	193	5,413	864	6,277
10	Jammu & Kashmir	1,554	610	2,164	2,155	890	3,045	3,614	750	4,364
11	Jharkhand	780	85	865	155	226	381	4,472	304	4,776
12	Karnataka	48,575	20,540	69,115	3,864	3,976	7,640	48,090	2,626	50,716
13	Kerala	18,337	8,023	26,360	1,285	6,176	7,461	57,369	1,552	58,921
14	Madhya Pradesh	7,647	2,814	10,461	1,685	805	2,490	20,592	1,550	22,142
15	Maharashtra	28,434	12,186	40,620	12,939	12,219	25,158	86,272	8,592	94,864
16	Manipur	358	108	466	16	44	60	332	208	540
17	Meghalaya	170	45	215	213	195	408	874	52	926
18	Mizoram	223	213	436	125	90	215	246	48	294
19	Nagaland	168	38	206	18	63	81	308	96	404
20	Orissa	3,084	1,665	4,749	3,705	3,510	7,215	20,068	1,472	21,540
21	Punjab	6,844	2,782	9,626	2,076	3,320	5,396	10,977	6,154	17,131
22	Rajasthan	1,845	572	2,417	1,810	2,181	3,991	10,844	736	11,580
23	Sikkim	158	22	180	27	51	78	140	0	141
24	Tamil Nadu	72,200	10,335	82,535	2,040	2,626	4,666	82,901	2,326	85,227
25	Tripura	328	141	469	127	158	285	316	84	400
26	Uttar Pradesh	18,139	1,098	19,237	4,512	4,414	8,926	46,364	4,316	50,680
27	Uttaranchal	1,000	898	1,898	1,170	798	1,968	6,768	736	7,504
28	West Bengal	4,950	1,150	6,100	3,792	1,688	5,480	12,040	720	12,760
29	A&N Islands	235	141	376	27	90	117	220	0	220
30	Chandigarh	797	432	1,229	34	36	70	740	276	1,016
31	D & N Haveli	655	34	689	0	0	0	212	16	228
32	Daman Diu	214	30	244	0	100	100	388	0	388
33	Delhi	3,210	1,859	5,069	185	155	340	8,512	2,792	11,304
34	Lakshadweep	0	0	0	0	0	0	80	16	96
35	Pondicherry	1,210	694	1,904	170	280	450	1,400	280	1,680
	INDIA	289,036	83,663	372,699	53,449	54,485	107,934	663,990	46,824	710,814

(Contd.)

Table 5. *(Contd.)*

Sr. No.	STATES/UTS	Inter. Colleges/Higher Secondary (Classes XI-XII)			High/Secondary (Classes IX-X)		
		Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(48)	(49)	(50)	(51)	(52)	(53)
1	Andhra Pradesh	774,865	519,752	1294,617	881,693	715,168	1596,861
2	Arunachal Pradesh	8,072	5,159	13,231	14,910	10,923	25,833
3	Assam	216,275	129,531	345,806	347,552	273,473	621,025
4	Bihar	281,139	92,143	373,282	598,593	247,242	845,835
5	Chhattisgarh	1619,119	98,560	260,479	245,261	150,967	396,228
6	Goa	12,086	11,657	23,743	19,328	18,314	37,642
7	Gujarat	333,407	236,601	570,008	692,749	474,902	1167,651
8	Haryana	216,079	150,774	366,853	315,976	225,016	540,992
9	Himachal Pradesh	83,010	68,305	151,315	116,292	106,669	222,961
10	Jammu & Kashmir	79,097	57,910	137,007	115,968	82,945	198,913
11	Jharkhand	26,966	17,368	44,334	207,143	122,588	329,731
12	Karnataka	356,977	305,937	662,914	686,893	597,244	1284,137
13	Kerala	42,389	42,796	85,185	535,032	530,706	1065,738
14	Madhya Pradesh	412,465	239,405	651,870	797,810	430,455	1228,265
15	Maharashtra	957,029	713,092	1670,121	1569,000	1307,255	2876,255
16	Manipur	11,778	9,460	21,238	36,370	34,540	70,910
17	Meghalaya	13,404	12,430	25,834	19,088	19,308	38,396
18	Mizoram	5,322	5,217	10,539	12,564	13,121	25,685
19	Nagaland	8,403	6,888	15,291	13,036	12,038	25,074
20	Orissa	108,195	62,404	170,599	478,361	366,434	844,795
21	Punjab	160,253	130,273	290,526	293,371	260,017	553,388
22	Rajasthan	388,268	157,198	545,466	793,247	316,914	1110,161
23	SIkkim	2,937	2,807	5,744	4,606	4,682	9,288
24	Tamil Nadu	507,658	507,571	1015,229	920,088	640,022	1760,110
25	Tripura	17,703	13,005	30,708	46,463	40,835	87,298
26	Uttar Pradesh	1058,240	721,164	1779,404	2631,705	1398,509	4030,214
27	Uttaranchal	79,890	68,933	148,823	181,155	130,071	311,226
28	West Bengal	448,563	287,320	735,883	863,579	635,310	1498,889
29	A&N Islands	3,312	3,362	6,674	5,781	5,601	11,382
30	Chandigarh	9,579	9,105	18,684	12,598	10,942	23,540
31	D & N Haveli	1,052	733	1,785	2,574	1,719	4,293
32	Daman Diu	965	667	1,632	2,008	1,727	3,735
33	Delhi	123,836	113,519	237,355	210,436	179,531	389,967
34	Lakshadweep	565	503	1,068	1,368	1,226	25,94
35	Pondicherry	9,693	10,454	20,147	18,683	18,260	36,943
	INDIA	6921,391	4812,003	11,733,394	13,691,281	9584,674	23,275,965

(Contd.)

Table 5. *(Concld.)*

Sr. No.	STATES/UTS	Upper Primary/Middle/Sr.B.isic (Classes VI-VIII)			Primary/Jr. Basic (Classes I-V)		
		Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(54)	(55)	(56)	(57)	(58)	(59)
1	Andhra Pradesh	1863,312	1639,157	3502,469	4044,148	3931,511	7975,659
2	Arunachal Pradesh	31,183	26,191	57,374	97,342	82,911	180,253
3	Assam	712,492	625,718	1338,210	1648,903	1583,644	3232,547
4	Bihar	1175,552	640,010	1815,562	5477,856	3993,330	9471,186
5	Chhattisgarh	657,586	501,001	1158,587	1766,331	1631,464	3397,795
6	Goa	38,782	34,683	73,465	56,577	51,298	107,875
7	Gujarat	1514,849	938,152	2453,001	3601,055	2950,715	6551,770
8	Haryana	604,498	485,249	1089,747	1070,770	939,889	2010,659
9	Himachal Pradesh	218,773	201,105	419,878	346,813	320,125	666,938
10	Jammu & Kashmir	238,713	190,516	429,229	516,063	434,233	950,296
11	Jharkhand	488,959	348,160	847,119	1764,061	1378,191	3140,252
12	Karnataka	1530,949	1365,770	2896,719	3238,145	3029,680	6267,825
13	Kerala	869,000	793,436	1662,436	1273,564	1218,866	2492,430
14	Madhya Pradesh	1864,236	1258,462	3122,698	4804,466	4026,267	8830,733
15	Maharashtra	3236,109	2851,681	6087,790	5829,244	5346,512	11,175,756
16	Manipur	70,210	62,700	132,910	175,410	163,700	339,110
17	Meghalaya	60,854	61,173	122,027	160,413	180,494	360,907
18	Mizoram	26,112	24,984	51,096	66,170	60,887	127,057
19	Nagaland	38,876	37,663	76,539	109,752	100,658	210,410
20	Orissa	786,434	641,822	1428,256	2592,488	2325,579	4916,067
21	Punjab	551,187	487,201	1038,388	1050,832	928,462	1979,294
22	Rajasthan	1811,621	1025,383	2837,004	5205,025	4274,730	9479,755
23	Sikkim	11,551	13,251	24,802	38,573	38,226	76,799
24	Tamil Nadu	1884,470	1716,400	3600,670	3410,465	3180,648	6591,113
25	Tripura	98,674	87,977	186,651	235,854	215,877	451,731
26	Uttar Pradesh	4082,817	2865,426	6948,243	12,964,090	11,116,777	24,080,867
27	Uttaranchal	283,169	259,573	542,742	601,690	562,795	1164,485
28	West Bengal	2004,877	1813,384	3818,261	5281,739	5045,986	10,327,725
29	A&N Islands	11,938	10,510	22,448	20,981	19,407	40,388
30	Chandigarh	20,881	18,155	39,036	36,097	29,937	66,034
31	D & N Haveli	7,207	4,512	11,719	17,830	15,082	32,912
32	Daman Diu	4,366	3,754	8,120	8,579	7,643	16,222
33	Delhi	438,411	393,380	831,791	772,425	669,834	1442,259
34	Lakshadweep	2,503	2,050	4,553	3,813	3,348	7,161
35	Pondicherry	34,952	32,306	67,258	52,859	49,162	102,021
	INDIA	27,286,103	2,1460,896	48,746,998	68,360,423	59,905,868	128,266,291

Table 6. Number of Girls, Enrolment per 100 Boys, Enrolment by Stages of School Education 2003-04

S.No.	STATES/UTs	Classes			
		I-V	VI-VIII	I-VIII	IX-XII
(1)	(2)	(3)	(4)	(5)	(6)
1	Andhra Pradesh	97	88	94	75
2	Arunachal Pradesh	85	84	85	70
3	Assam	96	88	94	71
4	Bihar	73	54	70	39
5	Chhattisgarh	92	76	88	61
6	Goa	91	89	90	95
7	Gujarat	82	62	76	69
8	Haryana	88	80	85	71
9	Himachal Pradesh	92	92	92	88
10	J&K	84	80	83	72
11	Jharkhand	78	70	76	60
12	Karnataka	94	89	92	87
13	Kerala	96	91	94	99
14	Madhya Pradesh	84	68	79	55
15	Maharashtra	92	88	90	80
16	Manipur	93	89	92	91
17	Meghalaya	100	101	100	98
18	Mizoram	92	96	93	103
19	Nagaland	92	97	93	88
20	Orissa	90	82	88	73
21	Punjab	88	88	88	86
22	Rajasthan	82	57	76	40
23	Sikkim	99	115	103	99
24	Tamil Nadu	93	91	92	94
25	Tripura	92	89	91	84
26	Uttar Pradesh	86	70	82	57
27	Uttaranchal	94	92	93	76
28	West Bengal	96	90	94	70
29	A&N Islands	92	88	91	99
30	Chandigarh	83	87	84	90
31	D&N Haveli	85	63	78	68
32	Daman & Diu	89	86	88	81
33	Delhi	87	90	88	88
34	Lakshadweep	88	82	85	89
35	Pondicherry	93	92	93	101
	INDIA	88	79	85	70

Table 7. Enrolment Ratio in Classes I-V and VI-VIII of Schools for General Education 1990-91

State/Union Territory	Classes I-V (6-11 Years)			Classes VI-VIII (11-14 Years)		
	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra Pradesh	121.02	93.16	107.25	67.49	39.85	53.79
Arunachal Pradesh	121.58	88.14	104.86	54.64	35.43	45.14
Assam	116.00	107.27	111.75	67.00	48.73	58.17
Bihar	107.55	55.05	81.70	53.54	19.37	36.51
Goa	108.31	97.53	102.92	113.78	98.55	106.19
Gujarat	136.62	108.37	122.77	83.68	57.27	70.22
Haryana	93.99	73.09	83.59	75.38	47.36	62.03
Himachal Pradesh	125.67	108.69	117.21	109.06	86.21	97.75
Jammu & Kashmir	101.21	68.19	85.12	75.21	42.34	59.30
Karnataka	113.92	101.70	107.95	67.14	47.15	57.25
Kerala	103.58	101.28	102.45	107.29	104.05	105.69
Madhya Pradesh	122.03	84.34	103.85	80.54	42.88	62.23
Maharashtra	129.46	116.52	123.15	93.18	68.26	81.01
Manipur	119.20	105.10	112.30	70.68	62.15	66.47
Meghalaya	109.02	103.03	106.02	59.53	50.78	55.09
Mizoram	153.36	146.08	149.81	78.27	81.29	79.75
Nagaland	113.23	99.11	106.29	68.79	67.43	68.12
Orissa	120.29	83.87	102.51	53.05	41.88	47.50
Punjab	99.00	92.22	95.76	73.77	61.77	68.11
Rajasthan	105.00	48.79	77.96	65.14	19.17	42.88
Sikkim	130.01	115.15	122.67	46.84	45.12	46.01
Tamil Nadu	141.08	126.48	133.95	107.95	83.09	95.75
Tripura	148.88	126.02	137.63	84.62	67.05	76.01
Uttar Pradesh	98.59	62.27	81.39	64.89	27.61	47.31
West Bengal	141.37	108.73	125.31	76.07	56.31	66.20
A.&N. Islands	101.16	85.71	93.24	89.87	77.13	83.68
Chandigarh	61.07	60.07	60.60	53.90	57.50	55.56
Dadra & Nagar Haveli	111.60	84.89	98.88	55.29	34.00	45.08
Daman & Diu	-	-	-	-	-	-
Delhi	89.43	91.09	90.20	83.73	82.52	84.27
Lakshadweep	150.60	127.67	139.13	108.94	93.93	101.68
Pondicherry	147.32	136.14	141.79	134.00	112.94	123.56
INDIA	115.29	85.97	101.03	73.38	46.13	60.11

Table 8. Gross Enrolment Ratio, 2003-04

Sr. No.	STATES/UTS	2003-2004								
		Classes I-V (6-11 years)			Classes VI-VIII (11-14 yrs)			Classes 1-V111 (6-14 yrs)		
(1)	(2)	Boys (3)	Girls (4)	Total (5)	Boys (6)	Girls (7)	Total (8)	Boys (9)	Girts (10)	Total (11)
1	Andhra Pradesh	87.42	88.03	87.72	67.10	62.49	64.86	79.80	78.58	79.20
2	Arunachal Pradesh	115.35	103.47	109.56	67.99	59.06	63.60	98.68	87.64	93.29
3	Assam	88.22	88.09	88.16	66.02	61.15	63.65	80.10	78.32	79.23
4	Bihar	80.20	64.20	72.57	30.64	19.21	25.33	62.37	48.50	55.82
5	Chhattisgarh	123.69	122.86	123.29	78.51	62.21	70.52	106.99	99.97	103.58
6	Goa	100.30	95.50	97.96	104.77	97.55	101.23	102.07	96.31	99.26
7	Gujarat	117.67	108.62	113.41	81.88	57.40	70.40	104.19	89.38	97.23
8	Haryana	73.53	77.31	75.25	68.24	62.40	65.51	71.53	71.49	71.51
9	Himachal Pradesh	106.10	106.88	106.47	99.91	96.49	98.24	103.62	102.61	103.13
10	J&K	75.55	67.25	71.52	54.46	46.46	50.60	67.31	59.17	63.37
11	Jharkhand	86.70	71.10	79.09	42.47	32.19	37.54	70.51	57.15	64.04
12	Karnataka	110.53	107.23	108.91	78.95	73.32	76.20	97.95	93.76	95.89
13	Kerala	97.25	96.59	96.92	95.69	91.49	93.64	96.61	94.51	95.58
14	Madhya Pradesh	112.11	100.68	106.59	71.78	53.88	63.30	96.89	83.43	90.44
15	Maharashtra	108.32	106.84	107.60	89.41	85.52	87.55	100.71	98.31	99.56
16	Manipur	139.30	135.64	137.51	86.95	81.57	84.33	118.85	114.60	116.77
17	Meghalaya	104.19	106.88	105.51	60.27	62.02	61.14	88.01	90.34	89.16
18	Mizoram	122.54	117.71	120.17	77.25	76.70	76.98	105.10	101.86	103.51
19	Nagaland	80.95	79.97	80.48	43.56	45.85	44.66	66.11	66.50	66.30
20	Orissa	114.23	107.44	110.91	58.13	49.69	54.01	93.28	85.86	89.65
21	Punjab	71.04	76.38	73.45	59.31	60.93	60.06	66.52	70.25	66.22
22	Rajasthan	120.18	109.41	115.07	74.30	47.22	61.54	103.65	87.19	95.87
23	Sikkim	116.54	116.48	116.51	52.02	61.63	56.75	90.63	94.77	92.68
24	Tamil Nadu	117.47	115.49	116.51	102.28	98.44	100.41	111.57	108.88	110.26
25	Tripura	125.73	119.68	122.76	75.34	70.23	72.84	105.01	99.41	102.27
26	Uttar Pradesh	96.69	92.58	94.75	53.61	42.97	48.64	81.09	74.86	78.16
27	Uttarancahal	106.10	107.66	106.85	81.08	79.59	80.36	96.57	96.88	96.72
28	West Bengal	107.45	107.21	107.33	65.90	62.57	64.28	91.57	90.20	90.90
29	A&N Islands	118.78	113.23	116.05	100.13	91.41	95.85	111.27	104.47	107.92
30	Chandigarh	72.00	70.77	71.44	69.19	69.85	69.50	70.95	70.42	70.71
31	D&N Haveli	133.92	117.88	126.06	95.75	66.08	81.64	120.14	99.86	110.30
32	Daman & Diu	111.66	111.01	111.35	100.85	94.11	97.62	107.76	104.81	106.36
33	Delhi	90.34	89.81	90.10	84.83	85.91	85.34	88.26	88.33	88.30
34	Lakshadweep	111.65	100.93	106.37	104.04	89.77	97.09	108.51	96.38	102.56
35	Pondicherry	121.94	118.72	120.37	121.89	117.37	119.68	121.92	118.18	120.09
	INDIA	100.63	95.58	98.20	66.76	57.62	82.40	87.90	81.43	84.80

(Contd.)

Table 8. *(Concld.)*

Sr. No.	STATES/UTS	2003-2004								
		Classes IX -XII (14-18 years)			Classes I-XII (6-18 yrs)			Higher Education, including Polytechnics (18-24 yrs)		
(1)	(2)	Boys (12)	Girls (13)	Total (14)	Boys (15)	Girls (16)	Total (17)	Boys (18)	Girts (19)	Total (20)
1	Andhra Pradesh	49.08	39.74	44.61	70.18	66.75	68.51	11.60	7.19	9.46
2	Arunachal Pradesh	44.30	32.75	38.68	83.19	72.12	77.78	7.57	4.72	6.21
3	Assam	45.69	35.54	40.83	69.94	66.05	68.05	10.15	5.33	7.81
4	Bihar	22.05	10.53	16.90	51.40	38.92	45.59	9.50	3.50	6.71
5	Chhattisgarh	42.93	28.37	35.92	88.08	79.07	83.72	9.10	5.53	7.35
6	Goa	62.33	62.80	62.55	88.14	84.64	86.43	13.26	16.92	14.98
7	Gujarat	44.40	35.02	40.01	85.05	72.07	78.96	11.49	9.55	10.57
8	Haryana	48.67	41.72	45.53	64.25	62.23	63.33	11.43	9.59	10.62
9	Himachal Pradesh	72.16	67.25	69.78	93.05	90.63	91.88	14.63	11.78	13.25
10	J&K	36.72	28.21	32.60	57.48	49.24	53.48	5.97	5.63	5.81
11	Jharkhand	18.27	12.53	15.60	55.60	45.10	50.57	9.72	5.10	7.53
12	Karnataka	42.95	40.27	41.66	79.64	76.45	78.09	13.19	9.85	11.62
13	Kerala	47.67	48.33	48.00	79.33	77.98	78.66	7.72	10.30	9.03
14	Madhya Pradesh	41.24	27.29	34.89	80.25	67.75	74.35	9.96	6.85	8.53
15	Maharashtra	55.73	51.70	53.86	85.65	83.44	84.60	13.75	11.60	12.78
16	Manipur	47.86	44.59	46.24	95.60	91.28	93.48	14.98	11.88	13.42
17	Meghalaya	27.95	28.23	28.09	70.12	71.96	71.03	12.53	10.66	11.59
18	Mizoram	42.54	44.81	43.66	84.85	83.22	84.05	11.09	9.64	10.38
19	Nagaland	18.31	17.77	18.06	49.74	50.00	49.87	5.32	3.89	4.64
20	Orissa	37.52	27.89	32.74	76.47	68.01	72.32	11.43	6.36	8.90
21	Punjab	38.79	39.30	39.03	57.46	60.03	58.63	8.49	10.33	9.34
22	Rajasthan	43.16	20.25	32.60	86.23	68.58	77.94	7.55	4.42	6.10
23	Sikkim	27.04	27.99	27.51	69.31	72.73	71.00	11.56	7.87	9.81
24	Tamil Nadu	57.26	56.42	56.85	92.87	90.68	91.80	13.49	9.96	11.73
25	Tripura	40.37	35.83	38.16	83.49	78.45	81.03	7.19	5.04	6.12
26	Uttar Pradesh	43.85	30.71	37.93	70.44	62.95	66.96	8.85	6.03	7.57
27	Uttarancahal	61.09	50.70	56.12	85.28	82.28	83.84	14.22	11.02	12.67
28	West Bengal	36.45	28.36	32.61	74.40	71.67	73.08	9.88	6.27	8.15
29	A&N Islands	55.30	60.55	57.78	91.27	89.50	90.41	5.42	6.86	6.07
30	Chandigarh	53.14	63.02	57.41	64.86	68.07	66.31	26.40	40.48	32.16
31	D&N Haveli	40.55	32.79	37.02	96.24	81.35	89.15	3.82	0.30	2.43
32	Daman & Diu	42.34	46.86	44.24	83.63	86.29	84.84	2.85	3.74	3.12
33	Delhi	50.09	54.21	51.93	75.77	77.75	76.69	9.97	12.65	11.11
34	Lakshadweep	67.00	62.89	64.99	94.75	85.35	90.15	4.29	2.22	3.24
35	Pondicherry	72.34	75.88	74.08	104.44	103.19	103.83	18.10	17.83	17.96
	INDIA	42.94	34.26	38.89	74.14	67.46	70.97	10.59	7.65	9.21

Table 9. Number of Teachers and Enrolment by Type of Institutions, 1990-91

State/Union Territory	(a) Higher Secondary Schools/Junior Colleges (10+2 New Pattern)								(b) High/Post Basic School							
	Number of Teachers			Percentage of Trained Teachers	Enrolment			Teachers Pupil Ratio	Number of Teachers			Percentage of Trained Teachers	Enrolment			Teachers Pupil Ratio
	Men	Women	Total		Boys	Girls	Total		Men	Women	Total		Boys	Girls	Total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Andhra Pradesh	5232	2866	8098	95.37	202322	90064	292386	36	51761	22990	74751	99.25	1577377	979877	2557254	34
Arunachal Pradesh	1037	186	1223	53.14	15987	10104	26091	21	751	199	950	40.94	13360	9785	23145	24
Assam	9626	2602	12228	25.00	192909	89323	282232	23	23675	6548	30223	31.00	428704	324932	753636	25
Bihar@	4118	1665	5783*	89.90	157535	46699	204234	35	36505	4856	41361	87.50	1177685	333998	1511683	37
Goa	584	386	970	59.00	11506	10057	21563	22	2707	3446	6153	86.00	95306	80932	176238	29
Gujarat	25385	9023	34408	100.00	661000	411000	1072000	31	18423	4960	23383	100.00	385000	220000	605000	26
Haryana	4332	3531	7863	99.21	171151	75093	246244	31	23715	15637	39352	99.54	834316	481849	1316165	33
Himachal Pradesh@	2800	1400	4200	94.09	86480	47870	134350	32	6300	2400	8700	97.13	171316	133147	304463	35
Jammu&Kashmir†	3493	1377	4870	88.00	67540	29290	96830	20	9494	4638	14132	82.00	184559	96527	281086	20
Karnataka	14851	3354	18205	100.00	453916	191973	645889	35	25514	8834	34348	96.39	593957	373071	967028	28
Kerala	1226	2120	3346	90.00	43082	38503	81585	24	34899	54852	89751	99.00	1342490	1314339	2656829	30
Madhya Pradesh	25375	7939	33314	N.A.	738550	280073	1018623	31	13907	3534	17441	N.A.	333757	107791	441548	25
Maharashtra	50302	19448	69750	97.00	1571000	871000	2442000	35	84975	39233	124208	95.00	2284000	1540000	3824000	31
Manipur	893	468	1361	47.00	12796	7054	19850	25	4237	1716	5953	32.00	62240	52740	114980	19
Meghalaya	-	-	-	-	-	-	-	-	1495	1446	2941	32.00	34669	32267	66936	23
Mizoram	-	-	-	-	-	-	-	-	1244	242	1486	76.72	13737	13550	27287	18
Nagaland	2	2	4	50.00	29	15	44	11	2159	1029	3188	32.80	44320	37846	82166	26

(Contd.)

Table 9. *(Contd.)*

State/Union Territory	(a) Higher Secondary Schools/Junior Colleges (10+2 New Pattern)								(b) High/Post Basic School							
	Number of Teachers			Percentage of Trained Teachers	Enrolment			Teachers Pupil Ratio	Number of Teachers			Percentage of Trained Teachers	Enrolment			Teachers Pupil Ratio
	Men	Women	Total		Boys	Girls	Total		Men	Women	Total		Boys	Girls	Total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Orissa	1250	350	1600	100.00	108373	43125	151498	N.A.	32547	7455	40002	95.00	507000	270000	777000	19
Punjab@	8655	7202	15857	99.03	292594	189419	482013	30	19116	14754	33870	99.39	516616	404662	921278	27
Rajasthan	22413	6994	29407	99.00	579401	176323	755724	26	25988	3727	32715	98.00	616854	186835	803689	25
Sikkim	453	306	759	40.71	7799	6445	14244	19	790	532	1322	43.27	13002	1438	24440	18
Tamil Nadu	43260	31178	74438	98.23	1402454	926815	2329269	31	24400	17979	42379	99.70	836152	659031	1495183	35
Tripura	3591	1664	5255	59.42	71203	50567	121770	23	3527	1204	4731	36.20	67726	54768	122494	26
Uttar Pradesh	48154	9861	58015	97.00	2119340	741393	2860733	49	32102	6578	38680	97.00	1412896	494261	1907157	49
West Bengal†	28987	8893	37880	70.00	783230	396919	1180149	31	49339	32798	82137	73.00	1983025	1142450	3125475	38
A.&N. Islands	833	617	1450	99.00	15176	12932	28108	19	346	314	660	97.00	7586	6297	13883	21
Chandigarh	368	940	1308	100.00	14142	14921	29063	22	518	1293	1811	100.00	27975	23435	51410	28
Dadra & Nagar Haveli	74	29	103	98.00	1536	980	2516	24	40	15	55	96.00	820	418	1238	23
Daman & Diu	21	6	27	90.00	781	408	1189	44	145	51	196	98.00	3010	2096	5106	26
Delhi	13845	19455	33300	99.00	395426	328518	723944	22	3235	4126	7361	99.00	83666	79925	163591	22
Lakshadweep	32	1	33	-	372	131	503	15	236	66	302	98.00	1211	760	1971	7
Pondicherry	757	364	1121	100.00	20905	13728	34633	31	960	824	1784	100.00	27648	25710	53358	30
INDIA	321949	144227	466176	92.39	10198535	5100742	15299277	32	535050	271276	806326	90.10	15681980	9494737	25176717	31

(Contd.)

Table 9. *(Contd.)*

State/Union Territory	(c) Middle/Senior Basic School								(d) Primary/Junior Basic School							
	Number of Teachers			Percentage of Trained Teachers	Enrolment			Teachers Pupil Ratio	Number of Teachers			Percentage of Trained Teachers	Enrolment			Teachers Pupil Ratio
	Men	Women	Total		Boys	Girls	Total		Men	Women	Total		Boys	Girls	Total	
(1)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
Andhra Pradesh	28270	13567	41837	98.51	1176922	809915	1986837	47	79219	31638	110857	97.00	3331537	2494942	5826479	53
Arunachal Pradesh	1355	316	1671	35.90	21927	13801	35728	21	1896	470	2366	35.12	40413	28605	69018	29
Assam	31742	6304	38046	27.00	663000	484500	1147500	30	57732	14586	72318	64.00	1524900	1392300	2917200	40
Bihar@	78917	19447	98364	88.13	2780749	1261715	4042464	41	95355	22286	117641	87.93	3908089	1960222	5868311	50
Goa	364	476	840	97.00	8336	7588	15924	19	1123	1789	2912	94.00	32033	30056	62089	21
Gujarat	73500	61750	135250	100.00	3267000	2444000	5711000	42	22500	13800	36300	100.00	748000	561000	1309000	36
Haryana	7167	4648	11815	99.50	264188	206427	470615	40	9012	6449	15461	99.99	369806	333585	703391	45
Himachal Pradesh@	5700	130	7000	98.27	94602	65304	159906	23	10980	6020	17000	94.17	369520	320705	690225	41
Jammu&Kashmir†	11822	5807	17629	83.00	269039	148619	417658	24	8159	5565	13724	85.00	250127	174110	424237	31
Karnataka	56112	35620	91732	95.43	2736286	2238697	4974983	54	29903	11599	41502	93.69	1035035	889399	1924434	46
Kerala	19875	31755	51630	93.00	856625	796546	1653171	32	18231	31542	49773	96.00	815794	774072	1589866	32
Madhya Pradesh	60932	1956	80888	N.A.	1773224	783806	2557030	32	136161	40043	176204	N.A.	4411053	2987909	7398962	42
Maharashtra	93365	55555	148920	95.00	3051000	2575000	5626000	38	72626	48485	121111	93.00	2487000	2180000	4667000	39
Manipur	4187	1168	5355	31.00	38614	36486	75100	14	8187	2397	10584	53.00	103363	84537	187900	18
Meghalaya	1895	1114	3009	35.00	28373	26435	54808	18	4243	2486	6729	42.00	123852	113859	237711	35
Mizoram	2626	636	3262	68.27	22702	21436	44138	14	2058	1689	3747	49.31	55556	49130	103686	28
Nagaland	2807	791	3598	29.02	37026	31230	68256	19	4531	1701	6232	50.07	71706	62859	134565	22

(Contd.)

Table 9. *(Contd.)*

State/Union Territory	(c) Middle/Senior Basic School								(d) Primary/Junior Basic School							
	Number of Teachers			Percentage of Trained Teachers	Enrolment			Teachers Pupil Ratio	Number of Teachers			Percentage of Trained Teachers	Enrolment			Teachers Pupil Ratio
	Men	Women	Total		Boys	Girls	Total		Men	Women	Total		Boys	Girls	Total	
(1)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
Orissa	31026	6375	37401	95.00	548500	427300	975800	26	78155	26265	104420	100.00	2174000	1446000	3620000	35
Punjab@	5267	4205	9472	97.09	103526	79734	183260	19	22139	25702	47841	99.40	1008524	862285	1870809	39
Rajasthan	52897	17456	70353	99.00	1530426	560318	2090744	30	55440	18768	74208	98.00	2155388	938635	3094023	42
Sikkim	1078	487	1565	41.02	12263	10534	22797	15	1608	637	2245	50.42	18709	15834	34543	15
Tamil Nadu	33608	31928	65536	100.00	1664065	1333555	2997620	46	70452	49921	120373	100.00	2940726	2505370	5446096	45
Tripura	3286	840	4126	33.37	61932	49616	111548	27	6847	1755	8602	29.50	129279	105079	234358	27
Uttar Pradesh	76442	18837	95279	95.00	2282144	813222	3095366	32	215553	48176	263729	98.00	8581620	4929124	13510744	51
West Bengal†	18092	7139	25231	71.00	631330	434021	1065351	42	144112	40636	184748	68.00	4259408	3387281	7646689	41
A.&N. Islands	351	349	700	97.00	7759	6855	14614	21	473	251	724	95.00	7971	7136	15107	21
Chandigarh	85	506	591	100.00	6355	5187	11542	20	78	686	764	100.00	8600	7382	15982	21
Dadra & Nagar Haveli	169	215	384	93.00	7482	5056	12538	33	110	50	160	92.00	4329	2840	7169	45
Daman & Diu	139	91	230	98.00	4063	3438	7501	33	119	159	278	97.00	4992	4787	9779	35
Delhi	2269	3396	5665	98.00	70226	51238	121464	22	8243	13943	22186	100.00	377195	319516	696711	31
Lakshadweep	75	49	124	100.00	2032	1634	3666	30	153	71	224	96.00	3704	3347	7051	31
Pondicherry	1063	729	1792	98.00	26462	23773	50235	28	1086	849	1935	94.00	26109	24821	50930	26
INDIA	706483	352812	1059295	91.04	24048178	15756986	39805164	37	1166484	470414	1636898	89.81	41377338	28996727	70374065	42

* Data relates to Higher Secondary only
@ Figure relates to 1989-90
† Figure relates to 1988-89

Table 10. Number of Teachers, Enrolment and Pupil by Type of Institutions, 2003-04

Sl. No.	STATES/UTS	Higher Education Institutions					Higher Secondary Schools			
		Number of Teachers	Enrolment			Pupil Teacher Ratio	Number of Teachers Total	% of Trained Teachers	No.of Female Teachers per 100 Male Teachers	Pupil Teacher Ratio
			Boys	Girls	Total					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Andhra Pradesh	41,414	502,442	295,415	797,857	19	39,830	95	36	34
2	Arunachal Pradesh	287	4,439	2,548	6,987	24	1,841	64	26	31
3	Assam	13,986	147,618	74,692	222,310	16	22,815	30	40	24
4	Bihar	28,834	396,505	127,605	524,110	18	17,720	96	14	30
5	Chhattisgarh	4,896	98,085	57,287	155,372	32	16,650	63	43	33
6	Goa	1,622	9,544	12,562	22,106	14	1,324	81	103	20
7	Gujarat	15,733	334,775	265,287	600,062	38	40,421	99	41	39
6	Haryana	9,833	147,887	103,140	251,027	26	34,091	97	89	29
9	Himachal Pradesh	3,436	53,074	41,007	94,081	27	15,093	99	55	26
10	J&K	4,144	36,965	32,242	69,207	17	8,497	75	59	17
11	Jharkhand	8,604	138,254	65,753	204,007	24	3,682	100	108	29
12	Karnataka	50,337	376,130	263,062	639,192	13	18,940	100	45	35
13	Kerala	20,214	117,254	180,139	297,393	15	14,413	60	293	21
14	Madhya Pradesh	16,401	338,752	198,938	537,690	33	63,467	72	59	18
15	Maharashtra	56,072	799,512	560,384	1359,896	24	117,289	99	42	41
16	Manipur	4,160	20,264	16,468	36,732	9	3,104	47	80	22
17	Meghalaya	3,144	16,179	13,970	30,149	10	949	98	110	36
18	Mizoram	489	6,317	5,256	11,573	24	663	38	79	16
19	Nagaland	1,047	7,910	5,269	13,179	13	1,519	24	102	34
20	Orissa	20,454	223,994	124,712	348,706	17	4,039	100	30	20
21	Punjab	11,256	129,061	136,548	265,629	24	38,836	99	132	30
22	Rajasthan	13,304	244,151	124,775	368,926	28	55,423	95	45	30
23	Sikkim	149	4,159	2,632	6,791	46	268	51	44	21
24	Tamil Nadu	50,086	413,977	345,762	759,739	15	139,789	100	141	32
25	Tripura	899	12,727	8,829	21,556	24	9,392	34	54	24
26	Uttar Pradesh	30,157	819,093	474,116	1293,209	43	138,714	97	36	47
27	Uttarancahal	3,357	72,317	52,794	125,111	37	21,355	100	40	30
28	West Bengal	24,283	440,826	258,078	698,904	29	65,442	86	41	58
29	A&N Islands	298	1,142	1,302	2,444	8	1,852	99	95	21
30	Chandigarh	5,648	17,990	19,500	37,490	7	2,625	100	457	29
31	D&N Haveli	0	0	0	0	0	165	93	129	11
32	Daman & Diu	0	313	275	588	0	50	100	39	33
33	Delhi	11,229	96,483	91,221	187,704	17	49,406	100	199	30
34	Lakshadweep	0	149	79	228	0	41	100	14	26
35	Pondicherry	969	9,421	9,761	19,182	20	3,113	96	98	29
	INDIA	456,742	6,037,729	3,971,407	10,009,137	22	952,818	90	63	35

(Contd.)

Table 10. *(Concld.)*

Sl. No.	STATES/UTS	High/Post Basic Schools				Middle/Senior Basic School				Primary/Junior Basic School			
		Number of Teachers Total	% of Trained Teachers	No. of Female Teachers per 100 Male Teachers	Pupil Teacher Ratio	Number of Teachers Total	% of Trained Teachers	No.of Female Teachers per 100 Male Teachers	Pupil Teacher Ratio	Number of Teachers Total	% of Trained Teachers	No.of Female Teachers per 100 Male Teachers	Pupil Teacher Ratio
(1)	(2)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
1	Andhra Pradesh	140,826	91	70	31	100,365	88	73	31	172,601	94	79	35
2	Arunachal Pradesh	1,641	47	32	27	2,969	33	40	28	3,195	28	41	39
3	Assam	54,224	30	36	20	73,147	36	30	17	83,919	73	53	40
4	Bihar	24,924	98	12	48	56,654	95	27	65	95,815	85	22	74
5	Chhattisgarh	7,935	72	51	45	25,213	59	30	45	68,512	52	37	47
6	Goa	6,240	97	190	26	564	98	266	16	2,313	94	420	20
7	Gujarat	30,557	99	31	30	199,341	94	115	39	18,482	98	128	32
8	Haryana	28,566	95	56	28	8,389	92	57	25	46,565	89	105	45
9	Himachal Pradesh	11,761	98	62	28	9,199	99	44	17	28,738	87	73	21
10	JAK	16,066	75	54	12	26,624	69	71	16	29,846	61	68	33
11	Jharkhand	9,828	100	39	46	26,536	100	41	60	31,150	100	26	73
12	Karnataka	76,852	100	49	17	189,768	100	129	39	51,308	100	85	34
13	Kerala	92,731	99	214	28	45,164	97	206	27	40,559	98	264	29
14	Madhya Pradesh	36,181	68	56	29	132,183	65	60	27	197,102	65	51	41
15	Maharashtra	155,368	98	49	34	186,821	96	76	38	187,819	96	154	37
16	Manipur	9,175	28	66	23	8,834	19	69	19	8,249	22	63	28
17	Meghalaya	5,325	36	71	19	6,607	36	85	14	13,745	45	88	36
18	Mizoram	3,231	64	34	13	5,606	80	42	10	5,849	82	94	18
19	Nagaland	6,283	44	59	23	5,365	42	42	18	7,474	37	53	19
20	Orissa	60,960	92	28	24	49,786	91	39	28	78,182	90	43	56
21	Punjab	29,196	99	118	27	13,543	93	104	18	40,805	95	167	42
22	Rajasthan	58,655	89	34	30	154,921	91	37	33	120,368	66	36	46
23	Sikkim	444	44	52	21	1,140	42	56	22	5,031	50	89	19
24	Tamil Nadu	68,212	100	180	28	60,079	100	132	37	121,236	100	172	35
25	Tripura	8,529	25	36	25	7,022	20	36	16	14,606	28	95	30
26	Uttar Pradesh	44,535	97	43	48	156,674	95	41	37	395,202	98	50	57
27	Uttarancahal	7,979	100	35	18	16,080	100	53	19	40,527	100	112	27
28	West Bengal	58,943	86	42	57	11,388	84	35	49	157,397	67	34	55
29	A&N Islands	892	99	115	18	737	96	108	19	956	93	127	19
30	Chandigarh	2,535	100	520	27	178	100	1,013	26	315	100	408	38
31	D&N Haveli	158	96	66	27	213	97	40	55	678	96	133	49
32	Daman & Diu	262	95	67	14	281	100	111	29	426	100	330	43
33	Delhi	9,797	100	178	29	9,192	100	272	25	24,699	100	217	40
34	Lakshadweep	405	100	42	18	111	100	91	16	313	100	83	21
35	Pondicherry	2,444	94	131	27	1,593	92	117	22	2,876	96	267	24
	INDIA	1,071,660	89	61	31	1,592,287	87	69	35	2,096,858	86	66	45

Table 11. Enrolment Ratio of Students Belong to Scheduled Castes, 1990-91

State/Union Territory	Classes I-V (6-11 Years)			Classes VI-VIII (11-14 Years)		
	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra Pradesh	161.88	122.02	142.18	76.62	42.35	59.63
Arunachal Pradesh	28.72	16.87	22.79	7.52	5.12	6.33
Assam	194.15	187.84	191.08	108.33	84.16	96.65
Bihar	102.23	39.36	71.27	37.91	9.70	23.85
Goa	116.16	100.32	108.24	71.24	50.11	60.70
Gujarat	184.18	144.71	164.83	117.79	68.26	93.49
Haryana	109.27	86.85	98.12	62.72	31.19	47.70
Himachal Pradesh	126.91	104.38	115.68	92.50	58.88	75.86
Jammu & Kashmir	97.89	67.72	83.19	74.44	42.59	59.02
Karnataka	120.67	102.86	111.96	63.53	41.56	52.67
Kerala	119.92	116.66	118.32	116.74	112.28	114.54
Madhya Pradesh	138.14	71.92	106.20	71.08	36.94	54.48
Maharashtra	269.83	231.38	251.08	179.47	118.01	149.46
Manipur	129.73	137.44	133.50	71.55	68.10	69.85
Meghalaya	303.06	293.67	298.35	227.08	158.55	192.30
Mizoram	-	-	-	-	-	-
Nagaland	-	-	-	-	-	-
Orissa	158.52	106.04	132.90	69.34	27.48	48.55
Punjab	130.82	112.05	121.84	65.51	48.03	57.27
Rajasthan	101.28	34.95	69.07	56.27	7.72	32.77
Sikkim	130.95	117.80	124.45	35.63	36.03	35.82
Tamil Nadu	154.12	133.00	143.80	105.16	76.30	91.00
Tripura	178.42	153.35	166.09	94.24	68.66	81.70
Uttar Pradesh	91.88	39.40	67.03	31.94	8.76	21.01
West Bengal	105.99	72.82	89.66	36.19	18.57	27.39
A.&N. Islands	-	-	-	-	-	-
Chandigarh	122.88	117.16	120.17	83.19	77.82	80.72
Dadra & Nagar Haveli	74.99	76.42	75.67	86.53	64.61	76.01
Daman & Diu	-	-	-	-	-	-
Delhi	120.43	106.71	114.08	80.37	62.24	72.12
Lakshadweep	-	-	-	-	-	-
Pondicherry	174.93	181.55	178.21	134.16	124.02	129.13
INDIA	122.68	80.60	102.21	61.40	33.28	47.71

Table 12. Gross Enrolment Ratio of SC Students in Classes I-V, VI-VIII and I-VIII, 2003-2004

Sr. No.	States/UTs	Classes I-V (6-11 years)			Classes VI-VIII (11-14 yrs)			Classes I-VIII (6-14 yrs)		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Andhra Pradesh	91.41	90.92	91.17	96.51	88.21	92.55	92.94	90.14	91.57
2	Arunachal Pradesh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Assam	65.20	63.06	64.15	74.82	73.21	74.05	68.09	66.02	67.08
4	Bihar	82.21	55.31	69.51	39.59	23.33	32.10	70.81	47.05	59.67
5	Chhattisgarh	97.10	92.45	94.86	109.41	88.97	99.54	100.72	91.42	96.24
6	Goa	111.07	122.21	126.63	79.08	82.38	80.67	98.19	105.82	101.83
7	Gujarat	65.37	66.05	65.69	97.34	88.91	93.41	74.99	72.80	73.96
8	Haryana	80.35	86.21	83.02	80.24	73.45	77.09	80.32	82.22	81.19
9	Himachal Pradesh	98.74	110.53	103.83	93.43	94.37	93.88	96.77	104.26	100.26
10	J&K	83.53	87.54	85.49	76.46	70.02	73.36	81.03	81.49	81.25
11	Jharkhand	70.06	51.22	60.97	46.13	30.02	38.48	63.53	45.57	54.90
12	Karnataka	104.47	94.92	99.74	112.57	92.45	102.77	107.01	94.17	100.67
13	Kerala	97.36	94.67	96.04	87.53	82.44	85.05	93.22	89.58	91.43
14	Madhya Pradesh	105.84	94.70	100.47	104.75	71.42	89.21	105.52	88.26	97.28
15	Maharashtra	108.67	107.80	108.25	91.26	87.51	89.49	101.71	99.94	100.86
16	Manipur	134.56	131.57	137.81	90.35	86.34	86.88	113.32	109.20	111.30
17	Meghalaya	95.81	100.06	97.71	83.13	86.84	84.95	88.87	92.24	90.46
18	Mizoram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Nagaland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	Orissa	94.33	110.30	101.23	57.57	61.47	59.19	82.98	95.92	88.50
21	Punjab	106.05	113.34	109.41	75.10	77.82	76.36	95.15	100.72	97.72
22	Rajasthan	92.10	82.00	87.33	81.13	46.60	65.29	89.33	73.45	81.88
23	Sikkim	89.00	93.70	91.35	43.70	48.29	46.07	73.46	77.46	75.48
24	Tamil Nadu	115.90	106.82	111.43	96.99	94.26	95.66	108.88	102.23	105.63
25	Tripura	122.83	123.05	122.94	78.56	73.22	75.96	105.84	103.59	104.75
26	Uttar Pradesh	81.74	55.02	69.25	56.98	23.88	41.53	74.58	46.04	61.25
27	Uttarancahal	101.91	111.15	106.30	110.49	93.97	102.51	104.59	105.67	105.11
28	West Bengal	116.68	113.19	114.96	105.70	90.29	98.38	113.82	107.54	110.75
29	A&N Islands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	Chandigarh	69.33	65.46	67.46	59.37	54.13	56.84	65.69	61.33	63.59
31	D&N Haveli	101.58	110.99	105.92	96.97	93.18	95.13	100.12	104.96	102.39
32	Daman & Diu	115.55	109.06	112.39	78.87	82.65	80.64	99.01	97.61	98.34
33	Delhi	66.70	68.11	67.37	51.18	48.73	50.00	61.32	61.24	61.28
34	Lakshadweep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	Pondicherry	119.32	119.49	121.00	116.30	109.04	111.73	118.00	114.87	116.45
	INDIA	93.12	83.00	88.30	79.39	63.36	71.86	88.95	77.16	83.36

Table 13. Enrolment Ratio of Students Belong to Scheduled Tribes, 1990-91

State/Union Territory	Classes I-V (6-11 Years)			Classes VI-VIII (11-14 Years)		
	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra Pradesh	153.46	96.90	125.51	49.95	20.91	35.55
Arunachal Pradesh	129.00	90.89	109.95	53.37	32.38	42.99
Assam	154.24	137.08	145.90	60.69	43.64	52.45
Bihar	106.69	57.69	82.57	41.26	16.81	29.07
Goa	31.91	19.83	25.87	9.75	3.36	6.56
Gujarat	153.06	113.32	133.58	64.03	37.00	50.77
Haryana	-	-	-	-	-	-
Himachal Pradesh	115.15	89.93	102.58	85.36	42.57	64.18
Jammu & Kashmir	-	-	-	-	-	-
Karnataka	92.56	79.92	86.38	47.41	32.83	40.20
Kerala	136.31	128.37	132.41	88.20	86.58	87.40
Madhya Pradesh	102.76	46.12	75.45	42.82	23.36	33.36
Maharashtra	132.90	106.35	119.95	64.35	36.30	50.66
Manipur	154.65	134.22	144.66	56.37	45.75	51.12
Meghalaya	113.56	107.02	110.28	60.84	55.28	58.02
Mizoram	162.62	154.05	158.45	82.83	85.97	84.37
Nagaland	131.77	126.31	129.09	60.75	53.82	57.36
Orissa	128.77	63.62	96.96	40.15	16.65	28.47
Punjab	-	-	-	-	-	-
Rajasthan	102.68	32.58	68.63	49.19	5.73	28.15
Sikkim	118.93	106.55	112.81	44.87	45.78	45.31
Tamil Nadu	122.96	97.54	110.54	65.74	41.49	53.85
Tripura	182.11	136.04	159.44	69.83	45.12	57.72
Uttar Pradesh	113.99	74.12	95.11	51.04	17.47	35.21
West Bengal	149.64	65.77	108.36	36.90	12.73	24.83
A.&N. Islands	69.82	60.97	65.28	77.73	70.81	74.37
Chandigarh	-	-	-	-	-	-
Dadra & Nagar Haveli	120.97	88.13	105.33	51.70	26.44	39.58
Daman & Diu	-	-	-	-	-	-
Delhi	-	-	-	-	-	-
Lakshadweep	163.61	138.88	151.25	117.46	99.52	108.78
Pondicherry	-	-	-	-	-	-
INDIA	126.78	78.60	103.35	51.33	27.50	39.72

Table 14. Gross Enrolment Ratio of ST Students in Classes 1-V, VI-VIII and 1-VIII, 2003-2004

Sr. No.	States/UTs	Classes I-V (6-11 years)			Classes VI-VIII (11-14 yrs)			Classes I-VIII (6-14 yrs)		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Andhra Pradesh	81.85	77.20	79.57	87.94	62.17	75.71	83.15	74.13	78.76
2	Arunachal Pradesh	99.76	89.96	94.99	91.87	65.21	77.30	97.77	82.54	90.11
3	Assam	66.21	70.02	68.02	94.93	95.34	95.11	73.90	76.45	75.10
4	Bihar	88.04	79.54	84.78	66.18	40.11	55.04	84.17	71.47	79.19
5	Chhattisgarh	110.41	111.98	111.15	99.75	83.76	92.30	107.43	104.32	105.95
6	Goa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Gujarat	92.05	100.48	95.90	77.74	67.58	72.90	87.88	90.33	89.01
8	Haryana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Himachal Pradesh	119.23	123.79	118.68	99.89	94.24	97.20	111.41	112.02	111.70
10	J&K	83.80	65.23	74.68	48.59	31.10	40.29	70.60	52.96	62.05
11	Jharkhand	94.89	76.50	86.03	91.56	67.94	80.63	94.26	74.98	85.03
12	Karnataka	92.80	91.61	92.22	106.63	88.79	98.05	96.82	90.80	93.91
13	Kerala	116.65	116.13	116.40	99.74	93.54	96.71	110.30	107.60	108.99
14	Madhya Pradesh	95.12	70.97	83.03	77.32	57.05	68.15	90.65	67.95	79.55
15	Maharashtra	105.97	105.02	105.52	90.46	75.91	83.39	100.91	95.10	98.15
16	Manipur	130.07	122.89	126.82	77.51	67.88	72.77	112.63	103.68	108.34
17	Meghalaya	95.05	98.94	96.97	63.71	73.67	68.70	84.81	90.49	87.62
18	Mizoram	122.74	117.36	120.11	77.74	69.02	73.21	105.47	97.46	101.45
19	Nagaland	72.40	64.17	68.31	48.72	42.26	45.46	64.07	56.31	60.19
20	Orissa	96.24	94.14	95.27	76.11	58.92	68.14	92.24	87.09	89.86
21	Punjab	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Rajasthan	94.89	87.84	91.61	82.03	48.42	66.88	91.69	78.46	85.58
23	Sikkim	131.31	137.83	140.94	71.14	84.76	78.08	109.90	118.50	114.23
24	Tamil Nadu	121.78	84.01	103.73	120.50	115.36	117.98	121.39	93.95	108.16
25	Tripura	128.52	119.56	124.21	65.76	53.68	59.81	106.43	95.63	101.19
26	Uttar Pradesh	75.06	53.32	64.67	73.88	37.90	56.71	74.72	48.87	62.37
27	Uttarancahal	89.33	99.50	94.21	86.36	86.28	86.32	88.33	94.99	91.53
28	West Bengal	74.02	72.45	73.28	61.49	38.49	49.85	70.99	63.38	67.33
29	A&N Islands	118.19	78.20	95.23	95.16	64.09	77.89	108.84	72.72	88.36
30	Chandigarh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	D&N Haveli	100.22	92.98	96.70	101.65	64.96	84.50	100.63	85.46	93.32
32	Daman & Diu	109.98	118.22	113.71	90.98	79.47	85.63	102.85	103.22	103.02
33	Delhi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	Lakshadweep	113.94	99.82	106.89	103.26	90.79	97.22	109.46	96.16	102.91
35	Pondicherry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	INDIA	94.66	87.77	91.37	84.00	68.62	75.76	90.58	81.10	86.06

Table 15. Scheduled Castes/Scheduled Tribes Studying at Different Level of Education, 2003-04

Sr. No.	States/Uts	Ph.D.						M.A.					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	409	170	579	114	74	188	1,449	626	2,075	479	240	719
2	Arunachal Pradesh	0	0	0	9	3	12	0	0	0	209	125	334
3	Assam	15	10	25	27	19	46	345	230	575	448	281	729
4	Bihar	230	79	309	39	15	54	465	105	570	275	85	360
5	Chhattisgarh	95	7	102	35	5	40	370	375	745	299	108	407
6	Goa	6	4	10	0	0	0	4	2	6	1	0	1
7	Gujarat	85	44	129	62	31	93	1,625	1,630	3,255	1,245	1,129	2,374
8	Haryana	112	38	150	0	0	0	734	395	1,129	0	0	0
9	Himachal Pradesh	46	26	72	23	8	31	191	135	326	58	89	147
10	J&K	0	0	0	0	0	0	0	0	0	0	0	0
11	Jharkhand	66	52	118	80	83	163	89	73	162	83	76	159
12	Karnataka	210	31	241	33	5	38	405	160	565	101	38	139
13	Kerala	80	81	161	5	2	7	430	615	1,045	128	84	212
14	Madhya Pradesh	225	32	257	11	5	16	1,125	1,169	2,294	989	327	1,316
15	Maharashtra	178	31	209	21	8	29	5,918	2,889	8,807	1,270	435	1,705
16	Manipur	1	1	2	2	1	3	35	25	60	105	60	165
17	Meghalaya	1	2	3	176	161	337	3	8	11	370	563	933
18	Mizoram	0	0	0	0	0	0	0	0	0	0	0	0
19	Nagaland	0	0	0	0	0	0	0	0	0	184	179	363
20	Orissa	65	42	107	52	21	73	615	316	931	330	155	485
21	Punjab	4	5	9	0	0	0	415	597	1,012	0	0	0
22	Rajasthan	32	12	44	28	8	36	952	982	1,934	670	590	1,260
23	Sikkim	0	0	0	0	0	0	0	0	0	0	0	0
24	Tamil Nadu	380	150	530	10	10	20	1,707	1,574	3,281	90	51	141
25	Tripura	2	0	2	0	0	0	122	61	183	89	78	167
26	Uttar Pradesh	79	9	88	5	0	5	13,221	7,982	21,203	822	525	1,347
27	Uttaranchal	4	1	5	0	0	0	1,401	540	1,941	38	27	65
28	West Bengal	44	12	56	0	0	0	2,906	1,695	4,601	491	241	732
29	A&N Islands	0	0	0	0	0	0	0	0	0	2	2	4
30	Chandigarh	0	0	10	0	0	0	16	12	28	1	0	1
31	D&N Haveli	0	0	0	0	0	0	0	0	0	0	0	0
32	Daman & Diu	0	0	0	0	0	0	0	0	0	0	0	0
33	Delhi	425	169	594	111	78	189	671	435	1,106	155	122	277
34	Lakshadweep	0	0	0	0	0	0	0	0	0	0	0	0
35	Pondicherry	39	18	57	2	2	4	124	48	172	0	0	0
	INDIA	2,833	1,026	3,859	845	539	1,384	35,338	22,679	58,017	8,932	5,610	14,542

(Contd.)

Table 15. *(Contd.)*

Sr. No.	States/Uts	M.Sc.						M.Com					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
(1)	(2)	Boys (15)	Girls (16)	Total (17)	Boys (18)	Girls (19)	Total (20)	Boys (21)	Girls (22)	Total (23)	Boys (24)	Girls (25)	Total (26)
1	Andhra Pradesh	1,147	584	1,731	350	186	536	556	245	801	122	85	207
2	Arunachal Pradesh	0	0	0	23	14	37	0	0	0	18	6	24
3	Assam	198	100	298	209	102	311	92	27	119	73	15	88
4	Bihar	591	78	669	480	38	518	1,080	39	1,119	288	42	330
5	Chhattisgarh	225	184	409	45	41	86	361	39	400	203	35	238
6	Goa	1	1	2	2	4	6	1	0	1	0	0	0
7	Gujarat	665	250	915	485	170	655	1,819	777	2,596	790	140	930
8	Haryana	107	90	197	0	0	0	49	103	152	0	0	0
9	Himachal Pradesh	24	14	38	13	6	19	49	18	67	7	2	9
10	J&K	0	0	0	0	0	0	0	0	0	0	0	0
11	Jharkhand	85	70	155	93	69	162	84	60	144	78	54	132
12	Karnataka	308	179	487	76	40	116	61	45	106	24	11	35
13	Kerala	174	501	675	13	31	44	131	243	374	13	20	33
14	Madhya Pradesh	2,680	821	3,501	210	112	322	995	301	1296	303	89	392
15	Maharashtra	481	250	731	69	53	122	809	385	1194	152	111	263
16	Manipur	6	3	9	11	9	20	2	2	4	15	8	23
17	Meghalaya	8	0	8	139	104	243	0	1	1	38	23	61
18	Mizoram	0	0	0	0	0	0	0	0	0	0	0	0
19	Nagaland	0	0	0	40	22	62	1	0	1	10	3	13
20	Orissa	1,240	520	1,760	220	45	265	85	45	130	27	25	52
21	Punjab	70	84	154	0	0	0	18	23	41	0	0	0
22	Rajasthan	264	227	491	130	122	252	280	191	471	140	145	285
23	Sikkim	1	0	1	1	0	1	0	0	0	0	0	0
24	Tamil Nadu	1,587	1,507	3,094	69	57	126	511	435	946	25	15	40
25	Tripura	24	18	42	6	7	13	16	1	17	13	0	13
26	Uttar Pradesh	5,370	1,890	7,260	453	227	680	2,701	495	3,196	78	47	125
27	Uttaranchal	270	70	340	10	8	18	150	37	187	8	7	15
28	West Bengal	1,187	466	1,653	181	68	249	500	149	649	96	35	131
29	A&N Islands	0	0	0	2	4	6	0	0	0	0	0	0
30	Chandigarh	1	6	7	0	0	0	3	4	7	0	1	1
31	D&N Haveli	0	0	0	0	0	0	0	0	0	0	0	0
32	Daman & Diu	0	0	0	0	0	0	0	0	0	0	0	0
33	Delhi	140	95	235	76	40	116	38	25	63	10	7	17
34	Lakshadweep	0	0	0	0	0	0	0	0	0	0	0	0
35	Pondicherry	77	45	122	0	0	0	25	12	37	0	0	0
	INDIA	16,931	8,053	24,984	3,406	1,579	4,985	10,417	3,702	14,119	2,531	926	3,457

(Contd.)

Table 15. *(Contd.)*

Sr. No.	States/Uts	B.A. / B.A. (Hons.)						B.Sc./B.Sc. (Hons.)					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
(1)	(2)	Boys (27)	Girls (28)	Total (29)	Boys (30)	Girls (31)	Total (32)	Boys (33)	Girls (34)	Total (35)	Boys (36)	Girls (37)	Total (38)
1	Andhra Pradesh	27,371	9,052	36,423	5,150	1,348	6,498	15,222	9,605	24,827	4,567	2,364	6,931
2	Arunachal Pradesh	0	0	0	2,481	1,712	4,193	0	0	0	188	98	286
3	Assam	8,408	5,104	13,512	13,583	7,694	21,277	1,676	543	2,219	1,712	599	2,311
4	Bihar	20,623	2,782	23,405	10,311	2,891	13,202	13,572	1,620	15,192	1,105	801	1,906
5	Chhattisgarh	4,001	2,525	6,526	3,889	2,215	6,104	2,788	1,669	4,457	502	170	672
6	Goa	19	18	37	49	33	82	10	22	32	9	3	12
7	Gujarat	15,984	9,001	24,985	16,167	11,910	28,077	5,462	2,711	8,173	930	604	1,534
8	Haryana	7,912	6,016	13,928	0	0	0	697	710	1,407	0	0	0
9	Himachal Pradesh	3,861	3,050	6,911	1,419	1,218	2,637	1,037	712	1,749	321	244	565
10	J&K	0	0	0	0	0	0	0	0	0	0	0	0
11	Jharkhand	857	524	1,381	2,913	2,678	5,591	780	328	1,108	2,099	2,650	4,749
12	Karnataka	10,755	5,615	16,370	3,269	1,417	4,686	1,084	953	2,037	288	208	496
13	Kerala	3,449	6,350	9,799	337	471	808	2,383	5,167	7,550	131	415	546
14	Madhya Pradesh	12,880	7,510	20,390	13,880	5,990	19,870	9,717	3,691	13,408	1,990	340	2,330
15	Maharashtra	36,383	23,595	59,978	10,680	4,485	15,165	5,285	3,108	8,393	923	532	1,455
16	Manipur	86	104	190	1,507	1,416	2,923	72	102	174	295	274	569
17	Meghalaya	99	74	173	5,965	6,428	12,393	70	55	125	1,060	940	2,000
18	Mizoram	0	0	0	2,624	2,376	5,000	0	0	0	300	226	526
19	Nagaland	5	26	31	4,678	3,987	8,665	7	36	43	513	223	736
20	Orissa	16,621	4,782	21,403	11,335	2,880	14,215	5,282	2,338	7,620	1,254	740	1,994
21	Punjab	7,835	7,783	15,618	0	0	0	647	582	1,229	0	0	0
22	Rajasthan	15,510	9,725	25,235	7,755	4,860	12,615	3,507	1,878	5,385	1,754	942	2,696
23	Sikkim	70	97	167	365	381	746	9	10	19	40	39	79
24	Tamil Nadu	13,681	9,930	23,611	1,034	144	1,178	13,710	11,042	24,752	248	214	462
25	Tripura	1,368	1,149	2,517	1,014	703	1,717	339	133	472	101	64	165
26	Uttar Pradesh	93,230	26,335	119,565	4,999	615	5,614	22,008	9,245	31,253	704	140	844
27	Uttaranchal	7,010	2,235	9,245	1,225	178	1,403	1,488	1,087	2,575	135	20	155
28	West Bengal	35,134	20,301	55,435	4,828	2,524	7,352	7,487	3,534	11,021	905	483	1,388
29	A&N Islands	0	0	0	63	46	109	0	0	0	1	4	5
30	Chandigarh	420	510	930	112	98	210	59	100	159	16	19	35
31	D&N Haveli	0	0	0	0	0	0	0	0	0	0	0	0
32	Daman & Diu	1	3	4	43	8	51	2	3	5	1	1	2
33	Delhi	2,500	2,925	5,425	789	690	1,479	1,455	1,552	3,007	230	111	341
34	Lakshadweep	0	0	0	0	0	0	0	0	0	0	0	0
35	Pondicherry	339	238	577	0	0	0	155	283	438	10	12	22
	INDIA	346412	167359	513771	132464	71396	203860	116010	62819	178829	22332	13480	35812

(Contd.)

Table 15. *(Contd.)*

Sr. No.	States/Uts	B.Com./B.Com.(Hons)						B.E./B.Sc.(Engg.)/B.Arch.					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)
1	Andhra Pradesh	14510	8545	23055	3592	1593	5185	11723	4227	15950	2992	659	3651
2	Arunachal Pradesh	0	0	0	197	69	266	0	0	0	25	3	28
3	Assam	1425	415	1840	1512	592	2104	362	83	445	341	76	417
4	Bihar	14465	269	14734	1232	178	1410	285	18	303	140	9	149
5	Chhattisgarh	3060	104	3164	502	170	672	208	78	286	426	65	491
6	Goa	41	31	72	68	21	89	17	4	21	11	3	14
7	Gujarat	16990	3896	20886	2320	771	3091	1758	317	2075	1839	202	2041
8	Haryana	887	420	1307	0	0	0	298	117	415	0	0	0
9	Himachal Pradesh	514	211	725	111	69	180	158	26	184	56	8	64
10	J&K	0	0	0	0	0	0	0	0	0	0	0	0
11	Jharkhand	859	531	1390	2888	2652	5540	252	21	273	189	28	217
12	Karnataka	1605	1030	2635	371	209	580	2815	932	3747	1410	481	1891
13	Kerala	1522	2115	3637	132	154	286	1190	786	1976	110	66	176
14	Madhya Pradesh	10207	447	10654	1156	214	1370	1330	224	1554	1819	192	2011
15	Maharashtra	9692	5612	15304	1748	908	2656	2768	530	3298	1800	46	1846
16	Manipur	8	3	11	46	15	61	11	5	16	50	5	55
17	Meghalaya	32	27	59	1023	372	1395	0	0	0	0	0	0
18	Mizoram	0	0	0	139	89	228	0	0	0	0	0	0
19	Nagaland	0	0	0	785	324	1109	0	0	0	0	0	0
20	Orissa	4629	1343	5972	778	204	982	311	134	445	715	200	915
21	Punjab	662	582	1244	0	0	0	1191	196	1387	0	0	0
22	Rajasthan	3774	1125	4899	605	161	766	418	48	466	296	34	330
23	Sikkim	6	4	10	41	23	64	5	0	5	17	7	24
24	Tamil Nadu	4736	3703	8439	119	106	225	4736	3703	8439	119	106	225
25	Tripura	139	8	147	121	15	136	98	20	118	152	27	179
26	Uttar Pradesh	11331	1254	12585	287	87	374	3935	280	4215	78	22	100
27	Uttaranchal	1783	464	2247	50	15	65	319	144	463	18	8	26
28	West Bengal	9270	1482	10752	1105	345	1450	323	35	358	6	2	8
29	A&N Islands	0	0	0	1	4	5	0	0	0	0	0	0
30	Chandigarh	62	74	136	3	9	12	193	51	244	6	0	6
31	D&N Haveli	0	0	0	0	0	0	0	0	0	0	0	0
32	Daman & Diu	4	7	11	8	4	12	0	0	0	0	0	0
33	Delhi	2600	1950	4550	304	141	445	1445	295	1740	389	95	484
34	Lakshadweep	0	0	0	0	0	0	0	0	0	0	0	0
35	Pondicherry	75	76	151	0	0	0	245	115	360	7	3	10
	INDIA	114888	35728	150616	21244	9514	30758	36394	12389	48783	13011	2347	15358

(Contd.)

Table 15. *(Contd.)*

Sr. No.	States/Uts	Medicine, Dentistry, Nursing, Pharmacy, Ayurvedic & Unani, Homeopathy, etc.						B.Ed./B.T.					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(51)	(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)	(61)	(62)
1	Andhra Pradesh	908	834	1742	399	244	643	1436	897	2333	419	238	657
2	Arunachal Pradesh	0	0	0	20	10	30	0	0	0	36	12	48
3	Assam	137	53	190	278	100	378	194	81	275	181	136	317
4	Bihar	840	650	1490	415	240	655	150	85	235	141	152	293
5	Chhattisgarh	150	66	216	80	50	130	181	49	230	19	18	37
6	Goa	7	10	17	1	4	5	1	1	2	0	0	0
7	Gujarat	544	430	974	601	580	1181	275	119	394	330	250	580
8	Haryana	263	57	320	0	0	0	25	26	51	0	0	0
9	Himachal Pradesh	146	64	210	72	30	102	10	4	14	5	3	8
10	J&K	0	0	0	0	0	0	0	0	0	0	0	0
11	Jharkhand	45	18	63	54	57	111	8	13	21	15	142	157
12	Karnataka	4070	3925	7995	1520	1260	2780	574	333	907	139	54	193
13	Kerala	265	590	855	70	285	355	100	418	518	19	35	54
14	Madhya Pradesh	445	320	765	250	150	400	570	295	865	98	76	174
15	Maharashtra	2890	2828	5718	850	599	1449	3441	1458	4899	1166	287	1453
16	Manipur	0	0	0	50	41	91	0	2	2	33	8	41
17	Meghalaya	0	0	0	0	0	0	13	7	20	60	137	197
18	Mizoram	0	0	0	0	0	0	0	0	0	81	81	162
19	Nagaland	0	0	0	0	0	0	0	0	0	78	86	164
20	Orissa	420	370	790	355	280	635	375	310	685	330	180	510
21	Punjab	312	499	811	0	0	0	215	434	649	0	0	0
22	Rajasthan	280	118	398	80	35	115	659	450	1109	46	31	77
23	Sikkim	0	0	0	4	7	11	7	3	10	13	10	23
24	Tamil Nadu	1051	1156	2207	270	198	468	302	368	670	18	13	31
25	Tripura	6	3	9	12	3	15	43	21	64	39	27	66
26	Uttar Pradesh	1401	1202	2603	145	101	246	1220	752	1972	441	335	776
27	Uttaranchal	15	8	23	6	2	8	116	56	172	3	2	5
28	West Bengal	316	236	552	13	2	15	752	583	1335	154	89	243
29	A&N Islands	0	0	0	0	0	0	0	0	0	1	3	4
30	Chandigarh	23	69	92	4	14	18	8	63	71	1	1	2
31	D&N Haveli	0	0	0	0	0	0	0	0	0	0	0	0
32	Daman & Diu	0	0	0	0	0	0	2	1	3	11	8	19
33	Delhi	275	405	680	85	180	265	118	180	298	22	42	64
34	Lakshadweep	0	0	0	0	0	0	0	0	0	0	0	0
35	Pondicherry	130	85	215	0	0	0	81	138	219	3	2	5
	INDIA	14939	13996	28935	5634	4472	10106	10876	7147	18023	3902	2458	6360

(Contd.)

Table 15. *(Contd.)*

Sr. No.	States/Uts	Other (not included in specified faculity)						Total (Higher Education)					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
(1)	(2)	Boys (63)	Girls (64)	Total (65)	Boys (66)	Girls (67)	Total (68)	Boys (69)	Girls (70)	Total (71)	Boys (72)	Girls ((73)	Total (74)
1	Andhra Pradesh	1486	1447	2933	608	586	1194	76217	36232	112449	18792	7617	26409
2	Arunachal Pradesh	0	0	0	27	11	38	0	0	0	3233	2063	5296
3	Assam	428	201	629	368	166	534	13280	6847	20127	18732	9780	28512
4	Bihar	4107	1000	5107	238	58	296	56408	6725	63133	14664	4509	19173
5	Chhattisgarh	1210	642	1853	3280	1773	5053	12649	5738	18388	9280	4650	13930
6	Goa	26	29	55	1	1	2	133	122	255	142	69	211
7	Gujarat	1027	829	1856	2085	1773	3858	46234	20004	66238	26854	17560	44414
8	Haryana	3089	819	3908	0	0	0	14173	8791	22984	0	0	0
9	Himachal Pradesh	2045	345	2390	328	57	385	8081	4605	12686	2413	1734	4147
10	J&K	220	315	535	316	452	768	220	315	535	316	452	768
11	Jharkhand	177	53	230	385	121	506	3302	1743	5045	8877	8610	17486
12	Karnataka	10296	6292	16588	4167	2544	6711	32183	19495	51678	11398	6267	17664
13	Kerala	3618	4801	8419	427	553	980	13342	21667	35009	1385	2116	3501
14	Madhya Pradesh	7973	727	8700	10280	1009	11289	48147	15537	63684	30986	8504	39490
15	Maharashtra	7247	3778	11025	6223	3316	9539	75092	44464	119556	24902	10780	35682
16	Manipur	318	294	612	3982	3580	7562	539	541	1080	6096	5417	11513
17	Meghalaya	27	16	43	4560	3073	7633	253	190	443	13391	11801	25193
18	Mizoram	1	0	2	2923	2408	5331	1	0	2	6067	5180	11247
19	Nagaland	0	0	0	1403	341	1744	13	62	75	7691	5165	12856
20	Orissa	2449	1772	4221	3241	2402	5643	32092	11972	44064	18637	7132	25769
21	Punjab	8836	7115	15951	0	0	0	20205	17900	38105	0	0	0
22	Rajasthan	11259	3281	14540	8112	2444	10556	36935	18037	54972	19616	9372	28988
23	Sikkim	55	25	80	227	100	327	153	139	292	708	567	1275
24	Tamil Nadu	17450	10355	27804	967	563	1530	59851	43923	103773	2969	1477	4447
25	Tripura	17	16	34	31	29	60	2174	1430	3605	1578	953	2531
26	Uttar Pradesh	12864	3643	16507	39	11	50	167360	53087	220447	8051	2110	10161
27	Uttaranchal	598	413	1011	101	70	171	13154	5055	18209	1594	337	1931
28	West Bengal	1134	342	1476	266	83	349	59053	28835	87888	8045	3872	11918
29	A&N Islands	0	0	0	5	7	12	0	0	0	75	70	146
30	Chandigarh	1071	829	1900	0	0	0	1856	1718	3574	143	142	285
31	D&N Haveli	0	0	0	0	0	0	0	0	0	0	0	0
32	Daman & Diu	2	1	3	7	2	9	11	15	26	70	23	93
33	Delhi	3354	996	4349	0	0	0	13021	9027	22047	2171	1506	3677
34	Lakshadweep	0	0	0	137	77	214	0	0	0	137	77	214
35	Pondicherry	183	149	332	0	0	0	1473	1207	2680	22	19	41
	INDIA	102589	50525	153094	54733	27611	82344	807607	385423	1193030	269034	139932	408966

(Contd.)

Table 15. *(Contd.)*

Sr. No.	States/Uts	Polytechnic Insitutes						Teacher Training School					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(75)	(76)	(77)	(78)	(79)	(80)	(81)	(82)	(83)	(84)	(85)	(86)
1	Andhra Pradesh	1649	812	2461	660	325	985	341	197	538	126	61	187
2	Arunachal Pradesh	0	0	0	80	42	122	0	0	0	0	0	0
3	Assam	295	58	353	274	41	315	11	11	22	4	4	8
4	Bihar	305	35	340	69	16	85	29	27	56	2	2	4
5	Chhattisgarh	30	15	45	8	7	15	91	57	148	71	238	309
6	Goa	30	8	38	19	5	24	2	4	6	0	0	0
7	Gujarat	2727	619	3346	3099	626	3725	950	870	1820	1160	999	2159
8	Haryana	1964	324	2288	0	0	0	9	2	11	0	0	0
9	Himachal Pradesh	257	64	321	59	12	71	20	15	35	36	39	75
10	J&K	14	6	20	23	5	28	2	1	3	20	6	26
11	Jharkhand	105	20	125	55	5	60	20	35	55	7	12	19
12	Karnataka	5209	1659	6868	1045	210	1255	464	477	941	116	119	235
13	Kerala	1278	690	1968	1045	105	43	109	387	496	21	57	78
14	Madhya Pradesh	1851	845	2696	547	157	704	547	225	772	253	139	392
15	Maharashtra	187	36	223	204	63	267	1642	1138	2780	1226	571	1797
16	Manipur	25	14	39	82	20	102	0	0	0	1	0	1
17	Meghalaya	10	5	15	42	15	57	7	2	9	32	31	63
18	Mizoram	0	0	0	223	213	436	0	0	0	76	54	130
19	Nagaland	0	0	0	168	38	206	0	0	0	18	56	74
20	Orissa	399	170	569	611	261	872	380	330	710	240	178	418
21	Punjab	1985	563	2548	0	0	0	561	799	1360	0	0	0
22	Rajasthan	258	44	302	156	12	168	280	327	607	126	152	278
23	Sikkim	8	1	9	25	6	31	2	2	4	12	10	22
24	Tamil Nadu	1800	120	1920	77	15	92	588	599	1187	50	41	91
25	Tripura	53	24	77	103	31	134	21	23	44	65	69	134
26	Uttar Pradesh	1557	96	1653	24	5	29	416	142	558	5	2	7
27	Uttaranchal	168	102	270	40	34	74	213	90	303	27	27	54
28	West Bengal	1680	52	1732	141	21	162	687	195	882	174	56	230
29	A&N Islands	0	0	0	2	5	7	0	0	0	0	18	18
30	Chandigarh	102	45	147	3	3	6	3	3	6	3	2	5
31	D&N Haveli	11	6	17	50	24	74	0	0	0	0	0	0
32	Daman & Diu	11	3	14	1	0	1	0	9	9	0	16	16
33	Delhi	1033	190	1223	115	25	140	29	24	53	15	8	23
34	Lakshadweep	0	0	0	0	0	0	0	0	0	0	0	0
35	Pondicherry	177	105	282	0	0	0	14	12	26	0	0	0
	INDIA	25178	6731	31909	9050	2347	10290	7438	6003	13441	3886	2967	6853

(Contd.)

Table 15. *(Contd.)*

Sr. No.	States/Uts	Tech./Industrial, Art & Craft School						Hr. Secondary (XI-XII Classes)					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
(1)	(2)	Boys (87)	Girls (88)	Total (89)	Boys (90)	Girls (91)	Total (92)	Boys (93)	Girls (94)	Total (95)	Boys (96)	Girls (97)	Total (98)
1	Andhra Pradesh	15773	540	16313	7361	252	7613	162674	95950	258624	48728	20613	69341
2	Arunachal Pradesh	5	0	5	250	0	250	28	7	35	5648	3832	9480
3	Assam	367	138	505	497	333	830	28555	16394	44949	36355	22172	58527
4	Bihar	1943	89	2032	907	41	948	11073	8286	19359	577	530	1107
5	Chhattisgarh	2111	87	2198	985	41	1026	23809	13135	36944	44089	21284	65373
6	Goa	30	0	30	5	0	5	168	140	308	166	86	252
7	Gujarat	5794	157	5951	12416	336	12752	32261	21711	53972	35643	25268	60911
8	Haryana	2448	497	2945	0	0	0	30405	18776	49181	0	0	0
9	Himachal Pradesh	812	130	942	379	60	439	15450	11847	27297	3477	2768	6245
10	J&K	0	0	0	0	0	0	3932	3447	7379	3132	1940	5072
11	Jharkhand	671	46	716	313	21	334	2208	1083	3291	3314	2136	5450
12	Karnataka	7214	394	7607	3366	184	3550	56983	38221	95204	17784	10591	28375
13	Kerala	8605	233	8838	4016	109	4124	7136	10063	17199	745	850	1595
14	Madhya Pradesh	3089	233	3321	1441	109	1550	57549	26949	84498	39160	17868	57028
15	Maharashtra	12941	1289	14230	6039	601	6640	128305	88155	216460	52627	29988	82615
16	Manipur	7	5	12	113	73	186	407	282	689	2288	1819	4107
17	Meghalaya	8	1	9	742	44	786	426	362	788	8736	8233	16969
18	Mizoram	0	0	0	231	40	271	0	0	0	5322	5217	10539
19	Nagaland	0	0	0	268	83	351	0	0	0	7612	6222	13834
20	Orissa	3010	221	3231	1405	103	1508	16381	8459	24840	12982	7487	20469
21	Punjab	2415	923	3338	0	0	0	32561	24797	57358	0	0	0
22	Rajasthan	1627	110	1737	759	52	811	51881	14124	66005	37124	9846	46970
23	Sikkim	9	0	9	30	0	30	116	98	214	823	789	1612
24	Tamil Nadu	16580	441	17021	1658	46	1704	81224	81209	162433	2548	2538	5086
25	Tripura	47	13	60	22	6	28	3298	2010	5308	2899	1286	4185
26	Uttar Pradesh	6955	647	7602	3245	302	3548	111610	32190	143800	1853	932	2785
27	Uttaranchal	872	416	1288	176	108	284	12887	6578	19465	3050	2021	5071
28	West Bengal	1806	108	1914	843	50	893	78130	37679	115809	11107	4312	15419
29	A&N Islands	0	0	0	22	0	22	0	0	0	108	58	166
30	Chandigarh	162	60	222	0	0	0	183	104	287	0	0	0
31	D&N Haveli	4	0	4	165	12	177	45	24	69	640	336	976
32	Daman & Diu	11	0	11	46	0	46	54	54	108	37	37	74
33	Delhi	1277	419	1696	596	195	791	8585	7460	16045	82	73	155
34	Lakshadweep	0	0	0	74	15	89	0	0	0	497	421	918
35	Pondicherry	300	62	362	0	0	0	1585	1500	3085	0	0	0
	INDIA	96892	7257	104149	48370	3217	51587	959909	571094	1531003	389153	211553	600706

(Contd.)

Table 15. *(Contd.)*

Sr. No.	States/Uts	High/Post Basic (Classes IX-X)						Middle/Senior Basic (Classes VI-VIII)					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
(1)	(2)	Boys (99)	Girls (100)	Total (101)	Boys (102)	Girls (103)	Total (104)	Boys (105)	Girls (106)	Total (107)	Boys (108)	Girls (109)	Total (110)
1	Andhra Pradesh	166157	124876	291033	51934	28883	80817	364687	303923	668610	132367	84520	216887
2	Arunachal Pradesh	37	15	52	10630	8017	18647	110	67	177	21898	18736	40634
3	Assam	46318	40040	86358	65408	47173	112581	84623	76468	161091	127511	107647	235158
4	Bihar	55343	21040	76383	3087	1441	4528	166337	83608	249945	8277	3743	12020
5	Chhattisgarh	37201	21964	59165	69408	39253	108661	115812	87999	203811	187992	137652	325644
6	Goa	260	231	491	612	507	1119	591	572	1163	1399	1283	2682
7	Gujarat	61121	36885	98006	75213	53987	129200	141486	112795	254281	194298	153886	348184
8	Haryana	49931	34792	84723	0	0	0	130416	103306	233722	0	0	0
9	Himachal Pradesh	26182	23211	49393	4600	3927	8527	57496	53108	110604	10612	9096	19708
10	J&K	9550	8197	17747	7727	4754	12481	22978	19415	42393	24780	14305	39085
11	Jharkhand	21702	9406	31108	44218	25451	69669	59346	34927	94273	124747	79660	204407
12	Karnataka	120218	92943	213161	43795	33619	77414	327064	255264	582328	114633	88519	203152
13	Kerala	50652	51025	101677	4147	4005	8152	86964	77875	164839	9210	8214	17424
14	Madhya Pradesh	119487	60253	179740	90646	42397	133043	343835	204881	548716	271101	165309	436410
15	Maharashtra	232281	191747	424028	109503	71011	180514	481112	413581	894693	274634	218044	492678
16	Manipur	1456	1302	2758	9470	8083	17553	2673	2527	5200	18851	15962	34813
17	Meghalaya	462	377	839	14105	14588	28693	1201	1212	2413	46347	53749	100096
18	Mizoram	0	0	0	12564	13121	25685	0	0	0	26112	24984	51096
19	Nagaland	0	0	0	12185	11038	23223	0	0	0	35773	31547	67320
20	Orissa	67802	49253	117055	57155	37485	94640	144423	109508	253931	126881	84968	211849
21	Punjab	79416	71593	151009	0	0	0	186802	167650	354452	0	0	0
22	Rajasthan	109311	35450	144761	78457	24897	103354	303261	147570	450831	210046	101819	311865
23	Sikkim	249	194	443	1498	1665	3163	628	740	1368	3909	4834	8743
24	Tamil Nadu	165614	151203	316817	9225	8269	17494	352559	323565	676124	23198	21418	44616
25	Tripura	8122	6892	15014	11849	8811	20660	18715	16632	35347	26110	20703	46813
26	Uttar Pradesh	317867	64793	382660	4773	1569	6342	734717	269712	1004429	9186	4302	13488
27	Uttaranchal	29191	17173	46364	4534	3502	8036	73048	58028	131076	9540	8920	18460
28	West Bengal	180080	117188	297268	32538	16644	49182	478450	369996	848446	86596	55517	142113
29	A&N Islands	0	0	0	436	486	922	0	0	0	1002	845	1847
30	Chandigarh	730	684	1414	0	0	0	2478	2100	4578	0	0	0
31	D&N Haveli	73	59	132	1752	987	2739	140	127	267	5318	2983	8301
32	Daman & Din	146	111	257	216	137	353	204	189	393	556	422	978
33	Delhi	17541	14943	32484	144	131	275	44711	39633	84344	300	282	582
34	Lakshadweep	0	0	0	1343	1204	2547	0	0	0	2479	2043	4522
35	Pondicherry	3529	3409	6938	0	0	0	6900	6463	13363	0	0	0
	INDIA	1978029	1251249	3229278	833172	517042	1350214	4733767	3343441	8077208	2135663	1525912	3661575

(Contd.)

Table 15. *(Concld.)*

Sr. No.	States/Uts	Primary/Jr. Basic (Classes I-V)						Pre-Primary/Pre-Basic Stage					
		Number of Students Belonging to											
		Scheduled Castes			Scheduled Tribes			Scheduled Castes			Scheduled Tribes		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(111)	(112)	(113)	(114)	(115)	(116)	(117)	(118)	(119)	(120)	(121)	(122)
1	Andhra Pradesh	806308	777643	1583951	450552	408980	859532	34315	31783	66098	21812	20188	42000
2	Arunachal Pradesh	188	104	292	70660	60388	131048	52	39	91	12155	9572	21727
3	Assam	171588	160193	331781	243304	232269	475573	31254	29979	61233	69162	67988	137150
4	Bihar	946726	569108	1515834	51216	28831	0.80047	0	0	0	0	0	0
5	Chhattisgarh	247054	218139	465193	535464	493765	1029229	3168	1834	5002	5390	4176	9566
6	Goa	1232	1214	2446	1803	1648	3451	0	0	0	0	0	0
7	Gujarat	220741	200065	420806	558586	512918	1071504	11586	9231	20817	6689	5861	12550
8	Haryana	296464	266672	563136	0	0	0	13875	12092	25967	0	0	0
9	Himachal Pradesh	103336	98053	201389	18664	18037	36701	427	263	690	69	36	105
10	J&K	45838	46069	91907	71233	53487	124720	4029	2812	6841	711	187	898
11	Jharkhand	240354	163998	404352	552509	414343	966852	5173	4636	9809	5389	4518	9907
12	Karnataka	666683	595925	1262608	243720	227120	470840	0	0	0	0	0	0
13	Kerala	132476	125350	257826	17941	16822	34763	0	0	0	0	0	0
14	Madhya Pradesh	853479	710790	1564269	994883	743572	1738455	0	0	0	0	0	0
15	Maharashtra	861101	805028	1666129	665778	583085	1248863	202191	187982	390173	139006	129238	268244
16	Manipur	4306	3937	8243	63681	53874	117555	1747	1660	3407	24973	22971	47944
17	Meghalaya	1146	964	2110	142426	143681	286107	905	927	1832	74001	75572	149573
18	Mizoram	0	0	0	66170	60707	126877	0	0	0	0	0	0
19	Nagaland	0	0	0	97832	85578	183410	0	0	0	49609	44443	94052
20	Orissa	529681	470835	1000516	645697	542495	1188192	0	0	0	0	0	0
21	Punjab	485299	442843	928142	0	0	0	1268	920	2188	0	0	0
22	Rajasthan	1019982	814573	1834555	733797	591375	1325172	14393	10071	24464	5472	6739	12211
23	Sikkim	2449	2580	5029	13059	13721	26780	849	699	1548	4135	3862	7997
24	Tamil Nadu	713998	636979	1350977	53188	33601	0	0	0	0	0	0	0
25	Tripura	46991	43615	90606	93905	80879	174784	20951	19340	40291	30525	29328	59853
26	Uttar Pradesh	2594545	1533620	4128165	22974	14939	37913	876	433	1309	0	0	0
27	Uttaranchal	148391	146502	294893	19366	19887	39253	0	0	0	0	0	0
28	West Bengal	1499255	1415520	2914775	326981	286694	613675	0	0	0	0	0	0
29	A&N Islands	0	0	0	1820	1624	3444	0	0	0	48	51	99
30	Chandigarh	5041	4435	9476	0	0	0	367	265	1 632	0	0	0
31	D&N Haveli	316	296	612	13203	11638	24841	0	0	0	0	0	0
32	Daman & Diu	364	326	690	1118	994	2112	58	34	92	32	21	53
33	Delhi	109926	100778	210704	882	781	1663	3947	3229	7176	37	25	62
34	Lakshadweep	0	0	0	3786	3304	7090	0	0	0	509	592	1101
35	Pondicherry	9158	8940	18098	0	0	0	2257	2032	4289	0	0	0
	INDIA	12764416	10365094	23129510	6776198	5741037	12517235	353688	320261	673949	449724	425368	875092

TABLE 16. Dropout Rates in Classes I-V, I-VIII and I-X, 2003-2004

Sr. No.	STATE/UTs	Classes I-V			Classes I-VIII			Classes I-X		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
1	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Andhra Pradesh	42.42	42.8	42.61	57.93	61.78	59.79	65.08	68.53	66.70
2	Arunachal Pradesh	48.07	46.67	46.34	64.38	62.46	63.52	71.40	73.02	72.09
3	Assam	54.70	51.36	53.15	69.54	72.41	70.81	75.07	74.57	74.84
4	Bihar	59.05	58.99	59.03	77.00	79.62	78.03	80.97	85.36	82.58
5	Chhattisgarh	-	-	-	-	-	-	-	-	-
6	Goa	-5.53	1.01	-1.90	6.15	12.91	9.43	37.64	38.26	37.94
7	Gujarat	27.42	24.17	26.02	45.09	49.48	46.94	62.38	63.96	63.05
8	Haryana	13.24	13.39	13.31	19.03	23.92	21.26	19.37	34.85	26.54
9	Himachal Pradesh	15.87	18.15	16.98	13.29	15.32	14.28	31.85	33.03	32.42
10	J&K	36.04	37.44	36.65	51.26	41.87	47.49	60.51	59.93	60.26
11	Jharkhand	-	-	-	-	-	-	-	-	-
12	Karnataka	10.10	9.36	9.75	50.29	50.94	50.59	59.67	61.16	60.38
13	Kerala	0.00	0.00	0.00	-12.55	-6.40	-9.54	12.13	4.88	8.58
14	Madhya Pradesh	24.74	22.58	23.78	44.41	49.99	46.81	58.97	70.29	63.81
15	Maharashtra	12.40	13.81	13.07	30.71	36.01	33.25	50.22	54.11	52.06
16	Manipur	26.42	26.41	26.41	31.52	29.59	30.61	51.55	46.11	49.02
17	Meghalaya	53.92	52.91	53.42	70.67	71.59	71.13	83.52	82.95	83.24
18	Mizoram	55.95	55.23	55.61	65.18	63.08	64.19	72.08	67.18	69.74
19	Nagaland	31.43	34.27	32.81	46.76	42.73	44.83	71.85	72.10	71.97
20	Orissa	41.19	34.36	38.19	64.58	57.51	61.72	86.13	62.59	64.72
21	Punjab	23.60	20.21	22.03	35.13	35.26	35.19	42.57	44.42	43.45
22	Rajasthan	50.29	55.83	57.94	64.64	73.87	68.50	71.63	81.78	75.47
23	Sikkim	56.93	50.69	53.85	76.63	69.62	73.29	81.80	79.71	80.82
24	Tamil Nadu	3.42	3.04	3.23	25.35	24.92	25.15	60.61	56.45	58.82
25	Tripura	45.07	44.80	44.80	62.64	66.10	64.29	74.77	73.78	74.31
26	Uttar Pradesh	23.03	-1.91	13.51	44.96	39.46	42.84	40.75	49.42	44.10
27	Uttaranchal*	-	-	-	-	-	-	-	-	-
28	West Bengal	34.12	32.73	33.46	62.72	84.92	63.77	76.37	84.44	80.24
29	A&N Islands	-1.10	0.47	-0.35	18.67	19.07	18.86	53.44	47.67	50.68
30	Chandigarh	-7.94	-1.25	-3.62	-1.23	-2.91	-2.03	14.57	9.27	12.13
31	D&N Haveli	21.38	36.55	28.40	35.81	56.61	45.24	70.97	74.31	72.48
32	Daman & Diu	0.00	0.00	0.00	12.05	23.14	17.36	50.29	50.62	50.45
33	Delhi	15.71	28.73	22.03	26.43	29.02	27.71	44.12	48.56	46.30
34	Lakshadweep	0.00	1.09	3.03	-1.35	11.66	4.90	47.51	36.53	42.24
35	Pondicherry	0.00	0.00	0.00	-3.20	-6.11	-4.60	25.72	20.04	22.96
	INDIA	33.74	28.57	31.47	51.85	52.92	52.32	80.98	84.92	62.69

* Dropout rates are shown combined with the respective parent state.

Table 17. Dropout Rates of SC Students in classes I-V, I-VIII and I-X, 2003-2004

Sl. No.	State/UTs	Classes I-V			Classes I-VIII			Classes I-X		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Andhra Pradesh	44.09	46.12	45.09	63.41	68.87	66.05	71.18	75.93	73.41
2	Arunachal Pradesh	21.88	32.26	26.98	54.55	50.00	52.54	60.00	58.82	59.26
3	Assam	58.58	52.83	56.00	67.28	67.64	67.44	72.56	68.87	70.90
4	Bihar	46.88	45.42	46.36	83.37	84.68	83.85	89.31	91.46	90.02
5	Chhattisgarh*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Goa	34.88	31.21	33.10	43.12	41.90	42.53	57.56	59.40	58.52
7	Gujarat	28.83	23.71	26.44	39.50	59.11	48.43	69.42	80.47	74.78
8	Haryana	19.29	19.90	19.58	39.14	47.82	43.20	52.25	63.83	57.70
9	Himachal Pradesh	13.01	17.54	15.27	30.19	32.52	31.33	47.70	48.46	48.06
10	J&K	35.54	11.15	25.78	33.66	33.98	33.80	62.94	60.84	61.99
11	Jharkhand*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Karanataka	6.12	14.03	9.97	27.19	51.62	38.62	64.13	69.44	66.66
13	Kerala	0.00	0.00	0.00	0.00	0.00	0.00	26.13	16.51	21.43
14	Madhya Pradesh	21.41	19.26	20.48	39.40	51.10	44.37	71.55	80.01	75.08
15	Maharashtra	17.02	18.21	17.59	30.03	38.22	33.98	51.46	55.89	53.59
16	Manipur	31.06	19.62	25.51	0.00	0.00	0.00	18.68	19.64	19.14
17	Meghalaya	58.20	59.34	58.72	68.61	69.09	68.84	74.27	79.88	77.02
18	Mizoram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	Nagaland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	Orissa	44.99	42.36	43.81	63.73	67.17	65.26	72.32	75.09	73.55
21	Punjab	33.22	29.27	31.37	54.67	51.50	53.19	63.75	64.83	64.27
22	Rajasthan	53.07	36.29	47.69	69.65	80.07	73.87	78.53	87.65	81.76
23	Sikkim	61.07	43.05	52.99	80.51	72.58	76.98	89.12	90.11	89.56
24	Tamil Nadu	27.08	26.75	26.95	42.97	38.90	41.09	64.23	63.13	63.71
25	Tripura	35.85	35.88	35.87	61.95	69.07	65.41	76.61	78.62	77.55
26	Uttar Pradesh	45.69	56.40	49.84	63.46	75.45	67.96	73.78	90.21	79.93
27	Uttaranchal*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	West Bengal	37.82	36.58	37.25	66.40	67.34	66.80	76.46	78.11	77.11
29	A&N Islands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	Chandigarh	4.20	15.28	9.58	55.02	56.19	55.57	87.15	80.53	84.44
31	D&N Haveli	16.13	18.03	17.07	27.59	24.53	26.13	54.90	33.33	45.16
32	Daman & Diu	0.00	0.00	0.00	0.00	0.00	0.00	29.58	33.90	31.54
33	Delhi	32.64	49.05	41.62	0.00	0.00	0.00	76.27	77.30	76.75
34	Lakshadweep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	Pondicherry	0.00	0.00	0.00	0.00	0.00	0.00	24.86	23.06	23.97
	INDIA	36.83	36.19	36.56	57.33	62.19	59.42	71.41	76.49	73.13

* Dropout rates are shown combined with the respective parent state.

Table 18. Dropout Rates of ST Students in Classes I-V, I-VIII and I-X, 2003-2004

Sl. No.	State/UTs	Classes I-V			Classes I-VIII			Classes I-X		
		Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Andhra Pradesh	63.29	68.47	65.76	76.80	82.49	79.33	82.81	87.57	84.83
2	Arunachal Pradesh	48.58	48.37	48.48	68.07	68.12	68.09	75.88	77.70	76.69
3	Assam	61.30	53.20	57.80	71.80	75.26	73.25	77.92	75.63	76.94
4	Bihar	62.28	59.51	61.22	81.71	84.39	82.84	88.14	90.41	89.05
5	Chhattisgarh*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Goa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Gujarat	36.18	43.10	39.35	66.45	68.66	67.41	80.21	82.93	81.45
8	Haryana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Himachal Pradesh	10.87	10.79	10.83	14.07	26.69	20.29	44.65	48.31	46.41
10	J&K	43.48	39.16	41.76	41.77	50.35	45.45	73.07	77.65	75.03
11	Jharkhand*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Karanataka	4.88	4.96	4.92	53.81	56.80	55.19	59.62	63.92	61.61
13	Kerala	6.13	9.46	7.75	33.49	37.54	35.45	56.86	49.71	53.43
14	Madhya Pradesh	35.26	38.91	36.89	56.80	61.61	58.80	71.23	79.28	74.51
15	Maharashtra	34.42	42.82	38.38	59.12	65.14	61.91	70.51	82.44	76.18
16	Manipur	38.77	54.99	46.96	62.11	60.91	61.56	78.98	78.98	78.98
17	Meghalaya	56.76	54.43	55.60	76.32	76.21	76.27	87.22	86.12	86.67
18	Mizoram	55.57	54.82	55.21	64.58	62.59	63.64	71.90	66.98	69.55
19	Nagaland	35.36	34.49	34.95	60.88	57.58	59.34	66.81	67.90	67.33
20	Orissa	59.58	63.19	61.20	76.49	76.56	76.52	83.30	84.01	83.58
21	Punjab	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Rajasthan	52.19	38.31	47.80	70.42	79.63	74.00	78.77	87.04	81.53
23	Sikkim	25.25	-1.13	12.60	58.18	40.44	49.74	76.94	71.79	74.52
24	Tamil Nadu	16.82	12.00	15.37	48.76	3.54	32.73	66.68	55.08	61.49
25	Tripura	58.06	61.25	59.56	79.75	82.04	80.82	85.71	87.38	86.47
26	Uttar Pradesh	25.68	19.40	23.11	34.03	31.75	33.07	46.01	60.69	52.11
27	Uttaranchal*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	West Bengal	67.76	51.55	62.41	84.89	78.68	83.05	80.72	71.60	78.80
29	A&N Islands	0.58	5.47	2.97	24.16	26.02	26.03	60.10	41.60	51.52
30	Chandigarh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	D&N Haveli	28.17	45.01	35.99	43.54	65.37	53.42	76.77	82.78	79.45
32	Daman & Diu	-3.88	3.48	-0.41	26.01	38.65	31.81	76.41	77.06	76.69
33	Delhi	78.66	82.72	80.62	79.62	81.42	80.49	77.81	79.81	78.63
34	Lakshadweep	0.00	1.10	3.03	-10.66	8.12	-1.38	48.04	37.55	42.98
35	Pondicherry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	INDIA	49.13	48.67	48.93	69.04	71.43	70.05	77.92	81.16	79.25

* Dropout rates are shown combined with the respective parent state.

Table 19. Educational Attainment Level by Age and Sex for Population Age 7 and above, India, 2001 (All Ages), 2003-04

	Educational Level	Total			Rural			Urban		
		Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Total	1028610328	532156772	496453556	742490639	381602674	360887965	286119689	150554098	135565591
2	Illiterate	467922531	195623056	272299475	380619822	1580581033	222568789	87302709	37572023	49730686
3	Literate	560687797	336533716	224154081	361870817	223551641	138319176	198816980	112962075	85834905
4	Literate without Educational Level	20022966	11361139	8661827	14615424	8387028	6228396	5407542	2974111	2433431
5	Below Primary	144831273	81148130	63683143	110003318	62657511	47345807	34827955	18490619	16337336
6	Primary	146740047	83525450	63214597	102382680	60231957	42142723	44357367	23285493	21071874
7	Middle	90226846	55940422	34286424	58782622	38086609	20696013	31444224	17853813	13590411
8	Matric/Secondary	79229721	51201516	28028205	43960211	30254014	13706197	35269510	20947502	14322008
9	Higher Secondary/Intermediate Pre-University/ Senior Secondary	37816215	24596339	13219876	18164354	13010597	5153757	19651861	11585742	8066119
10	Non-Technical Diploma or certificate not equal to degree	386146	258804	127542	145667	92944	52723	240479	165660	74819
11	Technical Diploma or certificate not equal to degree	3666880	2900838	765841	1599821	1267869	331952	2066859	1632970	433889
12	Completed Upper/Post Secondary Non-Teritary									
13	Graduate and Above	37670147	25533308	12136839	112160507	9515428	2645079	25509640	16017880	9491760
14	Unclassified	97756	67969	29787	56213	39684	16529	41543	28285	13258

Table 20. Expenditure by Level of Education in India, 2003-04

(in Crore)

Year	Total Expenditure on Education and Trg. (Rev) by Education and Other Departments															Total exp. on all Sectors (Rev)	GDP at Current Prices (at Factor Cost) Base Year 1993-94
	Elementary			Secondary/Higher Secondary			Adult Education			University & Higher Education*			Total				
	Expen-diture	% age to GDP	% age to Total exp. on all Sector	Expen-diture	% age to GDP	% age to Total exp. on all Sector	Expen-diture	% age to GDP	% age to Total exp. on all Sector	Expen-diture	% age to GDP	% age to Total exp. on all Sector	Expen-diture	% age to GDP	% age to Total exp. on all Sector		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1990-1991	9,076.28	1.78	6.19	6,310.33	1.24	4.30	273.15	0.05	0.19	3,956.09	0.77	2.70	19,615.85	3.84	13.37	146,711.53	510,954
1991-1992	10,367.83	1.76	6.09	7,400.56	1.26	4.34	228.52	0.04	0.13	4,396.78	0.75	2.58	22,393.69	3.80	13.14	170,370.38	589,086
1992-1993	11,321.50	1.68	5.95	8,574.97	1.27	4.51	210.97	0.03	0.11	4,922.90	0.73	2.59	25,030.30	3.72	13.15	190,327.45	673,221
1993-1994	13,071.14	1.67	5.98	9,371.34	1.20	4.29	280.01	0.04	0.13	5,557.20	0.71	2.54	28,279.69	3.62	12.94	218,535.15	781,345
1994-1995	15,133.05	1.65	6.01	10,835.33	1.18	4.30	338.31	0.04	0.13	6,299.53	0.69	2.50	32,606.22	3.56	12.95	251,691.92	917,058
1995-1996	18,433.93	1.72	6.44	12,530.38	1.17	4.38	259.71	0.02	0.09	6,954.07	0.65	2.43	38,178.09	3.56	13.34	286,194.55	1,073,271
1996-1997	21,543.63	1.73	6.54	14,164.00	1.14	4.30	205.74	0.02	0.06	7,983.11	0.64	2.42	43,896.48	3.53	13.33	329,389.92	1,243,547
1997-1998	24,083.17	1.73	6.49	15,663.50	1.13	4.22	209.80	0.02	0.06	8,595.67	0.62	2.32	48,552.14	3.49	13.09	370,838.48	1,390,148
1998-1999	30,191.07	1.89	6.87	20,100.97	1.26	4.57	189.45	0.01	0.04	11,097.42	0.69	2.52	61,578.91	3.85	14.00	439,768.11	1,598,127
1999-2000	34,068.78	1.93	6.65	25,447.89	1.44	4.97	186.53	0.01	0.04	15,112.89	0.86	2.95	74,816.09	4.25	14.60	512,519.32	1,761,838
2000-01	39,274.60	2.06	6.86	26,057.50	1.37	4.55	226.12	0.01	0.04	16,928.21	0.89	2.96	82,486.43	4.33	14.42	572,160.14	1,902,998
2001-02	40,019.36	1.91	6.46	25,163.47	1.20	4.06	359.56	0.02	0.06	14,323.32	0.69	2.31	79,865.71	3.82	12.89	619,713.14	2,090,957
2002-03	41,747.26	1.86	6.15	27,498.97	1.22	4.05	402.25	0.02	0.06	15,858.83	0.70	2.34	85,507.31	3.80	12.60	678,548.31	2,249,493
2003-04RE	47,409.51	1.88	6.17	29,718.60	1.18	3.87	460.28	0.02	0.06	17,064.13	0.68	2.22	94,652.52	3.76	12.31	768,852.27	2,519,785

* Including expendiure on Physical education, Technical education,Language, development etc.
Note: Expenditures on education by other Departments has been distributed by level, on the basis of expenditure (%)by education departments
RE: Revised Estimates

Table 21. Household Expenditure on Education and its Percentage to Total Government Expenditure on Education, 2003-04

(Rs. in Crore)

S.No.	STATES/UTS	Govt. Expenditure (Actual) on Edu. & Trg. by Edu. and other deptts. 2001-02	Household** Expenditure on Education as per NSSO 57th Round 2001-02	% age of Household Expenditure to Govt. Expenditure.
(1)	(2)	(3)	(4)	(5)
1	Andhra Pradesh	4,866.27	1,938.35	39.83
2	Assam	2,010.51	510.75	25.40
3	Bihar	2,537.27	1,287.15	50.73
4	Chhattisgarh	1,102.68	345.81	31.36
5	Gujarat	3,444.30	1,824.23	52.96
6	Haryana	1,637.65	1,258.07	76.82
7	Himachal Pradesh	885.56	239.26	27.02
8	Jammu & Kashmir	904.60	532.49	58.86
9	Jharkhand	-	638.03	-
10	Karnataka	3,570.92	1,466.08	41.06
11	Kerala	2,760.72	1,493.46	54.10
12	Madhya Pradesh	2,741.70	1,299.19	47.39
13	Maharashtra	10,492.33	3,431.69	32.71
14	Manipur	305.96	99.02	32.36
15	Meghalaya	254.59	55.40	21.76
16	Mizoram	188.74	32.31	17.12
17	Orissa	1,885.79	450.60	23.89
18	Punjab	1,962.70	1,355.07	69.04
19	Rajasthan	3,572.03	1,110.26	31.08
20	Tamil Nadu	5,019.26	2,662.19	53.04
21	Tripura	457.65	106.38	23.24
22	Uttar Pradesh	6,427.91	4,139.83	64.40
23	West Bengal	5,682.02	3,496.83	61.54
24	Delhi	1,127.35	1,516.83	134.55
25	Other small states	1,438.00	193.60	13.46
26	All UTs	469.70	419.47	89.31
	States/UTs Total	65,746.19	30,810.86	46.86
	Central*	14,119.52	-	-
	INDIA	79,865.71	30,810.86	38.58

* Statewise central expenditure is not available.
** The total expenditure will not tally because of coverage gaps and small sample size in UTs and some N.E. States.

Table 22. Budgeted Expenditure on Education by Education Department and Other Departments, 1998-99 to 2000-01

(Rs in crore)

	1998-99 (Actual) Expenditure on Education			1999-2000 (RE) Expenditure on Education			2000-2001 (BE) Expenditure on Education		
	Education Deptt.	Other Depts.	Total	Education Deptt.	Other Depts.	Total	Education Deptt.	Other Depts.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Centre									
Revenue	6,323.34	3,352.22	9,675.56	7,317.68	3,827.15	11,144.83	8,384.98	4,431.34	12,816.32
			(4.45)			(4.40)			(4.56)
Capital	0.96	0.00	0.96	0.98	0.00	0.98	0.98	0.00	0.98
			(0.0)			(0.0)			(0.0)
Loans and Advances	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			(0.0)			(0.0)			(0.0)
Total	6,324.30	3,352.22	9,676.52	7,318.66	3,827.15	11,145.81	8,385.96	4,431.34	12,817.30
			(3.46)			(3.67)			(3.79)
States/UTs									
Revenue	44,901.92	7,001.43	51,903.35	57,323.51	8,587.96	65,911.47	56,510.78	8,520.56	65,031.34
			(23.34)			(24.03)			(22.17)
Capital	431.91	0.00	431.91	484.56	0.00	484.56	386.86	0.00	386.86
			(1.22)			(1.17)			(0.82)
Loans and Advances	7.72	0.00	7.72	3.94	0.00	3.94	1.04	0.00	1.04
			(0.07)			(0.03)			(0.01)
Total	45,341.55	7,001.43	52,342.98	57,812.01	8,587.96	66,399.97	56,898.68	8,520.56	65,419.24
			(19.45)			(20.19)			(18.48)
Total (Centre + States/UTs)									
Revenue	51,225.26	10,353.65	61,578.91	64,641.19	12,415.11	77,056.30	64,895.76	12,951.90	77,847.66
			(14.00)			(14.61)			(13.55)
Capital	432.87	0.00	432.87	485.54	0.00	485.54	387.84	0.00	387.84
			(0.54)			(0.62)			(0.39)
Loans and Advances	7.72	0.00	7.72	3.94	0.00	3.94	1.04	0.00	1.04
			(0.03)			(0.01)			(0.01)
Total	51,665.85	10,353.65	62,019.50	65,130.67	12,415.11	77,545.78	65,284.64	12,951.90	78,236.54
			(11.31)			(12.26)			(11.30)

Note:- Figures in brackets indicate percentage to total budget of all Sectors.

Table 23. Budgeted Expenditure on Education by Education Department and Other Departments, 2002-03 to 2004-05

(Rs. in crore)

	2002-03 (Actual) Expenditure on Education			2003-04 (RE) Expenditure on Education			2004-05 (BE) Expenditure on Education		
	Education Deptt.	Other Depts.	Total	Education Deptt.	Other Depts.	Total	Education Deptt.	Other Depts.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Centre									
Revenue	9,089.23	7,067.38	16,156.61 (4.76)	10,287.00	7,158.19	17,445.10 (4.81)	11,062.07	8,079.35	19,141.42 (4.97)
Capital	0.00	0.00	0.00 (0.00)	0.01	0.00	0.01 (0.00)	0.01	0.00	0.01 (0.00)
Loans and Advances	0.00	0.00	0.00 (0.00)	0.00	0.00	0 (0.00)	0.00	0.00	0.00 (0.00)
Total	9,089.23	7,067.38	16,156.61 (3.90)	10,287.01	7,158.19	17,445.20 (3.68)	11,062.08	8,079.35	19,141.43 (4.01)
States/UTs									
Revenue	59,472.32	9,878.41	69,350.73 (20.46)	66,100.34	11,106.97	77,207.30 (19.02)	69,224.82	10,688.41	79,913.23 (18.93)
Capital	374.27	0.00	374.27 (0.52)	868.39 (0.67)	0.00	868.39	865.92	0	865.92 (0.51)
Loans and Advances	7.78	0.00	7.78 (0.05)	14.60	0.00	14.60 (0.06)	16.6	0.00	16.60 (0.11)
Total	59,854.37	9,878.41	69,732.78 (16.42)	66,983.33	11,106.97	78,090.30 (13.98)	70,107.34	10,688.41	80,795.75 (13.34)
Total (Centre+States/UTs)									
Revenue	68,561.55	16,945.79	85,507.34 (12.60)	76,387.34	18,265.16	94,652.50 (12.31)	80,286.89	18,767.76	99,054.65 (12.27)
Capital	374.27	0.00	374.27 (0.41)	868.40 (0.54)	0.00	868.40	865.93	0.00	865.93 (0.34)
Loans and Advances	7.78	0.00	7.78 (0.01)	14.60 (0.01)	0.00	14.60	16.60	0.00	16.60 (0.09)
Total	68,943.60	16,945.79	85,889.39 (10.24)	77,270.34	18,265.16	95,535.50 (9.25)	81,169.42	18,767.76	99,937.18 (9.23)

Note:- Figures in brackets indicate percentage to total budget of all Sectors.

Table 24. Relationship Between Budgeted Expenditure on Education and State Domestic Product of States/UTs, 1998-99 to 2000-01

(1)	State/ UTs (2)	Year (3)	Estimates of Net Domastic Product at Current Prices (Rs. in crore) (4)	%age of edu. & Trg. Budget to Total Revenue Budget (5)	%age of Total Budget (Revenue) to Net S. D. P. (6)	%age to Total Budget Exp. on Education Deptt. (Rev.) to Net S. D. P. (7)	%age to Total Budget Exp. on Education and Training (Rev.) to Net S. D. P. (8)
1	Andhra Pradesh	1998-99	102876 #	21.83	16.47	2.60	3.60
2	Arunachal Pradesh	1999-00	1533 $	15.64	56.93	8.29	8.90
3	Assam	1999-00	25051 $	31.54	28.76	8.40	9.07
4	Bihar	1999-00	62759 $	28.50	25.70	6.66	7.32
5	Goa	1997-98	3581 &	16.99	31.33	4.75	5.32
6	Gujarat	1998-99	88822 #	23.74	17.57	3.48	4.17
7	Haryana	1999-00	41627 $	20.08	17.47	2.93	3.51
8	Himachal Pradesh	1998-99	8210 #	22.45	40.61	8.30	9.12
9	Jammu and Kashmir	1998-99	9862 #	14.33	35.28	4.41	5.06
10	Karnataka	1998-99	81276 #	22.11	15.31	3.08	3.39
11	Kerala	1998-99	56563 #	23.60	16.31	3.39	3.85
12	Madhya Pradesh	1998-99	78946 #	23.49	18.01	3.21	4.23
13	Maharashtra	1998-99	204120 #	23.79	12.57	2.53	2.99
14	Manipur	1999-00	2384 $	30.92	60.23	17.64	18.63
15	Meghalaya	1999-00	2806 $	21.14	38.59	7.36	8.16
16	Mizoram	1997-98	1022 &	17.86	64.73	10.01	11.56
17	Nagaland	1997-98	2137 &	14.77	40.49	4.88	5.98
18	Orissa	1998-99	30857 #	24.77	22.10	4.73	5.47
19	Punjab	1998-99	47900 #	22.87	17.50	3.50	4.00
20	Rajasthan	1999-00	58650 $	23.32	23.64	5.17	5.51
21	Sikkim	1997-98	591 &	5.13	212.88	9.85	10.93
22	Tamil Nadu	1999-00	115644 $	23.33	17.44	3.57	4.07
23	Tripura	1999-00	3647 $	26.25	41.75	9.82	10.96
24	Uttar Pradesh	1999-00	164630 $	22.48	18.57	3.56	4.17
25	West Bengal	2000-01	143411 $	19.25	14.40	2.53	2.77
26	Delhi	2000-01	52804 $	33.23	8.02	2.48	2.66
	GRAND TOTAL	2000-01	1989480 $	13.55	28.87	3.26	3.91

& = Provisional; # = Quick Estimates; $ = Advance Estimates

Table 25. Relationship Between Budgeted Expenditure on Education and State Domestic Product of States/UTs, 2002-03 to 2004-05

Sr. No.	State/ UTs.	Year	Estimates of Net State Domestic product at current prices (Rs. in crore)	%age of Edu. & Trg. Budget to Total Revenue Budget	%age to Total Budget (Revenue) to Net S.D.P.	%age to Total Budget Exp. on Education Deptt. (Rev.) to S.D.P.	%age to Total Budget of Education and Training (Rev.) to S.D.P.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Andhra Pradesh	2003-04	162153	19.45	18.70	2.68	3.64
2	Arunachal Pradesh	2002-03	1747	16.04	59.04	7.89	9.47
3	Assam	2003-04	35943	22.38	32.29	6.51	7.23
4	Bihar	2003-04	54211	26.14	26.99	6.51	7.05
5	Chhattisgarh	2002-03	25094	26.99	22.04	2.8	5.95
6	Goa	2002-03	7298	14.93	27.41	3.55	4.09
7	Gujarat	2003-04	142559	17.89	16.56	2.51	2.96
8	Haryana	2003-04	66325	17.2	16.09	2.32	2.77
9	Himachal Pradesh	2002-03	14202	20.03	36.20	6.47	7.25
10	Jammu & Kashmir	2001-02	13697	14.77	44.70	5.74	6.6
11	Jharkhand	2002-03	27358	13.94	28.28	3.76	3.94
12	Karnataka	2002-03	100406	21.05	18.74	3.47	3.94
13	Kerala	2003-04	78933	24.31	20.56	4.50	5.00
14	Madhya Pradesh	2003-04	89236	17.37	22.37	2.62	3.89
15	Maharashtra	2003-04	286043	23.45	16.15	3.22	3.79
16	Manipur	2003-04	3571	18.08	52.59	8.49	9.51
17	Meghalaya	2002-03	3842	19.44	31.35	5.63	6.09
18	Mizoram	2001-02	1777	16.73	63.49	9.76	10.62
19	Nagaland	2001-02	3864	13.50	37.54	4.71	5.07
20	Orissa	2003-04	44990	16.80	28.10	4.21	4.72
21	Punjab	2003-04	69841	14.53	24.65	3.20	3.58
22	Rajasthan	2003-04	89075	20.50	21.75	4.16	4.46
23	Sikkim	2003-04	1233	13.50	86.76	10.56	11.71
24	Tamil Nadu	2003-04	149654	20.23	17.74	2.96	3.59
25	Tripura	2001-02	5660	25.24	32.03	7.12	8.09
26	Uttar Pradesh	2002-03	176076	20.56	18.71	3.32	3.85
27	Uttaranchal	2001-02	11361	25.30	24.93	5.76	6.31
28	West Bengal	2002-03	153781	20.18	15.06	2.82	3.04
29	Delhi	2002-03	68747	26.33	6.69	1.62	1.76
	ALL INDIA	2004-05	2838123	12.27	28.46	2.83	3.49

a = Advance Estimates, * provisional

Table 26. Total State Budgeted Expednditure on Education and Training (Revenue Account), 1998-99 to 2000-01

(Rs in thousand)

S. No.	State/ Union Territory	1998-99 (Actuals)			1999-00 (R.E.)			2000-01 (B.E.)		
		Total State Budget	Exp. on Edn. & Tran. by Edu. & Other Dept.	% Age of Col (3) to Col (2)	Total State Budget	Exp. on Edn. & Tran. by Edu. & Other Dept.	% Age of Col (6) to Col (5)	Total State Budget	Exp. on Edn. & Tran. by Edu. & Other Dept.	% Age of Col (9) to Col (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Andhra Pradesh	169435600	36989012	21.83	201733100	43897294	21.76	248815300	52268640	21.01
2	Arunachal Pradesh	7465000	1219776	16.34	8726800	1364812	15.64	8549000	1406546	16.45
3	Assam	44163400	14098626	31.92	72052500	22724331	31.54	74551500	24980799	33.51
4	Bihar	106225400	28009078	26.37	161283200	45967369	28.50	165345400	46842615	28.33
5	Goa	12880300	2186933	16.98	15623800	2624249	16.80	18600900	2426032	13.04
6	Gujarat	156061600	37041237	23.74	172479500	38354237	22.24	189593700	39683989	20.93
7	Haryana	70188900	13694475	19.51	72704300	14600230	20.08	80972000	15194206	18.76
8	Himachal Pradesh	33342600	7485571	22.45	38698000	7547136	19.50	40571100	8876451	21.88
9	Jamu & Kashmir	49093500	4987999	10.16	53556800	8290916	15.48	58338600	8792046	15.07
10	Karnataka	124456100	27515413	22.11	146772000	30833566	21.01	171549500	38653963	22.53
11	Kerala	92280800	21775587	23.60	112182400	28152180	25.10	121217700	30233651	24.94
12	Madhya Pradesh	142176400	33399519	23.49	164202300	34939474	21.28	170578200	34947669	20.49
13	Maharashtra	256630300	61061953	23.79	338919100	104886960	30.95	318803500	78349986	24.58
14	Manipur	7886400	1984957	25.17	14359100	4440419	30.92	11106700	3078753	27.72
15	Meghalaya	8154400	1745021	21.40	10827400	2288505	21.14	12029100	2573841	21.40
16	Mizoram	6908400	1221565	17.68	9034500	1648390	18.25	7976400	1387473	17.39
17	Nagaland	10491000	1421917	13.55	11803100	1627530	13.79	12568800	1854324	14.75
18	Orissa	68191500	16893306	24.77	86873700	19831951	22.83	96414500	19545073	20.27
19	Punjab	83843100	19177966	22.87	114869100	23349001	20.33	130715400	24155921	18.48

(Contd.)

Table 26. *(Concld.)*

(Rs in thousand)

S. No.	State/ Union Territory	1998-99 (Actuals)			1999-00 (R.E.)			2000-01 (B.E.)		
		Total State Budget	Exp. on Edn. & Tran. by Edu. & Other Dept.	% Age of Col (3) to Col (2)	Total State Budget	Exp. on Edn. & Tran. by Edu. & Other Dept.	% Age of Col (6) to Col (5)	Total State Budget	Exp. on Edn. & Tran. by Edu. & Other Dept.	% Age of Col (9) to Col (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
20	Rajasthan	115755700	29470132	25.46	138657200	32336383	23.32	145692700	34811950	23.89
21	Sikkim	14956000	1181290	7.90	15456900	1143806	7.40	9454900	1171236	12.39
22	Tamil Nadu	176974000	43009266	24.30	201660200	47044462	23.33	215648700	51566288	23.91
23	Tripura	11756200	2755301	23.44	15227000	3996992	26.25	19001700	4566665	24.03
24	Uttar Pradesh	260748500	64715250	24.82	305684600	68730962	22.48	329237800	64713174	19.66
25	West Bengal	142428900	32194343	22.60	194553400	52123061	26.79	206562100	39759778	19.25
	Total (States)	2172494000	505235493	23.26	2677940000	642744216	24.00	2863895200	631841069	22.06
26	A. & N. Islands	5065065	748825	14.78	5471000	759748	13.89	5621400	763637	13.58
27	Chandigarh	6360543	1427215	22.44	6874500	1742077	25.34	6930000	1648681	23.79
28	Daora & Nagar Haveli	1573777	132304	8.41	2016800	142390	7.06	2325900	145890	6.27
29	Daman & Diu	1309280	127969	9.77	1864700	147200	7.89	2000100	153000	7.65
30	Delhi	28401200	9961298	35.07	38172400	11866443	31.09	42328700	14065518	33.23
31	Lakshadweep	1397919	183632	13.14	1856769	205518	11.07	2000669	236909	11.84
32	Pondicherry	6889403	1216718	17.66	8476739	1507360	17.78	8278811	1458272	17.61
	Total (U.T.s)	50997187	13797961	27.06	64732908	16370736	25.29	69485580	18471907	26.58
	Total (States & U.T.)	2223491187	519033454	23.34	2742672908	659114952	24.03	2933380780	680312976	22.17
	Total (Centre)	2174190000	96755555	4.45	2530360000	111448336	4.40	2810980000	128163265	4.56
	Grand Total	4397681187	615789009	14.00	5273032908	770563288	14.61	5744360780	778476241	13.55

Table 27. Total State Budgeted Expenditure on Enucation & Training (Revenue Account), 2003-04

Sr. No.	State/Union Territory	2002-03 (Actuals)			2003-04 (R.E.)			2004-05 (B.E.)		
		Total State Budget	Exp. on Edn. Tran. by Edu. & Other Dept	% Age of Col (3) to Col (2)	Total State Budget	Exp. on Edn. Tran. by Edu. & Other Dept.	% Age of Col (6) to Col (5)	Total State Budget	Exp. on Edn. Tran. by Edu. & Other Dept.	% Age of Col (9) to Col (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Andhra Pradesh	260568900	50394347	19.34	303149100	58947786	19.45	341515400	62364271	18.26
2	Arunachal Pradesh	10313900	1654387	16.04	14421100	1502266	10.42	11650600	1920049	16.48
3	Assam	71125000	20016454	28.14	116054700	25974007	22.38	149828900	31368516	20.94
1	Bihar	140253500	24039556	17.14	146322500	38244727	26.14	163414900	41703859	25.52
5	Chhattisgarh	55300000	14927399	26.99	71101900	11314751	15.91	76057300	12190077	16.03
6	Goa	20000600	2986233	14.93	18525600	3154812	17.03	26350600	3243038	12.31
7	Gujarat	214401300	40760890	19.01	236074300	42240029	17.89	237863300	41913231	17.62
8	Haryana	93421200	16800747	17.98	106735100	18359123	17.20	116840200	19567851	16.75
9	Himachal Pradesh	51411600	10299719	20.03	54095200	10979520	20.30	57910700	11336682	19.58
10	Jammu & Kashmir	64126800.0	9045964	14.11	65958400	9940748	15.07	79676300	10459114	13.13
11	Jharkhand	77372200	10783614	13.94	73019600	16041407	21.97	78442400	18397215	23.45
12	Karnataka	188145000	39609173	21.05	230502800	42219345	18.32	254374800	48032701	18.88
13	Kerala	147560500	36910618	25.01	162274800	39454523	24.31	189710900	45927963	24.21
14	Madhya Pradesh	145598000	32497672	22.32	199623500	34684489	17.37	182611600	27815200	15.23
15	Maharashtra	404743100	100520073	24.84	461955000	108324576	23.45	479043900	100094279	20.89
16	Manipur	14151000	3003930	21.23	18778700	3394911	18.08	16868300	3337619	19.79
17	Meghalaya	12045500	2341535	19.44	15859900	2732237	17.23	16171300	2975733	18.40
18	Mizoram	11309600	2033716	17.98	13206900	2149246	16.27	11837400	2082041	17.59
19	Nagaland	15062800	2136692	14.19	17550300	2486818	14.17	17533100	2477731	14.13
20	Orissa	100146900	20459910	20.43	126428200	21237114	16.80	140839100	21294220	15.12
21	Punjab	148251300	22952625	15.48	172158900	25011278	14.53	191209000	27566516	14.42

(Contd.)

Table 27. *(Concld.)*

Sr. No.	State/Union Territory	2002-03 (ACTUALS)			2003-04 (R.E.)			2004-05 (B.E.)		
		Total State Budget	Exp. on Edn. Tran. by Edu. & Other Dept.	% Age of Col (3) to Col (2)	Total State Budget	Exp. on Edn. Tran. by Edu. & Other Dept.	% Age of Col (6) to Col (5)	Total State Budget	Exp. on Edn. Tran. by Edu. & Other Dept.	% Age of Col (9) to Col (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
22	Rajasthan	170157800	34768284	20.43	193705300	39700078	20.50	195882500	42304004	21.60
23	Sikkim	18826200	1355039	7.20	10698000	1443716	13.50	17548700	1646272	9.38
24	Tamil Nadu	256877000	47136371	18.35	265500400	53722559	20.23	281287300	56169456	19.97
25	Tripura	19607200	4987255	25.44	22007700	5371077	24.41	22157000	5850033	26.40
26	Uttaranchal	36755900	9235160	25.13	56132800	10925766	19.46	58635800	11442611	19.51
27	Uttar Pradesh	329385000	67728935	20.56	527980700	74135515	14.04	427857100	72594458	16.97
28	West Bengal	231607900	46730280	20.18	267800800	49725215	18.57	277184400	52056502	18.73
	Total (States)	3308525600	676116578	20.44	3967622200	753417639	18.99	4121102800	778131242	18.88
29	A. & N. Islands	7464701	967939	12.97	8625700	1038593	12.04	9069900	1083646	11.95
30	Chandigarh	8114608	1889712	23.29	8737000	1963818	22.48	9333600	2033273	21.78
31	Dadra & Nagar Haveli	3273847	177335	5.42	4160900	192000	4.61	4538200	203290	4.48
32	Daman & Diu	2248809	165997	7.38	2446400	194995	7.97	2475000	200595	8.10
33	Delhi	45982000	12108083	26.33	52902800	13038300	24.64	59523400	15242670	25.61
34	Lakshadweep	2080511	210699	10.13	2174700	224332	10.32	2186600	235812	10.78
35	Pondicherry	11513105	1870548	16.25	12982958	2005766	15.45	12892337	2001485	15.52
	Total (U.T.s)	80677581	17390313	21.56	92030458	18655704	20.27	100019037	21000771	21.00
	Total (States & U.T.)	3389203181	693506891	20.46	4059652658	772073343	19.02	4221121837	799132013	18.93
	Total (Centre)	3396280000	161566044	4.76	3628870000	174451976	4.81	3854930000	191414230	4.97
	Grand Total	6785483181	855072935	12.60	7688522658	946525319	12.31	8076051837	990546243	12.27

Table 28. Budgeted Expenditure (Revenue Account) of Education and Other Department, 1989-90

State/Union Territory	Budget Expenditure (Revenue Account) (in crore)			Projected Population (As on 1-3-90)	Per Capita Budgeted Expenditure (in Rs)	Percentage of Budgeted Expenditure of Education to Total Budgeted (Revenue Account)
	Plan	Non-Plan	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Andhra Pradesh	165.60	796.80	962.40	63159	152.38	20.66
Arunachal Pradesh	12.66	22.69	35.35	807	438.04	15.35
Assam	91.62	270.56	362.18	24456	148.10	20.36
Bihar	59.43	758.70	818.13	85733	96.55	21.77
Goa	11.02	40.07	51.09	133228	383.33	42.38
Gujarat	27.91	705.85	732.75	40377	181.48	20.94
Haryana	49.38	214.45	263.83	16140	163.46	16.25
Himachal Pradesh	26.82	122.22	149.04	5026	236.57	19.68
Jammu & Kashmir	23.95	114.15	138.10	7210	191.54	14.43
Karnataka	63.84	706.82	770.66	44569	172.92	21.70
Kerala	38.42	534.45	572.87	29666	193.11	25.29
Madhya Pradesh	92.94	532.70	625.64	63048	99.23	17.01
Maharashtra	94.92	1191.72	1286.64	74203	173.39	18.17
Manipur	9.90	46.17	56.07	1762	318.18	21.41
Meghalaya	10.53	43.09	53.62	1693	316.77	19.35
Mizoram	6.91	25.20	32.11	688	466.44	13.75
Nagaland	6.24	34.94	41.18	1098	375.18	13.39
Orissa	114.02	314.48	428.50	30924	138.57	21.39
Punjab	55.95	389.34	445.30	19571	227.53	21.81
Rajasthan	105.11	483.77	588.88	43476	135.45	22.66
Sikkim	8.88	12.04	20.92	436	480.15	18.28
Tamil Nadu	73.55	802.29	876.84	55677	157.49	21.21
Tripura	19.41	74.45	93.86	2530	371.00	22.12
Uttar Pradesh	166.30	1136.10	1302.40	133691	97.42	15.07
West Bengal	95.22	928.93	1024.15	64816	158.01	26.04
A.&N. Islands	2.38	11.64	14.02	283	495.23	11.37
Chandigarh	3.94	27.81	31.75	723	439.45	21.81
Dadra & Nagar Haveli	0.73	1.84	2.57	130	197.24	10.14
Daman & Diu	*	*	*	*	*	*
Delhi	46.52	183.05	229.57	8910	257.65	27.40
Lakshadweep	0.98	2.88	3.86	46	837.31	13.31
Pondicherry	8.26	19.44	27.70	734	377.23	19.22
INDIA	1493.36	10548.62	12041.98	825064	145.95	19.94

Table 29. Budgeted Expenditure (Revenue Account) on Education 2003-2004

SL.No.	STATE/UTs	Total Budget (Centre/States) (Rev. Account) (RE)	Expenditure (Rev. Acct) on Edu. & Trg. By Edu. and other Deptts. (RE)	Population as on 01-03-2001 (Census 2001)	Per Capita Expenditure (RE)	% age of Expenditure (RE) on Edn. & Trg. by Edu. and other Deptts. To Total Budget
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	Andhra Pradesh	30,314.91	5,894.78	7.62	773.49	19.45
2.	Arunachal Pradesh	1,442.11	150.22	0.11	1,368.16	10.42
3.	Assam	11,605.47	2,597.40	2.67	974.43	22.38
4.	Bihar	14,632.25	3,824.47	8.30	460.79	26.14
5.	Chhattisgarh*	7,110.19	1,131.47	2.08	543.09	15.91
6.	Goa	1,852.56	315.48	0.13	2,340.93	17.03
7.	Gujarat	23,607.43	4,224.00	5.07	833.61	17.89
8.	Haryana	10,673.51	1,835.91	2.11	868.27	17.20
9.	Himachal Pradesh	5,409.52	1,097.95	0.61	1,806.46	20.30
10.	J&K	6,595.84	994.07	1.01	979.99	16.07
11.	Jharkhand*	7,301.96	1,604.14	2.69	595.32	21.97
12.	Karanataka	23,050.22	4,221.93	5.29	798.84	18.32
13.	Kerala	16,227.48	3,945.45	3.18	1,239.10	24.31
14.	Madhya Pradesh	19,962.35	3,468.45	6.03	574.74	17.37
15.	Maharashtra	46,195.50	10,832.45	9.69	1,118.15	23.45
16.	Manipur	1,877.87	339.49	0.22	1,566.79	18.08
17.	Meghalaya	1,585.99	273.22	0.23	1,178.27	17.23
18.	Mizoram	1,320.69	214.92	0.09	2,418.71	16.27
19.	Nagaland	1,755.03	248.68	0.20	1,249.63	14.17
20.	Orissa	12,642.82	2,123.71	3.68	577.02	16.80
21.	Punjab	17,215.89	2,501.13	2.44	1,026.78	14.53
22.	Rajasthan	19,370.53	3,970.01	5.65	702.57	20.50
23.	Sikkim	1,069.80	144.37	0.05	2,669.31	13.50
24.	Tamil Nadu	26,550.04	5,372.25	6.24	860.86	20.23
25.	Tripura	2,200.77	537.11	0.32	1,678.89	24.41
26.	Uttar Pradesh	52,798.07	7,413.55	16.62	446.07	14.04
27.	Uttaranchal*	5,613.28	1,092.57	0.85	1,286.99	19.46
28.	West Bengal	26,780.08	4,972.52	8.02	620.20	18.57
29.	A&N Islands	862.57	103.86	0.04	2,916.17	12.04
30.	Chandigarh	873.70	196.38	0.09	2,180.46	22.48
31.	D&N Haveli	416.09	19.20	0.02	870.79	4.61
32.	Daman & Diu	244.64	19.49	0.02	1,231.95	7.97
33.	Delhi	5,290.28	1,303.63	1.39	941.21	24.64
34.	Lakshadweep	217.47	22.43	0.01	3,698.27	10.31
35.	Pondicherry	1,298.29	200.57	0.10	2,058.51	15.45
	States/UTs Total	405,965.26	77,207.33	102.86	750.60	19.02
	Central*	362,887.00	17,445.19			
	INDIA (Gr. Total)	768,852.26	94,652.53	102.86	920.20	12.31

* Statewise RE not available
RE = Revised Estimates

Table 30. Budgeted Expenditure on Education of the Education Departments According to Heads of Charges (Revenue Account) for 2000-01 (Budget Estimates)

(Rs in thousands)

State/ Union Territory	Ementary Education		Secondary Education		Adult Education		University & Higher Education		Technical Education		Physical Education		General Education		Language Development		Total
	Total	% Age	Total	% Age	Total	% Age	Total	% Age	Total	% Age	Total	% Age	Total	% Age	Total	% Age	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Andhra Pradesh	17349756	44.28	9980451	25.47	100000	0.26	9213568	23.52	798824	2.04	10038	0.03	1593644	4.07	135289	0.35	39181570
Arunachal Pradesh	846060	64.30	251101	19.08	16733	1.27	102889	7.82	0	0.00	5725	0.44	93325	7.09	0	0.00	1315833
Assam	13116677	55.26	5571799	23.47	185609	0.78	3553543	14.97	219670	0.93	38098	0.16	874237	3.68	176747	0.74	23736380
Bihar	29668837	68.67	7953955	18.41	64838	0.15	4636026	10.73	464165	1.07	20180	0.05	67875	0.16	330604	0.77	43206480
Goa	590123	27.68	1102993	51.75	6485	0.30	260580	12.22	123830	5.81	21980	1.03	22081	1.04	3510	0.16	2131582
Gujarat	19266975	56.96	10115184	29.90	16124	0.05	2803950	8.29	1055800	3.12	11000	0.03	525099	1.55	34168	0.10	33828300
Haryana	4980660	38.91	538208	40.14	11157	0.09	2185060	17.07	371360	2.90	0	1.00	108404	0.85	7000	0.05	12801849
Himachal Pradesh	4818177	59.87	2172606	26.97	14749	0.18	522978	6.50	88707	1.10	1922	0.02	409955	5.09	20180	0.25	8047274
Jammu & Kashmir	3471360	45.63	2735835	35.96	25223	0.33	831456	10.93	152003	2.00	31581	0.42	359988	4.73	0	0.00	7607446
Karnataka	17173122	48.36	9887851	27.84	64129	0.18	6418417	18.07	611830	1.72	2055	0.01	1182789	3.33	170404	0.48	35510597
Kerala	12851372	47.15	8686085	31.86	0	0.00	4198013	15.40	1227512	4.50	17575	0.06	123697	0.45	154873	0.57	27259127
Madhya Pradesh	15866511	63.47	4257895	17.03	100784	0.40	3154193	12.62	1093081	4.37	7085	0.03	469728	1.88	48315	0.19	24997592
Maharashtra	29672849	43.68	24371503	35.88	115835	0.17	10677570	15.72	2338018	3.44	35489	0.05	716360	1.05	483	0.00	67928107
Manipur	1449181	50.06	826196	28.54	18469	0.64	428215	14.79	32538	1.12	48446	1.67	88335	3.05	3483	0.12	2894863
Meghalaya	1301633	56.14	555313	23.95	32046	1.38	293960	12.68	16700	0.72	70	0.00	118495	5.11	253	0.01	2318470
Mizoram	679115	54.77	299403	24.14	11515	0.93	130610	10.53	13400	1.08	5642	0.45	26715	2.15	73635	5.94	1240035
Nagaland	1078260	65.68	346662	21.12	20663	1.26	128296	7.81	20235	1.23	0	0.00	0	0.00	47560	2.90	1641676
Orissa	10351725	60.58	3622260	21.29	22434	0.13	2602344	15.23	222435	1.30	25908	0.15	102853	0.60	138776	0.81	17088735
Punjab	6051637	29.34	11706977	56.76	56300	0.27	1941435	9.41	681339	3.30	10873	0.05	109988	0.53	67751	0.33	20626300

(Contd.)

Table 30. *(Concld.)*

(Rs in thousands)

State/ Union Territory	Ementary Education		Secondary Education		Adult Education		University & Higher Education		Technical Education		Physical Education		General Education		Language Development		Total
	Total	% Age	Total	% Age	Total	% Age	Total	% Age	Total	% Age	Total	% Age	Total	% Age	Total	% Age	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Rajasthan	18764576	57.66	10559917	32.45	51500	0.16	2240459	6.88	332256	1.02	17050	0.05	266171	0.82	312403	0.96	32544332
Sikkim	663536	61.67	341404	31.73	50	0.00	34424	3.20	1700	0.16	0	0.00	33435	3.11	1425	0.13	1075974
Tamil Nadu	19744198	43.45	16680591	36.71	44229	0.10	6334184	13.94	1519798	3.35	10293	0.02	933264	2.05	168002	0.37	45434559
Tripura	1962665	47.97	1438145	35.15	164344	4.02	253117	6.19	51332	1.25	108713	2.66	77970	1.91	35531	0.87	4091817
Uttar Pradesh	31650662	56.96	17537663	31.56	0	0.00	4243536	7.64	1217597	2.19	500	0.00	598268	1.08	320206	0.58	55568432
West Bengal	12151019	33.54	16486147	45.51	160033	0.44	4855197	13.40	790850	2.18	33490	0.09	1625307	4.49	127198	0.35	36229241
Total States	275520686	50.25	168026144	31.48	1303249	0.24	72044020	13.14	13444980	2.45	463713	0.08	10527983	1.92	2377796	0.43	548306571
A. & N. Islands	356975	49.64	258730	35.97	2704	0.38	45887	6.38	28600	3.98	0	0.00	24549	3.41	1755	0.24	719200
Chandigarh	294079	22.62	237498	18.27	2300	0.18	571408	43.95	159860	12.30	20203	1.55	10280	0.79	4435	0.34	1300063
Dadra & Nagar Haveli	85105	61.80	34765	25.25	243	0.18	0	0.00	8500	6.17	0	0.00	8877	6.45	210	0.15	137700
Daman & Diu	64260	43.42	57740	39.01	500	0.34	11050	7.47	11000	7.43	0	0.00	3450	2.33	0	0.00	148000
Delhi	2214319	16.93	9140141	69.90	388645	2.97	329000	2.52	641961	4.91	3710	0.03	355660	2.72	2200	0.02	13075636
Lakshadweep	112348	51.77	68655	31.64	0	0.00	23853	10.99	0	0.00	0	1.00	12146	5.60	0	0.00	217002
Pondicherry	464902	38.63	418253	34.75	2079	0.17	203475	16.91	82199	6.83	8148	0.68	24434	2.03	0	0.00	1203490
Total U.T.s	3591988	21.38	10215782	60.80	396471	2.38	1184673	7.05	932120	5.55	32061	0.19	439396	2.62	8600	0.05	16801091
Total (States & UTs)	279112674	49.39	182839926	32.35	1699720	0.30	73228693	12.96	14377100	2.54	495774	0.09	10967379	1.94	2386396	0.42	565107662
Total Centre	36107500	43.06	12300100	14.67	1238500	1.48	21287800	25.39	11055200	13.18	6500	0.01	884200	1.05	970000	1.16	83849800
Grand Total	311628186	48.57	195140026	30.07	2938220	0.45	94516493	14.56	25432300	3.92	502274	0.08	11851579	1.83	3356396	0.52	648957462

Table 31. Budgeted Expenditure on Education of The Education Departments According to Heads of Charges (Revenue Account) for 2004-O5 (Budget Estimates)

(Rupees in thousands)

State/Union Territory	Elementary Education		Secondary Education		Adult Education		Univversity and Higher Education		Technical Education		Physical Education		General Education		Language Development		Total
(1)	Total (2)	% Age (3)	Total (4)	% Age (5)	Total (6)	% Age (7)	Total (8)	% Age (9)	Total (10)	% Age (11)	Total (12)	% Age (13)	Total (14)	% Age (15)	Total (16)	% Age (17)	(18)
Andhra Pradesh	22,254,919	46.51	13,849,666	28.94	120,100	0.25	9,074,980	18.96	1,994,394	4.17	11,366	0.02	404,091	0.84	145,376	0.30	47,854,892
Arunachal Pradesh	950,163	60.11	350,370	22.17	17,208	1.09	236,953	14.99	0		5,745	0.36	20,213	1.28	0		1,580,652
Assam	18,666,840	63.91	7,127,143	24.40	105,812	0.36	2,547,148	8.72	280,943	0.96	79,733	0.27	99,509	0.34	298,821	1.02	29,205,949
Bihar	25,817,407	66.60	6,735,224	17.38	49,406	0.13	5,206,566	13.43	284,767	0.73	15,649	0.04	79,136	0.20	574,355	1.48	38,762,510
Chhattisgarh	7,317,452	64.85	2,178,580	19.31	76,047	0.67	1,416,910	12.56	258,506	2.29	3,188	0.03	27,580	0.24	4,781	0.04	11,283,044
Goa	608,885	22.26	1,482,200	54.18	5,665	0.21	373,567	13.66	196,394	7.18	29,061	1.06	23,620	0.86	16,100	0.59	2,735,492
Gujarat	18,869,598	52.59	10,514,897	29.30	46,465	0.13	3,595,855	10.02	1,138,000	3.17	112,281	0.31	1,571,095	4.38	33,790	0.09	35,881,981
Haryana	7,876,188	47.94	5,633,891	34.29	8,845	0.05	2,286,904	13.92	507,952	3.09	0	0.00	105,094	0.64	10,000	0.06	16,428,874
Himachal Pradesh	5,730,991	56.33	3,664,422	36.01	9,103	0.09	622,720	6.12	75,026	0.74	1,500	0.01	45,680	0.45	25,334	0.25	10,174,776
Jammu & Kashmir	4,139,151	46.18	3,228,744	36.02	8,131	0.09	1,008,994	11.26	235,312	2.63	43,800	0.49	299,691	3.34	0		8,963,823
Jharkhand	9,961,323	69.09	1,901,664	13.19	12,588	0.09	1,720,546	11.93	759,500	5.27	3,056	0.02	0	0.00	59,594	0.41	14,418,271
Karnataka	24,836,876	57.64	11,733,434	27.23	48,943	0.11	4,840,030	11.23	847,045	1.97	1,186	0.00	676,680	1.57	105,355	0.24	43,089,549
Kerala	20,416,095	49.88	12,813,150	31.31	4,000	0.01	5,269,156	12.87	1,870,153	4.57	4,882	0.01	408,446	1.00	143,131	0.35	40,929,013
Madhya Pradesh	9,167,904	57.83	2,889,636	18.23	8,555	0.05	2,958,690	18.66	766,729	4.84	5,702	0.04	28,955	0.18	26,782	0.17	15,852,953
Maharashtra	40,161,948	45.50	36,195,658	41.01	104,633	0.12	8,440,691	9.56	2,649,229	3.00	37,614	0.04	669,513	0.76	480	0.00	88,259,766
Manipur	1,445,291	47.86	777,530	25.75	30,099	1.00	629,054	20.83	33,003	1.09	55,350	1.83	44,939	1.49	4,286	0.14	3,019,552
Meghalaya	1,384,259	51.13	644,301	23.80	19,156	0.71	281,180	10.39	291,200	10.76	97	0.00	87,006	3.21	304	0.01	2,707,503
Mizoram	1,000,255	52.63	437,760	23.03	18,095	0.95	212,345	11.17	85,450	4.50	0		37,110	1.95	109,567	5.76	1,900,582
Nagaland	1,400,939	63.61	473,433	21.50	18,908	0.86	170,045	7.72	67,027	3.04	0		0		72,111	3.27	2,202,463
Orissa	10,879,601	57.40	5,026,657	26.52	18,000	0.09	2,723,894	14.37	197,831	1.04	9,621	0.05	15,305	0.08	83,272	0.44	18,954,181
Punjab	6,828,889	27.82	14,647,529	59.68	39,500	0.16	2,464,000	10.04	344,321	1.40	10,100	0.04	98,879	0.40	111,456	0.45	24,544,674

(Contd.)

Table 31. *(Concld.)*

(Rupees in thousands)

State/Union Territory	Elementary Education		Secondary Education		Adult Education		Univversity and Higher Education		Technical Education		Physical Education		General Education		Language Development		Total
(1)	Total (2)	% Age (3)	Total (4)	% Age (5)	Total (6)	% Age (7)	Total (8)	% Age (9)	Total (10)	% Age (11)	Total (12)	% Age (13)	Total (14)	% Age (15)	Total (16)	% Age (17)	(18)
Rajasthan	22,844,955	57.71	13,135,228	33.18	145,542	0.37	2,570,699	6.49	353,693	0.89	24,724	0.06	83,320	0.21	429,229	1.08	39,587,390
Sikkim	701,010	47.86	643,634	43.94	500	0.03	51,177	3.49	16,000	1.09	0		51,803	3.54	700	0.05	1,464,824
Tamil Nadu	20,457,053	43.38	18,932,599	40.15	7,694	0.02	5,162,566	10.95	1,158,838	2.46	9,521	0.02	1,250,000	2.65	175,654	0.37	47,153,925
Tripura	2,863,772	54.14	1,663,250	31.44	238,914	4.52	246,539	4.66	42,000	0.79	127,090	2.40	90,837	1.72	17,293	0.33	5,289,695
Uttaranchal	4,751,925	44.64	4,478,885	42.26	0		845,971	7.98	439,752	4.15	0	0.00	47,243	0.45	34,138	0.32	10,597,914
Uttar Pradesh	35,397,132	57.00	19,700,025	31.72	0		5,158,040	8.31	1,295,172	2.09	500	0.00	130,467	0.21	417,799	0.67	62,099,135
West Bengal	16,752,359	34.36	24,248,658	49.74	40,559	0.08	6,179,518	12.68	711,827	1.46	27,477	0.06	642,255	1.32	150,882	0.31	48,753,535
Total States	343,483,180	50.98	225,108,168	33.41	1,202,468	0.18	76,294,738	11.32	16,900,064	2.51	619,243	0.09	7,038,467	1.04	3,050,590	0.45	673,696,918
A. & N. Islands	509,110	49.99	344,009	33.78	2,690	0.26	68,249	6.70	53,900	5.29	2,000	0.20	36,712	3.60	1,730	0.17	1,018,400
Chandigarh	412,300	27.42	299,748	19.94	3,400	0.23	592,002	39.37	176,400	11.73	2,845	0.19	12,700	0.84	4,150	0.28	1,503,545
Dadra & Nagar Haveli	130,550	67.12	43,750	22.49	250	0.13	100	0.05	10,400	5.35	0		9,450	4.86	0		194,500
Daman & Diu	78,000	42. S5	71,500	39.01	600	0.33	13,300	7.26	15,100	8.24	0		4,800	2.62	0		183,300
Delhi	3,088,613	22.17	9,021,183	64.77	374,300	2.69	475,700	3.42	614,074	4.41	12,100	0.09	342,585	2.46	0		13,928,555
Lakshadweep	6,400	03.13	191,348	93.57	0	0.00	400	0.20	0	0.00	0		6,352	3.11	0		204,500
Pondicherry	628,459	41.39	482,407	31.77	1,994	0.13	211,005	13.90	153,552	10.11	4,614	0.30	34,321	2.26	1,971	0.13	1,518,323
Total U.T.s	4,853,432	26.16	10,453,945	56.35	383,234	2.01	1,360,756	7.34	1,023,426	5.52	21,559	0.12	446,920	2.41	7,851	0.04	18,551,123
Total (States & UTs)	348,336,612	50.32	235,562,113	34.03	1,585,702	0.23	77,655,494	11.22	17,923,490	2.59	640,802	0.09	7,485,387	1.08	3,058,441	0.44	692,248,041
Total Centre	51,525,300	52.00	14,342,700	12.97	2,521,500	2.28	17,966,400	16.24	15,949,000	14.42	6,500	0.01	719,000	0.65	15,910,300	1.44	110,620,700
Grand Total	405,861,912	50.55	249,904,813	31.13	4,107,202	0.51	95,621,894	11.91	33,872,490	4.22	647,302	0.08	8,204,387	1.02	4,648,741	0.58	802,868,741

Table 32. Budgeted Expenditure on Education According to Heads of Charges (Capital Account) for 2000-01 (Budget Estimates)

(Rs in thousands)

State/ Union Territory (1)	Ementary Education (2)	Secondary Education (3)	Adult Education (4)	University & Higher Education (5)	Technical Education (6)	Physical Education (7)	General Education (8)	Language Development (9)	Total (10)
Andhra Pradesh	700	33100	0	0	3500	0	0	0	37300
Arunachal Pradesh	23648	0	0	0	0	0	0	0	23648
Assam	0	2500	0	3500	0	0	0	0	6000
Bihar	0	0	0	12000	11850	0	0	0	23850
Goa	3700	3000	0	500	9515	0	0	0	16715
Gujarat	32654	10000	0	7510	75900	0	26000	0	152064
Haryana	0	0	0	10000	12300	0	0	0	22300
Himachal Pradesh	1	15000	0	22500	20900	0	38320	0	96721
Jammu & Kashmir	421241	0	0	0	0	0	0	0	421241
Karnataka	0	17500	0	1000	1000	0	0	0	19500
Kerala	0	0	0	24000	139700	0	30000	0	193700
Madhya Pradesh	0	0	0	0	7150	0	5000	0	12150
Maharashtra	0	0	0	3150	61083	0	4470	0	68703
Manipur	3000	1000	0	500	0	0	0	0	4500
Meghalaya	1000	0	0	0	0	0	0	0	1000
Mizoram	100	100	0	2500	3216	0	0	0	5916
Nagalamd	25000	2000	0	200	1100	0	1325	0	29625
Orissa	0	39828	0	13000	0	0	4000	0	56828
Punjab	0	0	0	26000	50900	0	0	0	76900

(Contd.)

Table 32. *(Concld.)*

(Rs in thousands)

State/ Union Territory	Ementary Education	Secondary Education	Adult Education	University & Higher Education	Technical Education	Physical Education	General Education	Language Development	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rajasthan	165171	0	1000	5757	6588	0	0	0	178516
Sikkim	119100	51040	0	27420	127500	0	0	0	325060
Tamil Nadu	1	11935	0	43855	5017	0	0	0	60808
Tripura	0	0	0	3730	370	0	0	0	4100
Uttar Pradesh	86435	77828	0	91000	52582	0	0	0	307845
West Bengal	5000	5000	0	20000	57100	0	0	0	87100
Total States	886751	269831	1000	318122	647271	0	109115	0	2232090
A. & N. Islands	50000	40000	0	17000	11000	0	33000	0	151000
Chandigarh	0	0	0	0	41800	0	35400	0	77200
Dadra & Nagar Haveli	6600	5100	0	100	3000	0	0	0	14800
Daman & Diu	0	0	0	0	0	0	0	0	0
Delhi	350000	650000	0	185000	137600	0	0	0	1322600
Lakshadweep	0	4415	0	2609	0	0	0	0	7024
Pondicherry	14500	41900	0	7500	0	0	0	0	63900
Total U.T.s	421100	741415	0	212209	193400	0	68400	0	1636524
Total (States & UTs)	1307851	1011246	1000	530331	840671	0	177515	0	3868614

Table 33. Budgeted Expenditure on Education According to Heads of Charhes (Capital Account) for 2004-05 (Budget Estimates)

(Rupees in thousands)

State/ Union Territory (1)	Elementary Education (2)	Secondary Education (3)	Adult Education (4)	Univ.& Higher Education (5)	Technical Education (6)	Physical Education (7)	General Education (8)	Language Development (9)	Total (10)
Andhra Pradesh	0	0	0	0	10	0	0	0	10
Arunachal Pradesh	800	0	0	561	0	0	10,970	0	12,331
Assam	0	2,500	0	3,500	3,435	0	0	0	9,435
Bihar	167,377	0	0	0	0	0	0	0	167,377
Chhattisgarh	1,667	184,106	0	37,213	155,447	0	0	0	378,433
Goa	7,000	1,000	0	5,000	62,500	0	36,500	0	112,000
Gujarat	44,858	20,125	0	190,425	38,890	0	0	0	294,298
Haryana	0	10,000	0	60,000	0	0	0	0	70,000
Himachal Pradesh	29,008	98,900	0	155,000	39,400	0	34,897	0	357,205
Jammu & Kashmir	300,000	42,500	100	75,000	160,000	0	31,200	0	608,800
Jharkhand	0	0	0	0	313,700	0	0	0	313,700
Karnataka	0	10,000	0	17,000	500	0	0	0	27,500
Kerala	0	0	0	21,000	0	0	0	0	21,000
Madhya Pradesh	101,088	15,000	0	20,001	60,000	0	0	0	196,089
Maharashtra	0	0	0	9,400	66,546	0	0	0	75,946
Manipur	70,300	0	0	92,821	669	0	0	0	163,790
Meghalaya	6,000	3,000	0	2,000	5,000	0	0	0	16,000
Mizoram	10	0	0	1,200	65,400	0	0	0	66,610
Nagaland	0	20,000	0	0	45,200	0	6,700	0	71,900
Orissa	0	1,101	0	4	0	0	3	0	1,108
Punjab	374,600	1,318,113	0	85,041	19,500	0	0	20,000	1,817,254

(Contd.)

Table 33. *(Concld.)*

(Rupees in thousands)

State/ Union Territory (1)	Elementary Education (2)	Secondary Education (3)	Adult Education (4)	Univ.& Higher Education (5)	Technical Education (6)	Physical Education (7)	General Education (8)	Language Development (9)	Total (10)
Rajasthan	83,051	94,386	0	4,020	21,500	0	0	132	203,089
Sikkim	104,493	6,200	0	5,000	186,600	0	0	0	302,293
Tamil Nadu	609,506	4,276	0	19,201	22,003	0	0	0	654,986
Tripura	194,350	1,432	0	0	37,535	0	50	0	233,367
Uttaranchal	0	283,602	0	100,600	43,000	0	0	0	427,202
Uttar Pradesh	1	70,000	40,000	0	26,278	0	0	0	136,279
West Bengal	2,000	2,000	0	3,250	3,883	0	84,080	0	95,213
Total States	2,096,109	2,188,241	40,100	907,237	1376,996	0	204,400	20,132	6,833,215
A. & N. Islands	27,200	24,800	0	22,000	37,000	0	18,000	0	129,000
Chandigarh	3,900	14,900	0	8,000	21,800	0	500	0	49,100
Dadra & Nagar Haveli	0	11,500	0	0	10,500	0	0	0	22,000
Daman & Diu	15,300	0	0	0	0	0	0	0	15,300
Delhi	380,000	570,000	0	430,000	90,800	0	10,000	0	1,480,800
Lakshadweep	0	10,000	0	4,500	0	0	0	0	14,500
Pondicherry	26,500	53,400	35,400	0	0	0	0	0	115,300
Total U.T.s	452,900	684,600	354,00	464,500	160,100	0	28,500	0	1,826,000
Total (States & UT)	2,549,009	2,872,841	755,00	1,371,737	1,537,096	0	232,900	20,132	8,659,215

Table 34. Plan & Non-Plan Budgeted Expenditure on Elementary Education, 1998-99 to 2000-01

(Rs in thousands)

		1998-99 (Actual)				1999-2000 (RE)				2000-2001 (BE)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Education	Plan	Non-Plan	Total	% Age to Total Exp. on Education	Plan	Non-Plan	Total	% Age to Total Exp. on Education
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	3521067	9326816	12847883	48.09	4454263	12576175	17030438	52.23	4344777	13004979	17349756	44.28
2	Arunachal Pradesh	370677	323932	694609	61.49	463800	345590	809390	63.66	463800	382260	846060	64.30
3	Assam	2140017	5707860	7847877	58.41	2438030	10877021	13315051	63.31	2730885	10385792	13116677	55.26
4	Bihar	1213785	15347786	16561571	65.02	1877798	26754662	28632460	68.47	2420897	27247940	29668837	68.67
5	Goa	17048	532708	549756	28.51	14731	545460	560191	24.20	14737	575386	590123	27.68
6	Gujarat	882922	15971614	16854536	54.54	1302470	15112638	16415108	49.46	2390848	16876127	19266975	56.96
7	Haryana	585173	4842517	5427690	45.35	636250	4504739	5140989	42.13	594595	4386065	4980660	38.91
8	Himachal Pradesh	1204158	2677500	3881658	57.00	1410095	2693595	4103690	60.57	1816342	3001835	4818177	59.87
9	Jammu & Kashmir	314981	1770893	2085874	48.00	591147	2676136	3267285	45.85	705280	2766080	3471360	45.63
10	Karnataka	2447529	10590355	13037884	52.11	2889166	11752694	14641860	52.19	3747373	13425749	17173122	48.36
11	Kerala	72873	8962795	9035668	47.07	65000	12277231	12342231	49.88	73000	12778372	12851372	47.15
12	Madhya Pradesh	1694452	14110767	15805219	62.41	2104738	13318258	15422996	62.07	1887201	13979310	15866511	63.47
13	Maharashtra	817691	22572967	23390658	45.26	1146098	42079534	43225632	46.73	1167915	28504934	29672849	43.68
14	Manipur	152181	654970	807151	44.74	185371	1906513	2091884	49.73	104890	1344291	1449181	50.06
15	Meghalaya	246543	640664	887207	55.16	438150	708798	1146948	55.53	475000	826633	1301633	56.14
16	Mizoram	111466	474130	585596	53.26	150704	578990	729694	48.63	126020	553095	679115	54.77
17	Nagaland	72115	753796	825911	64.57	65103	867330	932433	62.80	65103	1013157	1078260	65.68
18	Orissa	941629	7102173	8043802	55.09	1492673	9906322	11398995	65.61	984478	9367247	10351725	60.58
19	Punjab	15911	5052511	5068422	30.25	56498	5606656	5663154	29.12	72365	5979272	6051637	29.34

(Contd.)

Table 34. *(Concld.)*

(Rs in thousands)

		1998-99 (Actual)				1999-2000 (RE)				2000-2001 (BE)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Education	Plan	Non-Plan	Total	% Age to Total Exp. on Education	Plan	Non-Plan	Total	% Age to Total Exp. on Education
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	1589628	13282107	14871735	54.22	2636176	14848866	17485042	57.71	2964961	15799615	18764576	57.66
21	Sikkim	248726	442312	691038	63.22	179100	481050	660150	62.11	143410	520126	663536	61.67
22	Tamil Nadu	766466	17543698	18310164	48.29	1029756	17892716	18922472	45.84	1046272	18697926	19744198	43.46
23	Tripura	353195	794952	1148147	46.95	532874	1192387	1725261	48.20	614375	1348290	1962665	47.97
24	Uttar Pradesh	2578912	29308592	31887504	56.20	4487514	26836078	31323592	53.38	3772298	27878364	31650662	56.96
25	West Bengal	312791	9333554	9646345	32.43	1043080	10944954	11988034	24.51	1333399	10817620	12151019	33.54
	Total States	22671936	198121969	220793905	50.59	31690585	236407372	265659929	49.96	34060221	241460465	275520686	50.25
26	A. & N. Islands	101623	286140	387763	54.67	91100	280385	371485	51.83	62475	294500	356975	49.64
27	Chandigarh	3721	256608	260329	22.69	5522	277356	282878	19.89	2600	291479	294079	22.62
28	Dadra & Nagar Haveli	24273	55033	79306	63.13	25638	60605	86243	64.26	21205	63900	85105	61.80
29	Daman & Diu	1685	51752	53437	42.94	3700	60300	64000	44.94	1560	62700	64260	43.42
30	Delhi	705992	847775	1553767	16.78	884111	1123254	2007365	18.27	1143400	1070919	2214319	16.93
31	Lakshadweep	7513	73226	80739	48.27	8930	82330	91260	49.08	8709	103639	112348	51.77
32	Pondicherry	55278	366609	421887	40.80	94311	355772	450083	35.56	94269	370633	464902	38.63
	Total U.T.	900085	1937143	2837228	22.58	1113312	2240002	3353314	22.58	1334218	2257770	3591988	21.38
	Total (State & UTs)	23572021	200059112	223631133	49.80	32803897	238647374	269013243	49.25	35394439	243718235	279112674	49.39
	Centre Total	27498200	17500	27515700	43.51	28522800	19600	28542400	39.00	36087500	20000	36107500	43.06
	Grand Total	51070221	200076612	251146833	49.03	61326697	238666974	297555643	48.09	71481939	243738235	315220174	48.57

Table 35. Plan and Non-Plan Budgeted Expenditure on Elementary Education, 2002-03 to 2004-05

Account: Revenue Account; Program: Total Expenditure *(Rs. in Thousand)*

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Education	Plan	Non-Plan	Total	% age to Total Exp. on Education	Plan	Non-Plan	Total	% age to Total Exp. on Education
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Ahdhra Pradesh	1676943	14088408	15765351	42.12	3825892	16575250	20401142	46.84	4182711	18072208	22254919	46.51
2	Arunachal Pracesh	487173	381866	869039	63.01	633832	45010	678842	51.00	492858	457305	950163	60.11
3	Assam	2189744	8466132	10655876	57.96	2327732	11706158	14033890	59.95	1340825	17326015	18666840	63.91
4	Bihar	0	13625290	13625290	60.91	2305422	20663286	22968708	65.13	2250839	23566568	25817407	66.60
5	Chhattisgarh	805278	4033866	4839144	68.95	2558561	4318342	6876903	66.43	2719214	4598238	7317452	64.85
6	Goa	19716	567971	587687	22.68	31153	565480	596633	22.41	45700	563185	608885	22.26
7	Gujarat	1268334	16924129	18192463	51.53	2505001	15752535	18257536	51.00	2850752	16018846	18869598	52.59
8	Haryana	293723	6463413	6757136	48.34	412957	6855059	7268016	47.27	673903	7202285	7876188	47.94
9	Himachal Pradesh	1950870	3145068	5095938	55.49	441231	5128338	5569569	55.88	496596	5234395	5730991	56.33
10	Jammu & Kashmir	727931	2977755	3705686	47.10	773019	3218239	3991258	46.78	820900	3318251	4139151	46.18
11	Jharkhand	0	7172558	7172558	69.77	977973	7131595	8109568	65.71	2153700	7807623	9961323	69.09
12	Karnataka	3533116	14424685	17957801	51.52	4022961	16386029	20408990	54.56	6792820	18044056	24836876	57.64
13	Kerala	100000	16154746	16254746	49.26	30000	17693495	17723495	49.88	0	20416095	20416095	49.88
14	Madhya Pradesh	1799247	12641387	14440634	64.15	2795901	11923744	14719645	62.93	2430897	6737007	9167904	57.83
15	Maharashtra	1080509	39592715	40673224	46.23	1128161	40985063	42113224	45.73	212699	39949249	40161948	45.50
16	Manipur	335120	980958	1316078	48.62	485208	993482	1478690	48.75	477553	967738	1445291	47.86
17	Meghalaya	316423	929675	1246098	57.62	388170	912295	1300465	53.33	366502	1017757	1384259	51.13
18	Mizoram	242384	668648	911032	49.95	255300	742530	997830	52.54	254230	746025	1000255	52.63
19	Nagaland	91468	1109798	1201266	62.62	160490	1183459	1343949	61.00	160593	1240346	1400939	63.61
20	Orissa	437232	10032473	10469705	57.27	503850	10584896	11088746	58.61	405849	10473752	10879601	57.40
21	Punjab	649017	5147777	5796794	28.41	384082	5584645	5968727	26.71	710300	6118589	6828889	27.82

(Contd.)

Table 35. *(Concld.)*

Account: Revenue Account; Program: Total Expenditure

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Education	Plan	Non-Plan	Total	% age to Total Exp. on Education	Plan	Non-Plan	Total	% age to Total Exp. on Education
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	1272942	17442472	18715414	57.30	2450665	19595703	22046368	59.54	3098915	19746040	22844955	57.71
23	Sikkim	198844	444681	643525	51.90	199560	469935	669495	51.41	199735	501275	701010	47.86
24	Tamil Nadu	816149	15769726	16585875	42.19	1476978	17693105	19170083	43.23	1417899	19039154	20457053	43.38
25	Tripura	518369	1825788	2344157	52.39	557065	1927664	2484729	52.35	783091	2080681	2863772	54.14
26	Uttaranchal	145048	4186230	4331278	51.67	394148	3946276	4340424	45.02	444023	4307902	4751925	44.84
27	Uttar Pradesh	1238697	32191867	33430564	57.19	1141916	34996490	36138406	56.84	768525	34628607	35397132	57.00
28	West Bengal	1139770	13543076	14682846	33.86	1215548	14443511	15659059	33.88	1806470	14945889	16752359	34.36
	Total States	23334047	264933158	288267205	49.76	34382776	292021614	326404390	50.63	38358099	305125081	343483180	50.98
29	A. & N. Islands	122952	321037	443969	48.43	126000	339770	465770	47.87	142400	366710	509110	49.99
30	Chandigarh	22802	320099	342901	24.17	69200	326060	395260	27.61	75000	337300	412300	27.42
31	Dadra & Nagar Haveli	46734	70081	116815	68.99	48000	74355	122355	66.79	51700	78850	130550	67.12
32	Daman & Diu	3721	64948	68669	45.16	6300	69900	76200	42.67	6100	71900	78000	42.55
33	Delhi	1107357	1250076	2357433	21.10	1050200	1305819	2356019	19.84	1506300	1582313	3088613	22.17
34	Lakshadweep	2010	4767	6777	3.66	4700	4300	9000	4.62	2400	4000	6400	3.13
35	Pondicherry	123394	417439	540833	38.57	154503	426718	581221	38.83	160268	468191	628459	41.39
	Total U.T.	1428970	2448447	3877417	25.15	1458903	2546922	4005825	24.53	1944168	2909264	4853432	26.16
	Total (State & Uts)	24763017	267381605	292144622	49.12	35841679	294568536	330410215	49.99	40302267	308034345	348336612	50.32
	Centre Total	42575723	22990	42598713	46.87	52170000	24700	52194700	50.74	57500000	25300	57525300	52.00
	Grand Total	67338740	267404595	334743335	48.82	88011679	294593236	382604915	50.09	97802267	308059645	405861912	50.55

Table 36. Plan & Non-Plan Budgeted Expenditure on Elementary Education (Sub-head wise), 1998-99 to 2000-01

Account: Revenue Account
Programme: Direction, Inspection & Administration

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	1245556	19166	1264722	9.84	2573984	23168	2597152	15.25	2573984	26471	2600455	14.99
2	Arunachal Pradesh	333866	323932	657798	94.70	439800	345590	785390	97.03	439800	382260	822060	97.16
3	Assam	71539	101358	172897	2.20	72120	132060	204180	1.53	82525	137320	219845	1.68
4	Bihar	0	196314	196314	1.19	0	320049	320049	1.12	0	323658	323658	1.09
5	Goa	0	17093	17093	3.11	0	17582	17582	3.14	0	18730	18730	3.17
6	Gujarat	1310	87125	88435	0.52	17000	90495	107495	0.65	17000	92929	109929	0.57
7	Haryana	4310	357291	361601	6.66	5250	243117	248367	4.83	5850	266031	271881	5.46
8	Himachal Pradesh	39561	89208	128769	3.32	70085	63578	133663	3.26	87870	71047	158917	3.30
9	Jammu & Kashmir	23558	132451	156009	7.48	29046	200157	229203	7.02	39555	212060	251615	7.25
10	Karnataka	23644	3286	26930	0.21	45000	5338	50338	0.34	25000	5875	30875	0.18
11	Kerala	0	124845	124845	1.38	0	181794	181794	1.47	0	169933	169933	1.32
12	Madhya Pradesh	100932	425713	526645	3.33	76181	348250	424431	2.75	79825	278698	358523	2.26
13	Maharashtra	10714	264017	274731	1.17	11050	612161	623211	1.44	12613	483201	495814	1.67
14	Manipur	725	43919	44644	5.53	574	63125	63699	3.05	580	44509	45089	3.11
15	Meghalaya	3200	19050	22250	2.51	3400	25080	28480	2.48	4400	27377	31777	2.44
16	Mizoram	10012	10459	20471	3.50	15795	14710	30505	4.18	8245	13860	22105	3.25
17	Nagaland	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
18	Orissa	36608	157437	194045	2.41	46675	176446	223121	1.96	54861	178982	233843	2.26
19	Punjab	0	225104	225104	4.44	0	49136	49136	0.87	0	51873	51873	0.86

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Direction, Inspection & Administration

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	143063	262061	405124	2.72	154284	242750	397034	2.27	154000	264696	418696	2.23
21	Sikkim	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
22	Tamil Nadu	2021	487255	489276	2.67	3715	882288	886003	4.68	4136	867583	871719	4.42
23	Tripura	2420	56266	58686	5.11	3260	96464	99724	5.78	4996	120894	125890	6.41
24	Uttar Pradesh	21184	460133	481317	1.51	7251	547098	554349	1.77	12922	595747	608669	1.92
25	West Bengal	240	197166	197406	2.05	7567	222335	229902	1.92	10238	234337	244575	2.01
	Total States	2074463	4060649	6135112	2.78	3582037	4902771	8484808	3.04	3618400	4868071	8486471	3.08
26	A. & N. Islands	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Chandigarh	3442	242832	246274	94.60	5243	258953	264196	93.40	2220	272417	274637	93.39
28	Dadra & Nagar Haveli	10760	51465	62225	78.46	10947	56845	67792	78.61	13105	60795	73900	86.83
29	Daman & Diu	1685	51752	53437	100.00	1300	60100	61400	95.94	1160	62500	63660	99.07
30	Delhi	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
31	Lakshadueep	0	820	820	1.02	0	0	0	0.00	0	0	0	0.00
32	Pondicherry	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total U.T.	15887	346869	362756	12.79	17490	375898	393388	11.73	16485	395712	412197	11.48
	Total (State & Uts)	2090350	4407518	6497868	2.91	3599527	5278669	8878196	3.14	3634885	5263783	8898668	3.19

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Government Primary Schools

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	25334	361835	387169	3.01	5531	511621	517152	3.04	2890	539133	542023	3.12
2	Arunachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Assam	1256218	5563708	6819926	86.90	1194680	10122304	11316984	84.99	1219683	10188633	11408316	86.98
4	Bihar	299591	15092101	15391692	92.94	429248	26118590	26547838	92.72	498550	26613832	27112382	91.38
5	Goa	2224	429691	431915	78.56	1100	436792	437892	78.17	1100	469102	470202	79.68
6	Gujarat	130322	15293880	15424202	91.51	397090	13904927	14302017	87.13	853022	15994700	16847722	87.44
7	Haryana	495618	4307510	4803128	88.49	500818	4028163	4528981	88.10	495285	3847402	4342687	87.19
8	Himachal Pradesh	994658	2502296	3496954	90.09	894333	2543980	3438313	83.79	1139163	2844536	3983699	82.68
9	Jammu & Kashmir	272307	1530967	1803274	86.45	335733	2313568	2649301	81.09	429248	2301268	2730516	78.66
10	Karnataka	332048	0	332048	2.55	30000	0	30000	0.20	30000	0	30000	0.17
11	Kerala	18254	3331505	3349759	37.07	19000	4832605	4851605	39.31	24500	4960212	4984712	38.79
12	Madhya Pradesh	1118736	13239182	14357918	90.84	1411256	11565035	12976291	84.14	967403	12222779	13190182	83.13
13	Maharashtra	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
14	Manipur	53801	575915	629716	78.02	94412	1430645	1525057	72.90	60600	946018	1006618	69.46
15	Meghalaya	65703	380264	445967	50.27	124000	406346	530346	46.24	143800	475268	619068	47.56
16	Mizoram	48660	406024	454684	77.64	40909	543935	584844	80.15	33300	526505	559805	82.43
17	Nagaland	63230	748446	811676	98.28	57298	861283	918581	98.51	57298	1007110	1064408	98.72
18	Orissa	278759	6786940	7065699	87.84	862329	9575032	10437361	91.56	396394	9005240	9401634	90.82
19	Punjab	10801	4792389	4803190	94.77	15228	5525201	5540429	97.83	31095	5895080	5926175	97.93

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Government Primary Schools

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	382794	7588837	7971631	53.60	489719	8302529	8792248	50.28	590048	9083900	9673948	51.55
21	Sikkim	235193	437895	673088	97.40	160000	476500	636500	96.42	116870	515500	632370	95.30
22	Tamil Nadu	34510	11300411	11334921	61.91	70000	11246528	11316528	59.80	70000	11446443	11516443	58.33
23	Tripura	350282	705148	1055430	91.92	529114	1050472	1579586	91.56	606779	1172532	1779311	90.66
24	Uttar Pradesh	0	75503	75503	0.24	0	87489	87489	0.28	0	94782	94782	0.30
25	West Bengal	1	32772	32773	0.34	1398	18162	19560	0.16	469	19130	19599	0.16
	Total States	6469044	95483219	101952263	46.18	7663196	115901707	123564903	44.29	7767497	120169105	127936602	46.43
26	A. & N. Islands	87855	267291	355146	91.59	76336	264086	340422	91.64	46855	277431	324286	90.84
27	Chandigarh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
28	Dadra & Nagar Haveli	30	0	30	0.04	30	0	30	0.03	30	0	30	0.04
29	Daman & Diu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
30	Delhi	34	0	34	0.00	50	0	50	0.00	500	0	500	0.02
31	Lakshadweep	7513	72406	79919	98.98	350	2450	2800	3.07	327	4050	4377	3.90
32	Pondicherry	179	354373	354552	84.04	406	347314	347720	77.26	367	361415	361782	77.82
	Total U.T.	95611	694070	789681	27.83	77172	613850	691022	20.61	48079	642896	690975	19.24
	Total (State & UTs)	6564655	96177289	102741944	45.94	7740368	116515557	124255925	44.01	7815576	120812001	128627577	46.08

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Assistance to Non-Government Primary Schools

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	984	954255	955239	7.43	0	989085	989085	5.81	0	1077034	1077034	6.21
2	Arunachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Assam	0	40333	40333	0.51	0	51919	51919	0.39	0	55725	55725	0.42
4	Bihar	0	0	0	0.00	0	200000	200000	0.70	0	200000	200000	0.67
5	Goa	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
6	Gujarat	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
7	Haryana	0	51768	51768	0.95	0	85940	85940	1.67	0	114118	114118	2.29
8	Himachal Pradesh	13319	0	13319	0.34	20795	0	20795	0.51	17100	0	17100	0.35
9	Jammu & Kashmir	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
10	Karnataka	0	145	145	0.00	0	0	0	0.00	0	0	0	0.00
11	Kerala	0	5095440	5095440	56.39	0	6921170	6921170	56.08	0	7260731	7260731	56.50
12	Madhya Pradesh	37200	416320	453520	2.87	19300	388823	408123	2.65	15440	311058	326498	2.06
13	Maharashtra	0	16334	16334	0.07	0	30180	30180	0.07	0	19290	19290	0.07
14	Manipur	42129	35136	77265	9.57	36800	106979	143779	6.87	33602	48000	81602	5.63
15	Meghalaya	156332	237159	393491	44.35	265850	274930	540780	47.15	293800	321183	614983	47.25
16	Mizoram	50441	53275	103716	17.71	91000	12195	103195	14.14	81475	50	81525	12.00
17	Nagaland	800	0	800	0.10	900	0	900	0.10	900	0	900	0.00
18	Orissa	53899	41146	95045	1.18	64341	47244	111585	0.98	65309	58776	124085	1.20
19	Punjab	0	34958	34958	0.69	0	32300	32300	0.57	0	32300	32300	0.53

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Assistance to Non-Government Primary Schools

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	995	264119	265114	1.78	0	323645	323645	1.85	0	323646	323646	1.72
21	Sikkim	4861	0	4861	0.70	5000	0	5000	0.76	5000	0	5000	0.75
22	Tamil Nadu	28431	5608722	5637153	30.79	157514	5683900	5841414	30.87	182073	6303900	6485973	32.85
23	Tripura	200	26041	26241	2.29	100	34797	34897	2.02	200	41756	41956	2.14
24	Uttar Pradesh	1000000	28636115	29636115	92.94	1175593	25708551	26884144	85.83	2379928	26700854	29080782	91.88
25	West Bengal	0	8539400	8539400	88.52	0	10279320	10279320	85.75	0	10127164	10127164	83.34
	Total States	1389591	50050666	51440257	23.30	1837193	51170978	53008171	19.00	3074827	52995585	56070412	20.35
26	A. & N. Islands	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Chandigarh	0	6766	6766	2.60	0	9323	9323	3.30	0	9652	9652	3.28
28	Dadra & Nagar Haveli	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
29	Daman & Diu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
30	Delhi	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
31	Lakshadweep	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
32	Pondicherry	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total U.T.	0	6766	6766	0.24	0	9323	9323	0.28	0	9652	9652	0.27
	Total (State & UTs)	1389591	50057432	51447023	23.01	1837193	51180301	53017494	18.78	3074827	53005237	56080064	20.09

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Assistance to Local Bodies for Primary Education

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	423560	7917498	8341058	64.92	270886	11014144	11285030	66.26	8200	11310431	11318631	65.24
2	Arunachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Assam	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
4	Bihar	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
5	Goa	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
6	Gujarat	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
7	Haryana	0	417	417	0.01	0	1200	1200	0.02	0	480	480	0.01
8	Himachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Jammu & Kashmir	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
10	Karnataka	1265304	10486319	11751623	90.13	2067466	11620384	13687850	93.48	29822373	0	16221287	94.46
11	Kerala	0	403453	403453	4.47	0	322616	322616	2.61	0	0	368825	2.87
12	Madhya Pradesh	390960	0	390960	2.47	508200	1005000	1513200	9.81	0	0	1713450	10.80
13	Maharashtra	716869	22124650	22841519	97.65	986761	41179465	42166226	97.55	0	0	28855847	97.25
14	Manipur	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
15	Meghalaya	200	1372	1572	0.18	800	540	1340	0.12	0	0	1900	0.15
16	Mizoram	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Nagaland	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
18	Orissa	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
19	Punjab	0	0	0	0.00	0	19	19	0.00	0	0	19	0.00

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Assistance to Local Bodies for Primary Education

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	251066	4469440	4720506	31.74	715770	5312900	6028670	34.48	0	0	6224629	33.17
21	Sikkim	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
22	Tamil Nadu	0	147310	147310	0.80	0	80000	80000	0.42	0	0	80000	0.41
23	Tripura	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
24	Uttar Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
25	West Bengal	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total States	3047959	45550459	48598418	22.01	4549883	70536268	75086151	26.92	0	0	64785068	23.51
26	A. & N. Islands	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Chandigarh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
28	Dadra & Nagar Haveli	600	247	847	1.07	800	500	1300	1.51	800	305	1105	1.30
29	Daman & Diu	0	0	0	0.00	2400	200	2600	4.06	400	200	600	0.93
30	Delhi	629400	847775	1477175	95.07	777500	1123254	1900754	94.69	1023000	1070919	2093919	94.56
31	Lakshadweep	0	0	0	0.00	8580	79880	88460	96.93	8382	99589	107971	96.10
32	Pondicherry	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total U.T.	630000	848022	1478022	52.09	789280	1203834	1993114	59.44	1032582	1171013	2203595	61.35
	Total (State & UTs)	3677959	46398481	50076440	22.39	5339163	71740102	77079265	27.30	1032582	1171013	66988663	24.00

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Teachers' Training

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	52443	9915	62358	0.49	90490	1854	92344	0.54	90490	2681	93171	0.54
2	Arunachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Assam	0	4	4	0.00	0	147	147166	0.00	0	147	147	0.00
4	Bihar	0	47124	47124	0.28	0	110265	110265	0.39	4425	102572	106997	0.36
5	Goa	0	1736	1736	0.32	0	1686	1686	0.30	0	1840	1840	0.31
6	Gujarat	0	100944	100944	0.60	0	88500	88500	0.54	0	100000	100000	0.52
7	Haryana	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
8	Himachal Pradesh	45739	0	45739	1.18	25401	0	25401	0.62	27911	0	27911	0.58
9	Jammu & Kashmir	16478	92642	109120	5.23	20316	139998	160314	4.91	29849	160025	189874	5.47
10	Karnataka	385	76245	76630	0.59	700	98611	99311	0.68	1000	150474	151474	0.88
11	Kerala	51414	0	51414	0.57	41000	0	41000	0.33	41000	0	41000	0.32
12	Madhya Pradesh	0	28052	28052	0.18	0	9060	9060	0.06	0	9435	9435	0.06
13	Maharashtra	35	167966	168001	0.72	3000	257728	260728	0.60	0	202470	202470	0.68
14	Manipur	52	0	52	0.01	90	0	90	0.00	50	0	50	0.00
15	Meghalaya	0	800	800	0.09	0	0	0	0.00	0	0	0	0.00
16	Mizoram	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Nagaland	935	5350	6285	0.76	950	6047	6997166	0.75	950	6047	6997	0.65
18	Orissa	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
19	Punjab	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Teachers' Training

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
21	Sikkim	1989	4417	6406	0.93	12700	4550	17250	2.61	8700	4626	13326	2.01
22	Tamil Nadu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
23	Tripura	0	7460	7460	0.65	100	10609	10709166	0.62	1900	13057	14957	0.76
24	Uttar Pradesh	2596	109060	111656	0.35	0	142429	142429	0.45	0	150658	150658	0.48
25	West Bengal	9642	39601	49243	0.51	38750	71281	110031	0.92	40100	74205	114305	0.94
	Total States	181708	691316	873024	0.40	233497	942765	19011907	0.42	246375	978237	1224612	0.00
26	A. & N. Islands	3753	4777	8530	2.20	2557	3863	6420	1.73	3292	4119	7411	2.08
27	Chandigarh	279	6120	6399	2.46	279	8220	8499	3.00	380	8550	8930	3.04
28	Dadra & Nagar Haveli	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
29	Daman & Diu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
30	Delhi	56264	0	56264	3.62	69700	0	69700	3.47	69700	0	69700	3.15
31	Lakshadweep	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
32	Pondicherry	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total U.T.	60296	10897	71193	2.51	72536	12083	84619	2.52	73372	12669	86041	2.40
	Total (State & U.T.s)	242004	702213	944217	0.42	306033	954848	19096526	0.45	319747	990906	1310653	0.47

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Non-Formal Education

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	251350	2296	253646	1.97	388159	948	389107	2.28	353811	0	353811	2.04
2	Arunachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Assam	0	373	373	0.00	0	0	0	0.00	0	0	0	0.00
4	Bihar	101341	0	101341	0.61	199515	0	199515	0.70	431959	0	431959	1.46
5	Goa	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
6	Gujarat	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
7	Haryana	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
8	Himachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Jammu & Kashmir	2638	14833	17471	0.84	3252	22415	25667	0.79	4228	22665	26893	0.77
10	Karnataka	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
11	Kerala	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
12	Madhya Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
13	Maharashtra	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
14	Manipur	17082	0	17082	2.12	4400	0	4400	0.21	4400	0	4400	0.30
15	Meghalaya	900	0	900	0.10	1000	0	1000	0.09	1000	0	1000	0.08
16	Mizoram	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Nagaland	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
18	Orissa	72919	0	72919	0.91	104413	0	104413	0.92	106425	0	106425	1.03
19	Punjab	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Non-Formal Education

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	113293	5583	118876	0.80	116365	6790	123155	0.70	123595	7490	131085	0.70
21	Sikkim	67	0	67	0.01	100	0	100	0.02	10	0	10	0.00
22	Tamil Nadu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
23	Tripura	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
24	Uttar Pradesh	287127	0	287127	0.90	558711	3	558714	1.78	677625	0	677625	2.14
25	West Bengal	45	863	908	0.01	1400	8055	9455	0.08	1400	8058	9458	0.08
	Total States	846762	23948	870710	0.39	1377315	38211	1415526	0.51	1704453	38213	1742666	0.63
26	A. & N. Islands	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Chandigarh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
28	Dadra & Nagar Haveli	50	0	50	0.06	50	0	50	0.06	50	0	50	0.06
29	Daman & Diu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
30	Delhi	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
31	Lakskadweep	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
32	Pondicherry	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total U.T.	50	0	50	0.06	50	0	50	0.06	50	0	50	0.00
	Total (State & UTs)	846812	23948	870760	0.39	1377365	38211	1415576	0.50	1704503	38213	1742716	0.62

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Scholarships

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	51	8293	8344	0.06	0	10000	10000	0.06	0	21900	21900	0.13
2	Arunachal Pradesh	21935	0	21935	3.16	24000	0	24000	2.97	24000	0	24000	2.84
3	Assam	0	1391	1391	0.02	0	2025	2025	0.02	0	2025	2025	0.02
4	Bihar	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
5	Goa	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
6	Gujarat	2282	0	2282	0.01	4586	0	4586	0.03	4586	0	4586	0.02
7	Haryana	45560	3834	49394	0.91	54060	3844	57904	1.13	42360	3825	46185	0.93
8	Hinachal Pradesh	40513	701	41214	1.06	37380	850	38230	0.93	31800	0	31800	0.66
9	Jammu & Kashmir	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
10	Karnataka	274747	0	274747	2.11	142500	0	142500	0.97	142000	0	142000	0.83
11	Kerala	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
12	Madhya Pradesh	15000	0	15000	0.09	14800	110	14910	0.10	14800	110	14910	0.09
13	Maharashtra	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
14	Manipur	22	0	22	0.00	15	0	15	0.00	15	0	15	0.00
15	Meghalaya	0	0	0	0.00	0	0	0	0.00	500	0	500	0.04
16	Mizoram	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Nagaland	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
18	Orissa	0	2639	2639	0.03	0	2640	2640	0.02	0	2640	2640	0.23
19	Punjab	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Scholarships

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	0	0	0	0.00	5330	32144	37474	0.21	900	32144	33044	0.18
21	Sikkim	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
22	Tamil Nadu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
23	Tripura	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
24	Uttar Pradesh	0	54	54	0.00	0	7147	7147	0.02	0	7147	7147	0.02
25	West Bengal	19636	4538	24174	0.25	43500	9000	52500	0.44	50000	9000	59000	0.49
	Total States	419746	21450	441196	0.20	326171	67760	393931	0.14	310961	78791	389752	0.14
26	A. & N. Islands	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Chandigarh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
28	Dadra & Nagar Haveli	0	0	0	0.00	1000	0	1000	1.16	100	0	100	0.12
29	Daman & Diu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
30	Delhi	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
31	Lakshadweep	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
32	Pondicherry	0	7	7	0.00	0	9	9	0.00	0	12	12	0.00
	Total U.T.	0	7	7	0.00	1000	9	1009	0.03	100	12	112	0.00
	Total (State & UTs)	419746	21457	441203	0.20	327171	67769	394940	0.14	311061	78803	389864	0.14

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Text Books

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
2	Arunachal Pradesh	14876	0	14876	2.14	0	0	0	0.00	0	0	0	0.00
3	Assam	21199	0	21199	0.27	20008	30370	50378	0.38	30000	370	30370	0.23
4	Bihar	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
5	Goa	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
6	Gujarat	182688	0	182688	1.08	203000	0	203000	1.24	194850	0	194850	1.01
7	Haryana	2185	117697	119882	2.21	2035	138475	140510	2.73	3000	150109	153109	3.07
8	Himachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
9	Jammu & Kashmir	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
10	Karnataka	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
11	Kerala	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
12	Madhya Pradesh	31584	0	31584	0.20	75000	0	75000	0.49	62000	0	62000	0.39
13	Maharasntra	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
14	Manipur	0	0	0	0.00	55	0	55	0.00	35	0	35	0.00
15	Meghalaya	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
16	Mizoram	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
17	Nagaland	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
18	Orissa	3431	113284	116715	1.45	3593	104127	107720	0.94	3815	120776	124591	1.20
19	Punjab	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00

(Contd.)

Table 36. *(Contd.)*

Account: Revenue Account
Programme: Text Books

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
21	Sikkim	5880	0	5880	0.85	100	0	100	0.02	2000	0	2000	0.30
22	Tamil Nadu	174098	0	174098	0.95	175626	0	175626	0.93	175626	0	175626	0.89
23	Tripura	293	37	330	0.03	300	45	345	0.02	500	51	551	0.03
24	Uttar Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
25	West Bengal	23662	123432	147094	1.52	52315	121500	173815	1.45	35000	130000	165000	1.36
	Total States	459896	354450	814346	0.37	532032	394517	926549	0.33	506826	401306	908132	0.33
26	A. & N. Islands	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
27	Chandigarh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
28	Dadra & Nagar Haveli	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
29	Daman & Diu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
30	Delhi	2626	0	2626	0.17	13500	0	13500	0.67	16500	0	16500	0.75
31	Lakshadweep	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
32	Pondicherry	21467	0	21467	5.09	42160	0	42160	9.37	36140	0	36140	7.77
	Total U.T.	24093	0	24093	0.85	55660	0	55660	1.66	52640	0	52640	1.47
	Total (State & Uts)	483989	354450	838439	0.37	587692	394517	982209	0.35	559466	401306	960772	0.34

(Contd.)

Table 36. *(Concld.)*

Account: Revenue Account
Programme: Other Expenditure

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Andhra Pradesh	1521789	53558	1575347	12.26	1125213	25355	1150568	6.76	1315402	27329	1342731	7.74
2	Arunachal Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
3	Assam	791061	693	791754	10.09	1151222	538196	1689418	12.69	1398677	1572	1400249	10.68
4	Bihar	812853	12247	825100	4.98	1249035	5758	1254793	4.38	1485963	7878	1493841	5.04
5	Goa	14824	84188	99012	18.01	13631	89400	103031	18.39	13637	85714	99351	16.84
6	Gujarat	566320	489665	1055985	6.27	680794	1028716	1709510	10.41	1321390	688498	2009888	10.43
7	Haryana	37500	4000	41500	0.76	74087	4000	78087	1.52	48100	4100	52200	1.05
8	Himachal Pradesh	70368	85295	155663	4.01	362101	85187	447288	10.90	512498	86252	598750	12.43
9	Jammu & Kashmir	0	0	0	0.00	202800	0	202800	6.21	202400	70062	272462	7.85
10	Karnataka	551401	24360	575761	4.42	603500	28361	631861	4.32	567000	30486	597486	3.48
11	Kerala	3205	7552	10757	0.12	5000	19046	24046	0.19	7500	18671	26171	0.20
12	Madhya Pradesh	40	1500	1540	0.01	1	1980	1981	0.01	189533	1980	191513	1.21
13	Maharashtra	90073	0	90073	0.39	145287	0	145287	0.34	99428	0	99428	0.34
14	Manipur	38370	0	38370	4.75	49025	305764	354789	16.96	5608	305764	311372	21.49
15	Meghalaya	20208	2019	22227	2.51	43100	1902	45002	3.92	30500	1905	32405	2.49
16	Mizoram	2353	4372	6725	1.15	3000	8150	11150	1.53	3000	12680	15680	2.31
17	Nagaland	7150	0	7150	0.87	5955	0	5955	0.64	5955	0	5955	0.55
18	Orissa	496013	727	496740	6.18	411322	833	412155	3.62	357674	833	358507	3.46
19	Punjab	5110	60	5170	0.10	41270	0	41270	0.73	41270	0	41270	0.68

(Contd.)

Table 36. *(Concld.)*

Account: Revenue Account
Programme: Other Expenditure

(Rs in thousands)

Sr. No.	State/Union Territory	1998-99 (Actuals)				1999-00 (R.E.)				2000-01 (B.E.)			
		Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% Age to Total Exp. on Pmy. Edu.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
20	Rajasthan	698417	692067	1390484	9.35	1154708	628108	1782816	10.20	1185289	774239	1959528	10.44
21	Sikkim	736	0	736	0.11	1200	0	1200	0.18	10830	0	10830	1.63
22	Tamil Nadu	527406	0	527406	2.88	622901	0	622901	3.29	614437	0	614437	3.11
23	Tripura	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
24	Uttar Pradesh	1268005	27727	1295732	4.06	2745959	343361	3089320	9.86	701823	329176	1030999	3.26
25	West Bengal	259565	395782	655347	6.79	898150	215301	1113451	9.29	1196192	215726	1411918	11.62
	Total States	7782767	1885812	9668579	4.38	11589261	3329418	14918679	5.35	11314106	2662865	13976971	5.07
26	A. & N. Islands	10015	14072	24087	6.21	12207	12436	24643	6.63	12328	12950	25278	7.08
27	Chandigarh	0	890	890	0.34	0	860	860	0.30	0	860	860	0.29
28	Dadra & Nagar Haveli	12833	3321	16154	20.37	12811	3260	16071	18.63	7120	2800	9920	11.66
29	Daman & Diu	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
30	Delhi	17668	0	17668	1.14	23361	0	23361	1.16	33700	0	33700	1.52
31	Lakshadweep	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
32	Pondicherry	33632	12229	45861	10.87	51745	8449	60194	13.37	57762	9206	66968	14.40
	Total U.T.	74148	30512	104660	3.69	100124	25005	125129	3.73	110910	25816	136726	3.81
	Total (State & UTs)	7856915	1916324	9773239	4.37	11689385	3354423	15043808	5.33	11425016	2688681	14113697	5.06

Table 37. Plan and Non-Plan Budgeted Expenditure on Elementary Education (Sub-head wise), 2002-03 to 2004-05

Account: Revenue Account;
Programme: Direction, Inspection & Administration

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh	98766	0	98766	0.63	79602	0	79602	0.39	147542	0	147542	0.66
2	Arunachal Pradesh	395381	381866	777247	89.44	449708	45010	494718	72.88	420958	457305	878263	92.43
3	Assam	15403	148533	163936	1.54	49510	156680	206190	1.47	35810	436378	472188	2.53
4	Bihar	0	260969	260969	1.92	0	232090	232090	1.01	0	244868	244868	0.95
5	Chhattisgarh	50290	127337	177627	3.67	56580	137691	194271	2.82	62280	202028	264308	3.61
6	Goa	0	20353	20353	3.46	0	19010	19010	3.19	0	20010	20010	3.29
7	Gujarat	11943	75003	86946	0.48	15250	90135	105385	0.58	34500	89960	124460	0.66
8	Haryana	18000	237241	255241	3.78	11915	259071	270986	3.73	24418	281857	306275	3.89
9	Himachal Pradesh	53788	67528	121316	2.38	36700	106172	142872	2.57	16250	107419	123669	2.16
10	Jammu & Kashmir	0	157456	157456	4.25	0	157932	157932	3.96	0	159676	159676	3.96
11	Jharkhand	0	97409	97409	1.36	0	106878	106878	1.32	0	99977	99977	1.00
12	Karnataka	10341	4570	14911	0.08	5000	3787	8787	0.04	4000	3986	7986	0.03
13	Kerala	50000	4074031	4124031	25.37	15000	4930082	4945082	27.90	0	5317072	5317072	26.04
14	Madhya Pradesh	130722	342706	473428	3.28	148413	327917	476330	3.24	3	421506	421509	4.60
15	Maharashtra	0	427220	427220	1.05	0	468426	468426	1.11	0	486217	486217	1.21
16	Manipur	2890	117767	120657	9.17	4000	44318	48318	3.27	6000	48054	54054	3.74
17	Meghalaya	3299	25644	28943	2.32	4620	31115	35735	2.75	4402	30860	35262	2.55
18	Mizoram	9988	16692	26680	2.93	57000	15165	72165	7.23	85630	16195	101825	10.18
19	Nagaland	0	0	0	0	0	0	0	0.00	0	0	0	0.00
20	Orissa	0	254809	254809	2.43	0	264843	264843	2.39	0	261645	261645	2.40
21	Punjab	0	53856	53856	0.93	0	67994	67994	1.14	0	76419	76419	1.12

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Direction, Inspection & Administration

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp on Pmy. Edu
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	173501	274402	447903	2.39	231050	301918	532968	2.42	396701	58514	455215	1.99
23	Sikkim	139	0	139	0.02	400	0	400	0.06	200	0	200	0.03
24	Tamil Nadu	0	523431	523431	3.16	0	597286	597286	3.12	7700	644741	652441	3.19
25	Tripura	825	189847	190672	8.13	2300	196427	198727	8.00	840	211597	212437	7.42
26	Uttaranchal	557	62542	63099	1.46	14195	69687	83882	1.93	13	31	44	0.00
27	Uttar Pradesh	809	411440	412249	1.23	3229	558343	561572	1.55	3356	585974	589330	1.66
28	West Bengal	230	377803	378033	2.57	244	402921	403165	2.57	200	417751	417951	2.49
	Total States	1026872	8730455	9757327	3.38	1184716	9590898	10775614	3.30	1250803	10680040	11930843	3.47
29	A. & N. Islands												
30	Chandigarh	20108	302973	323081	94.22	64230	305705	369935	93.59	57240	316650	373890	90.68
31	Dadra & Nagar Haveli	11249	65493	76742	65.70	9610	68055	77665	63.48	10050	71050	81100	62.12
32	Daman & Diu	722	64848	65570	95.49	1800	69700	71500	93.83	1600	71700	73300	93.97
33	Delhi												0.00
34	Lakshadweep												0.00
35	Pondicherry												0.00
	Total U.T.	32079	433314	465393	12.00	75640	443460	519100	12.96	68890	459400	528290	10.88
	Total (State & UTs)	1058951	9163769	10222720	3.50	1260356	10034358	11294714	3.42	1319693	11139440	12459133	3.58

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Government Primary Schools

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh	1,63,005	6,45,726	8,08,731	5.13	98,543	7,60,980	8,59,523	4.21	1,09,655	7,84,066	8,93,721	4.02
2	Arunachal Pradesh	24,065	0	24,065	2.77	62,800	0	62,800	9.25	34,000	0	34,000	3.58
3	Assam	13,50,490	81,83,067	95,33,557	89.47	12,90,358	1,09,86,242	1,22,76,600	87.48	2,88,850	1,62,08,352	1,64,97,202	88.38
4	Bihar	0	1,30,76,880	1,30,76,880	95.98	2,82,090	2,02,71,210	2,05,53,300	89.48	4,93,460	2,31,53,020	2,36,46,480	91.59
5	Chhattisgarh	5,24,497	35,74,598	40,99,095	84.71	22,00,754	37,52,499	59,53,253	86.57	23,22,659	38,92,327	62,14,986	84.93
6	Goa	5,900	4,23,419	4,29,319	73.05	5,700	4,33,090	4,38,790	73.54	200	4,22,305	4,22,505	69.39
7	Gujarat	1,55,261	1,64,37,008	1,65,92,269	91.20	11,38,901	1,54,85,535	1,66,24,436	91.06	10,55,222	1,57,89,376	1,68,44,598	89.27
8	Haryana	1,00,707	60,37,370	61,38,077	90.84	1,22,040	64,17,420	65,39,460	89.98	1,33,870	67,16,789	68,50,659	86.98
9	Himachal Pradesh	17,24,536	30,04,652	47,29,188	92.80	3,35,300	48,40,896	51,76,196	92.94	3,36,295	49,43,254	52,79,549	92.12
10	Jammu & Kashmir	7,27,931	27,84,053	35,11,984	94.77	7,73,019	30,24,061	37,97,080	95.13	8,20,900	31,23,779	39,44,679	95.30
11	Jharkhand	0	67,78,241	67,78,241	94.50	1,28,911	67,22,976	68,51,887	84.49	45,834	74,09,541	74,55,375	74.84
12	Karnataka	36,500	0	36,500	0.20	15,000	0	15,000	0.07	5,000	0	5,000	0.02
13	Kerala	50,000	40,74,031	41,24,031	25.37	15,000	49,30,082	49,45,082	27.90	0	53,17,072	53,17,072	26.04
14	Madhya Pradesh	16,61,414	1,05,56,926	1,22,18,340	84.61	21,71,094	99,71,209	1,21,42,303	82.49	17,44,281	60,43,755	77,88,036	84.95
15	Maharashtra	0					0		0.00		0		
16	Manipur	9,745	7,57,687	7,67,432	58.31	34,000	8,40,530	8,74,530	59.14	30,950	8,50,530	8,81,480	60.99
17	Meghalaya	77,129	5,48,250	6,25,379	50.19	1,11,300	4,95,980	6,07,280	46.70	1,10,820	5,93,445	7,04,265	50.88
18	Mizoram	48,638	6,21,188	6,69,826	73.52	42,900	6,82,772	7,25,672	72.73	41,200	7,20,390	7,61,590	76.14
19	Nagaland	83,556	10,99,662	11,83,218	98.50	97,490	11,72,316	12,69,806	94.48	79,310	12,28,830	13,08,140	93.38
20	Orissa	1,03,896	95,57,980	96,61,876	92.28	1,20,500	1,01,21,382	1,02,41,882	92.36	70,865	1,00,31,924	1,01,02,789	92.86
21	Punjab	6,49,017	50,59,557	57,08,574	98.48	3,84,082	5,45,5651	58,39,733	97.84	7,10,300	59,75,658	66,85,958	97.91

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Government Primary Schools

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	3,125	87,91,569	87,94,694	46.99	67,579	95,40,498	96,08,077	43.58	1,35,376	28,76,572	30,11,948	13.18
23	Sikkim	1,55,323	4,40,403	5,95,726	92.57	1,52,160	4,64,820	6,16,980	92.16	1,62,360	4,94,702	6,57,062	93.73
24	Tamil Nadu	2,72,795	97,14,379	99,87,174	60.21	8,96,115	1,06,80,847	1,15,76,962	60.39	8,96,832	1,14,34,986	1,23,31,818	60.28
25	Tripura	5,05,575	16,20,806	21,26,381	90.71	5,53,565	16,77,253	22,30,818	89.78	7,81,746	18,10,916	25,92,662	90.53
26	Uttaranchal	39,468	7,800	47,268	1.09	2,42,602	10,872	2,53,474	5.84	2,42,600	9,964	2,52,564	5.31
27	Uttar Pradesh	0	1,44,153	1,44,153	0.43	0	90,450	90,450	0.25	0	95,342	95,342	0.27
28	West Bengal	0	50,294	50,294	0.34	0	53,638	53,638	0.34	0	55,781	55,781	0.33
	Total States	84,72,573	11,39,89,699	12,24,62,272	42.48	1,13,41,803	12,88,83,209	14,02,25,012	42.96	1,06,52,585	12,99,82,676	14,06,35,261	40.94
29	A. & N. Islands	68,267	3,05,046	3,73,313	84.08	67,700	3,25,620	3,93,320	84.45	66,648	3,44,450	4,11,098	80.75
30	Chandigarh	0	9,816	9,816	2.86	0	12,000	12,000	3.04	0	12,250	12,250	2.97
31	Dadra & Nagar Haveli	14,900	4,230	19,130	16.38	37,440	6,000	43,440	35.50	40,700	7,500	48,200	36.92
32	Daman & Diu												
33	Delhi					0							
34	Lakshadweep	2,010	4,767	6,777	100.00	4,700	4,300	9,000	10.00	2,400	4,000	6,400	100.00
35	Pondicherry	1,763	4,16,232	4,17,995	77.29	11,879	4,25,341	4,37,220	75.22	942	4,66,727	4,67,669	74.42
	Total U.T.	86,940	7,40,091	8,27,031	21.33	1,21,719	7,73,261	8,94,980	22.34	1,10,690	8,34,927	9,45,617	19.48
	Total (State & UTs)	85,59,513	1,14,729,790	12,32,89,303	42.20	1,14,63,522	12,96,56,470	14,11,19,992	42.71	1,07,63,275	13,08,17,603	14,15,80,878	40.64

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Assistance to Non-Govt. Primary Schools

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh	0	1,181,602	1,181,602	7.49	0	1,157,337	1,157,337	5.67	0	1,182,605	1,182,605	5.31
2	Arunachal Pradesh	0											
3	Assam	79,993	124,338	204,331	1.92	101,692	133,506	235,198	1.68	93,727	106,572	200,299	1.07
4	Bihar	0	171,580	171,580	1.26	0	78,429	78,429	0.34	0	79,741	79,741	0.31
5	Chhattisgarh	23,450	67,982	91,432	1.89	8,727	66,680	75,407	1.10	4,731	67,530	72,261	0.99
6	Goa	0											
7	Gujarat												
8	Haryana	0	85,795	85,795	1.27	0	64,218	64,218	0.88	0	83,893	83,893	1.07
9	Himachal Pradesh	19,577	0	19,577	0.38	0	19,096	19,096	0.34	0	17,596	17,596	0.31
10	Jammu & Kashmir												
11	Jharkhand	0	270,000	270,000	3.76	0	270,000	270,000	3.33	0	270,000	270,000	2.71
12	Karnataka	0	0	0	0.00	25,000	0	25,000	0.12	5,000	0	5,000	0.02
13	Kerala	0	7,113,184	7,113,184	43.76	0	6,926,980	6,926,980	39.08	0	8,888,191	8,888,191	13.54
14	Madhya Pradesh	6,417	261,682	268,099	1.86	75,362	273,750	349,112	2.37	69,740	60,037	129,777	1.42
15	Maharashtra	0	18,857	18,857	0.05	0	20,932	20,932	0.05	0	20,716	20,716	0.05
16	Manipur	54,902	104,108	159,010	12.08	31,986	108,464	140,450	9.50	28,536	68,964	97,500	6.75
17	Meghalaya	222,168	354,720	576,888	46.30	261,750	380,240	641,990	49.37	247,580	391,052	638,632	46.14
18	Mizoram	183,758	30,768	214,526	23.55	155,400	44,593	199,993	20.04	127,400	9,440	136,840	13.68
19	Nagaland	4,000	2,000	6,000	0.50	6,000	2,000	8,000	0.60	5,000	2,000	7,000	0.50
20	Orissa	53,442	38,612	92,054	0.88	67,199	62,291	129,490	1.17	50,383	44,741	95,124	0.87
21	Punjab	0	34,364	34,364	0.59	0	61,000	61,000	1.02	0	66,512	66,512	0.97

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Assistance to Non-Govt. Primary Schools

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	0	297,411	297,411	1.59	0	317,897	317,897	1.44	0	317,897	317,897	1.39
23	Sikkim	2,556	0	2,556	0.40	4,000	0	4,000	0.60	2,500	0	2,500	0.36
24	Tamil Nadu	0	5,459,547	5,459,547	32.97	0	6,354,774	6,354,774	33.15	0	6,899,229	6,899,229	33.73
25	Tripura	200	0	200	0.01	200	39,041	39,241	1.58	20	42,150	42,170	1.47
26	Uttaranchal	75,023	4,077,486	4,152,509	95.87	102,351	3,822,202	3,924,553	90.42	169,210	4,252,202	4,421,412	93.04
27	Uttar Pradesh	1,202,806	30,968,757	32,171,563	96.23	1,066,171	33,750,624	34,816,795	96.34	693,080	33,343,758	34,036,838	96.16
28	West Bengal	0	12,390,164	12,390,164	84.39	0	13,213,946	13,213,946	84.39	0	13,812,103	13,812,103	82.45
	Total States	1,928,292	63,052,957	64,981,249	22.54	1,905,838	67,168,000	69,073,838	21.16	1,496,907	70,026,929	71,523,836	20.82
29	A. & N. Islands												
30	Chandigarh												
31	Dadra & Nagar Haveli												
32	Daman & Diu												
33	Delhi												
34	Lakshadweep												
35	Pondicherry												
	Total U.T.	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total (State & UTs)	1,928,292	63,052,957	64,981,249	22.24	1,905,838	67,168,000	69,073,838	20.91	1,496,907	70,026,929	71,523,836	20.53

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Assistance to Local Bodies for Primary Education

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp on Pmy. Edu	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh	9,099	12,222,275	12,231,374	77.58	4,789	14,567,970	14,572,759	71.43	4,789	14,888,612	14,893,401	66.92
2	Arunachal Pradesh				0.00		...						
3	Assam	0	0	0	0.00	94,800	371,867	466,667	3.33	84,765	452,300	537,065	2.88
4	Bihar	0									...		
5	Chhattisgarh	105,081	251,895	356,976	7.38	167,500	350,000	517,500	7.53	189,000	420,000	609,000	8.32
6	Goa												
7	Gujarat			0									
8	Haryana	0	1,220	1,220	0.02	0	1,220	1,220	0.02	0	1,520	1,520	0.02
9	Himachal Pradesh												
10	Jammu & Kashmir												
11	Jharkhand	0					0	0					
12	Karnataka	1,522,906	14,201,010	15,723,916	87.56	1,560,361	16,155,863	17,716,224	86.81	2,093,019	17,554,742	19,647,761	79.11
13	Kerala	0	883,859	883,859	5.44	0	886,201	886,201	5.00	0	872,087	872,087	4.27
14	Madhya Pradesh	694	1,478,626	1,479,320	10.24	401,032	1,347,481	1,748,513	11.88	616,873	200,510	817,383	8.92
15	Maharashtra	278,092	38,931,718	39,209,810	96.40	279,516	40,252,852	40,532,368	96.25	212,699	39,207,238	39,419,937	98.15
16	Manipur												
17	Meghalaya	13,495	884	14,379	1.15	0	950	950	0.07	0	1,050	1,050	0.08
16	Mizoram												
19	Nagaland												
20	Orissa												
21	Punjab									0			

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account; *(Rs. in Thousand)*
Programme: Assistance to Local Bodies for Primary Education

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	457,700	6,369,771	6,827,471	36.48	753,933	8,280,001	9,033,934	40.98	1,025,848	15,947,451	16,973,299	74.30
23	Sikkim	800	0	800	0.12	800	1,000	1,800	0.27	800	1,000	1,800	0.26
21	Tamil Nadu	0	72,078	72,078	0.43	0	60,001	60,001	0.31	0	60,001	60,001	0.29
25	Tripura												
26	Uttaranchal												
27	Uttar Pradesh												
28	West Bengal						0			0			
	Total States	2,387,867	74,413,336	76,801,203	26.64	3,262,731	82,275,406	85,538,137	26.21	4,227,793	89,606,511	93,834,304	27.32
29	A. & N. Islands								...				
30	Chandigarh				0.00						...		
31	Dadra & Nagar Haveli	950	300	1,250	1.07	950	300	1,250	1.02	950	300	1,250	0.96
32	Daman & Diu	2,999	100	3,099	4.51	4,500	200	4,700	6.17	4,500	200	4,700	6.03
33	Delhi	1,035,545	1,250,076	2,285,621	96.95	932,500	1,305,819	2,238,319	95.00	1,367,500	1,582,313	2,949,813	95.51
34	Lakshadweep								...		...		
35	Pondicherry		...					...				...	
	Total U.T.	1,039,494	1,250,476	2,289,970	59.06	937,950	1,306,319	2,244,269	56.03	1,372,950	1,582,813	2,955,763	60.90
	Total (State & UTs)	3,427,361	75,663,812	79,091,173	27.07	4,200,681	83,581,725	87,782,406	26.57	5,600,743	91,189,324	96,790,067	27.79

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Teachers' Training

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh	0	0	0	0.00	0	0	0	0.00	0	20,000	20,000	0.09
2	Arunachal Pradesh												
3	Assam	3,111	2,980	6,091	0.06	5,648	1,837	7,485	0.05	5,648	2,311	7,959	0.04
4	Bihar	0	62,114	62,114	0.46	0	81,557	81,557	0.36	0	88,939	88,939	0.34
5	Chhattisgarh	0	10,240	10,240	0.21	0	9,352	9,352	0.14	0	10,233	10,233	0.14
6	Goa	0	1,877	1,877	0.32	0	1,965	1,965	0.33	0	2,055	2,055	0.34
7	Gujarat	0	114,558	114,558	0.63	0	106,890	106,890	0.59	0	81,395	81,395	0.43
8	Haryana										0		
9	Himachal Pradesh										0		
1C	Jammu & Kashmir	0	36,246	36,246	0.98	0	36,246	36,246	0.91	0	34,796	34,796	0.84
11	Jharkhand	0	26,908	26,908	0.38	0	31,741	31,741	0.39	0	28,105	28,105	0.28
12	Karnataka	512	99,047	99,559	0.55	1,100	139,722	140,822	0.69	0	158,897	158,897	0.64
13	Kerala					...	...	...	...		0		
0.1	Madhya Pradesh	0	840	840	0.01	0	2,132	2,132	0.01	0	1,072	1,072	0.01
15	Maharashtra	0	214,920	214,920	0.53	0	242,853	242,853	0.58	0	235,078	235,078	0.59
16	Manipur	80	0	80	0.01	260	0	260	0.02	580	0	580	0.04
17	Meghalaya										0		
18	Mizoram						..	...			0		
19	Nagaland	0	8,136	8,136	0.68	1,700	9,143	10,843	0.81	1,983	9,516	11,499	0.82
20	Orissa	0									0		....
21	Punjab							...			0		

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Teachers' Training

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan							...					
23	Sikkim	25,769	4,278	30,047	4.67	20,600	4,115	24,715	3.69	7,825	5,573	13,398	1.91
24	Tamil Nadu												
25	Tripura	7,244	15,069	22,313	0.95	1,000	14,875	15,875	0.64	395	15,943	16,338	0.57
26	Uttaranchal	0	37,448	37,448	0.86	0	39,663	39,663	0.91	0	43,005	43,005	0.91
27	Uttar Pradesh	0	92,408	92,408	0.28	0	100,306	100,306	0.28	0	105,766	105,766	0.30
28	West Bengal	60,526	90,322	150,848	1.03	64,550	96,327	160,877	1.03	20,000	99,246	119,246	0.71
	Total States	97,242	817,391	914,633	0.32	94,858	918,724	1,013,582	0.31	36,431	941,930	978,361	
29	A. & N. Islands	3,213	4,398	7,611	1.71	2,985	5,300	8,285	1.78	2,700	5,060	7,760	1.52
30	Chandigarh	244	6,415	6,659	1.94	520	7,320	7,840	1.98	600	7,300	7,900	1.92
31	Dadra & Nagar Haveli												
32	Daman & Diu		0		0			0					
33	Delhi	15,643	0	15,643	0.66	17,800	0	17,800	0.76	18,800	0	18,800	0.61
34	Lakshadweep		0									0	
35	Pondicherry				0							0	0.00
	Total U.T.	19,100	10,813	29,913	0.77	21,305	12,620	33,925	0.85	22,100	12,360	34,460	0.71
	Total (State & UTs)	116,342	828,204	944,546	0.32	116,163	931,344	1,047,507	0.32	58,531	954,290	1,012,821	0.29

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Non-Formal Education

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh	0	0	0	0.00	0	0	0	0.00	69	0	69	0.00
2	Arunachal Pradesh												
3	Assam				0.00	0			0.00				
4	Bihar	0	53,747	53,747	0.39	0	0	0	0.00	0	0	0	0.00
5	Chhattisgarh	13,727	0	13,727	0.28	22,500	0	22,500	0.33	22,500	0	22,500	0.31
6	Goa		0									0	
7	Gujarat												
8	Haryana		0	0		0			0.00				
9	Himachal Pradesh		0										
10	Jammu & Kashmir	0		0									
11	Jharkhand			0									
12	Karnataka					0	0						
13	Kerala												
14	Madhya Pradesh												
15	Maharashtra				0.00								
16	Manipur					0							
17	Meghalaya	0	0	0	0.00	3,000	0	3,000	0.23	3,000	0	3,000	0.22
18	Mizoram		0										
19	Nagaland		0	0									
20	Orissa	52,941	0	52,941	0.51	130,000	0	130,000	1.17	230,000	0	230,000	2.11
21	Punjab												

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Non-Formal Education

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	391,378	7,587	398,965	2.13	881,285	7,720	889,005	4.03	998,800	8,020	1,006,820	4.41
23	Sikkim	0	0	0	0.00	100	0	100	0.01	50	0	50	0.01
24	Tamil Nadu	0											
25	Tripura												
26	Uttaranchal	0			0.00								
27	Uttar Pradesh	5,252	1,412	6,664	0.02	20,000	0	20,000	0.06	13,000	0	13,000	0.04
28	West Bengal	18,406	834	19,240	0.13	19,630	890	20,520	0.13	10	894	904	0.01
	Total States	481,704	63,580	545,284	0.19	1,076,515	8,610	1,085,125	0.33	1,267,429	8,914	1,276,343	0.37
29	A. & N. Islands												
30	Chandigarh												
31	Dadra & Nagar Haveli												
32	Daman & Diu												
33	Delhi												
34	Lakshadweep												
35	Pondicherry												
	Total U.T.	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
	Total (State & UTs)	481,704	63,580	545,284	0.19	1,076,515	8,610	1,085,125	0.33	1,267,429	8,914	1,276,343	0.37

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Scholarships

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh	0	0	0	0.00	0	0	0	0.00	0	0	0	0
2	Arunachal Pradesh	30,520	0	30,520	3.51	81,115	0	81,115	11.95	37,000	0	37,000	3.89
3	Assam	5	3,651	3,656	0.03	0	2,025	2,025	0.01	0	2,025	2,025	0.01
4	Bihar	0	0	0	0.00	0	0			0			
5	Chhattisgarh	16,588	98	16,686	0.34	20,000	120	20,120	0.29	20,000	120	20,120	0.27
6	Goa									0			
7	Gujarat	0		0	0.00					0	0		
8	Haryana	44,663	3,819	48,482	0.72	59,360	3,825	63,185	0.87	66,360	3,825	70,185	0.89
9	Himachal Pradesh												
10	Jammu & Kashmir							0					
11	Jharkhand			0		0				0			
12	Karnataka	287,207	0	287,207	1.60	217,000	0	217,000	1.06	421,751	0	421,751	1.70
13	Kerala			0					0.00		0		0.00
14	Madhya Pradesh	0	74	74	0.00	0	30	30	0.00	0	15	15	0.00
15	Maharashtra				0.00	0							
16	Manipur	0	0	0	0.00	300	0	300	0.02	300	0	300	0.02
17	Meghalaya	115	0	115	0.01	1,200	1,855	3,055	0.23	400	200	600	0.04
18	Mizoram				0.00		0	0	0.00	0			
19	Nagaland	0			0.00							0	
20	Orissa	0	2,546	2,546	0.02	0	2,640	2,640	0.02	0	2,640	2,640	0.02
21	Punjab				0.00						0		0.00

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Scholarships

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	0	31,820	31,820	0.17	0	32,476	32,476	0.15	0	32,476	32,476	0.14
23	Sikkim												
24	Tamil Nadu											0	
25	Tripura				0.00								
26	Uttaranchal	0	954	954	0.02	0	2,200	2,200	0.05	0	1,500	1,500	0.03
27	Uttar Pradesh	0	112,123	112,123	0.34	0	7,147	7,147	0.02	0	7,147	7,147	0.02
28	West Bengal	11,588	3,558	15,146	0.10	12,358	3,795	16,153	0.10	35,000	3,795	38,795	0.23
	Total States	390,686	158,643	549,329	0.19	391,333	56,113	447,446	0.14	580,811	53,743	634,554	0.18
29	A. & N. Islands									0			
30	Chandigarh		0		0.00							0	
31	Dadra & Nagar Haveli	35	0	35	0.03	0	0	0	0.00	0	0	0	0.00
32	Daman & Diu	0								0		0	
33	Delhi			0	0.00								
34	Lakshadweep				0.00			0	0.00				
35	Pondicherry	0	11	11	0.00	0	12	12	0.00	0	12	12	0.00
	Total U.T.	35	11	46	0.00	0	12	12	0.00	0	12	12	0.00
	Total (State & UTs)	390,721	158,654	549,375	0.19	391,333	56,125	447,458	0.14	580,811	53,755	634,566	0.18

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Text Books

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh							0		0	0		
2	Arunachal Pradesh	36,568	0	36,568	4.21	39,300	0	39,300	5.79	100	0	100	0.01
3	Assam	908	177	1,085	0.01	5,000	370	5,370	0.04	20,000	370	20,370	0.11
4	Bihar		0									0	
5	Chhattisgarh	22,168	0	22,168	0.46	31,000	0	31,000	0.45	34,000	0	34,000	0.46
6	Goa	0						0			0	0	
7	Gujarat	316,324	0	316,324	1.74	257,500	0	257,500	1.41	257,795	0	257,795	1.37
8	Haryana	2,873	93,904	96,777	1.43	3,457	105,205	108,662	1.50	3,900	110,301	114,201	1.45
9	Himachal Pradesh										0		
10	Jammu & Kashmir												
11	Jharkhand												
12	Karnataka												
13	Kerala				0.00								
14	Madhya Pradesh	0	0										
15	Maharashtra		0		0.00						0	0	
16	Manipur	132	0	132	0.01	1,900	0	1,900	0.13	300	0	300	0.02
17	Meghalaya				0.00			0					
18	Mizoram												0.00
19	Nagaland	0	0		0.00								
20	Orissa	0	177,916	177,916	1.70	0	132,907	132,907	1.20	0	131,969	131,969	1.21
21	Punjab	0											

(Contd.)

Table 37. *(Contd.)*

Account: Revenue Account;
Programme: Text Books

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	0		0							0		
23	Sikkim	10,347	0	10,347	1.61	10,000	0	10,000	1.49	6,000	0	6,000	0.86
24	Tamil Nadu	174,941	0	174,941	1.05	229,826	0	229,826	1.20	175,626	0	175,626	0.86
25	Tripura	200	66	266	0.01	0	68	68	0.00	90	75	165	0.01
26	Uttaranchal											0	
27	Uttar Pradesh		0		0.00			0	0.00	0		0	0.00
28	West Bengal	37,621	142,723	180,344	1.23	40,122	152,212	192,334	1.23	35,000	159,923	194,923	1.16
	Total States	602,082	414,786	1016,868	0.35	618,105	390,762	1,008,867	0.31	532,811	402,638	935,449	0.27
29	A. & N. Islands						0						
30	Chandigarh												
31	Dadra & Nagar Haveli												
32	Daman & Diu	...		...							...	...	0.00
33	Delhi	11,555	0	11,555	0.49	11,500	0	11,500	0.49	100,000	0	100,000	3.24
34	Lakshadheep	...		...							...		0.00
35	Pondicherry	64,689	0	64,689	11.96	87,111	0	87,111	14.99	82,853	0	82,853	13.18
	Total U.T.	76,244	0	76,244	1.97	98,611	0	98,611	2.46	182,853	0	182,853	3.77
	Total (State & UTs)	678,326	414,786	1,093,112	0.37	716,716	390,762	1,107,478	0.34	715,664	402,638	1,118,302	0.32

(Contd.)

Table 37. *(Concld.)*

Account: Revenue Account;
Programme: Other Expenditure

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	Andhra Pradesh	1,406,073	38,805	1,444,878	9.16	3,642,958	88,963	3,731,921	18.29	3,920,656	1,196,925	5,117,581	23.00
2	Arunachal Pradesh	639	0	639	0.07	909	0	909	0.13	800	0	800	0.08
3	Assam	739,834	3,386	743,220	6.97	780,724	53,631	834,355	5.95	812,025	117,707	929,732	4.98
4	Bihar	0	0	0	0.00	2,023,332	0	2,023,332	8.81	1,757,379	0	1,757,379	6.81
5	Chhattisgarh	49,477	1,716	51,193	1.06	51,500	2,000	53,500	0.78	64,044	6,000	70,044	0.96
6	Goa	13,816	122,322	136,138	23.17	25,453	111,415	136,868	22.94	45,500	118,815	164,315	26.99
7	Gujarat	784,806	297,560	1,082,366	5.95	1,093,350	69,975	1,163,325	6.37	1,503,235	58,115	1,561,350	8.27
8	Haryana	127,480	4,064	131,544	1.95	216,185	4,100	220,285	3.03	445,355	4,100	449,455	5.71
9	Himachal Pradesh	152,969	72,888	225,857	4.43	69,231	162,174	231,405	4.15	144,051	166,126	310,177	5.41
10	Jammu & Kashmir						0	0			0		
11	Jharkhand	0	0	0	0.00	849,062	0	849,062	10.47	2,107,866	0	2,107,866	21.16
12	Karnataka	1,675,650	120,058	1,795,708	10.00	2,199,500	86,657	2,286,157	11.20	4,264,050	326,431	4,590,481	18.48
13	Kerala	0	9,641	9,641	0.06	0	20,150	20,150	0.11	0	21,673	21,673	0.11
14	Madhya Pradesh	0	533	533	0.00	0	1,225	1,225	0.01	0	10,112	10,112	0.11
15	Maharashtra	802,417	0	802,417	1.97	848,645	0	848,645	2.02	0	0	0	0.00
16	Manipur	267,371	1,396	268,767	20.42	412,762	170	412,932	27.93	410,887	190	411,077	28.44
17	Meghalaya	217	177	394	0.03	6,300	2,155	8,455	0.65	300	1,150	1,450	0.10
18	Mizoram								0.00	0			
19	Nagaland	3,912	0	3,912	0.33	55,300	0	55,300	4.11	74,300	0	74,300	5.30
20	Orissa	226,953	610	227,563	2.17	186,151	833	186,984	1.69	54,601	833	55,434	0.51
21	Punjab	0					...		0.00				0.00

(Contd.)

Table 37. *(Concld.)*

Account: Revenue Account;
Programme: Other Expenditure

(Rs. in Thousand)

Sr. No.	State/Union Territory	2002-03 (Actuals)				2003-04 (R.E.)				2004-05 (B.E.)			
		Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.	Plan	Non-Plan	Total	% age to Total Exp. on Pmy. Edu.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
22	Rajasthan	247,238	1,669,912	1,917,150	10.24	516,818	1,115,193	1,632,011	7.40	542,190	505,110	1,047,300	4.58
23	Sikkim	3,910	0	3,910	0.61	11,500	0	11,500	1.72	20,000	0	20,000	2.85
24	Tamil Nadu	368,413	291	368,704	2.22	351,037	197	351,234	1.83	337,741	197	337,938	1.65
25	Tripura	4,325	0	4,325	0.18	0	0	0	0.60	0	0	0	0.00
26	Uttaranchal	30,000	0	30,000	0.69	35,000	1,652	36,652	0.94	32,200	1,200	33,400	0.70
27	Uttar Pradesh	29,830	461,574	491,404	1.47	52,516	489,620	542,136	1.50	59,089	490,620	549,709	1.55
28	West Bengal	1,011,399	487,378	1,498,777	10.21	1,078,644	519,782	1,598,426	10.21	1,716,260	396,396	2,112,656	12.61
	Total States	7,946,729	3,292,311	11,239,040	3.90	14,506,877	2,729,892	17,236,769	5.28	18,312,529	3,421,700	21,734,229	6.33
29	A. & N. Islands	51,472	11,593	63,065	14.20	55,315	8,850	64,165	13.78	73,052	17,200	90,252	17.73
30	Chandigarh	2,450	895	3,345	0.98	4,450	1,035	5,485	1.39	17,160	1,100	18,260	4.43
31	Dadra & Nagar Haveli	19,600	58	19,658	16.83	0	0	0	0.00	0	0	0	0.00
32	Daman & Diu		...										
33	Delhi	44,614	0	44,614	1.89	88,400	0	88,400	3.75	20,000	0	20,000	0.65
34	Lakshadweep	0		...									
35	Pondicherry	56,942	1,196	58,138	10.75	55,513	1,365	56,878	9.79	76,473	1,452	77,925	12.40
	Total U.T.	175,078	13,742	188,820	4.87	203,678	11,250	214,928	5.37	186,685	19,752	206,437	4.25
	Total (State & UTs)	8,121,807	3,306,053	11,427,860	3.91	14,710,555	2,741,142	17,451,697	5.28	18,499,214	3,441,452	21,940,666	6.30

BOOK REVIEW

Sengupta, Jati K.; *India's Economic Growth: A Strategy for the New Economy,* Palgrave Macmillan, New Delhi, 2005, Pp. 210 (hardbound), Price: £ 55.

Jati Sengupta, Professor of Economics at the University of California, in the book under review examines new policies of India's economic growth, emphasising on information technology, knowledge diffusion, competitive market efficiency and dynamic comparative advantages as strategies for rapid economic development and growth. The book is divided into six chapters dealing with growth synergy in India as a challenge, lessons of growth experience for India, growth theories, growth of Indian and world information technology (IT) industry, the role of science and technology in India's growth and competition and decentralisation in India's new economy.

As the author points out, the history of India's economic growth is characterised by striking features and contrasts: First, India's immense growth potential is in striking contrast to its performance in comparison with the newly industrialising countries (NICs). Second, India's huge market potential due to its large population base with a strong middle class has failed to attract huge foreign investments compared to the other NICs and even China where totalitarian controls are more perverse. Third, India's transition from a controlled and regulated economy to an open market system of competition and outward orientation has been rather slow. Further, in India, heavy bureaucratic controls and state regulations overpowered the large potential of managerial talent and leadership skills of Indians leading to inefficiency and hampering its growth. In NICs like Taiwan, rapid economic growth promoted equity in distribution of personal and sectoral incomes. Low inflation rates accompanied by high state support of primary and secondary education sector have helped the strategy of growth with equity.

It is increasingly realised that the 'new economy' is a knowledge-driven economy and knowledge sectors are the most important in the new economy. Sengupta believes in the motto 'From brain drain to brain gain'. He cites the example of the success story of the migrated Indians in the Silicon Valley and believes that the talent and skill of such Indian entrepreneurs should be sought to augment the growth process in the knowledge sector of our economy. Sengupta argues that India must encourage foreign collaborations in research ventures through universities and industrial research enterprises.

Sengupta very strongly agrees with the conclusions derived by Sivasubramonian, in his work, *Sources of Economic Growth in India 1950-51 to 1999-2000 (Oxford University Press),* that contribution of education and advances in knowledge, which reflect the possible improvements in the quality of labour and capital inputs and the adoption of modern technology have not become as important as they should be in a rapidly growing economy. The adoption of modern imported technology has been slow; moreover its diffusion has been nonexistent. Sengupta does not adduce any evidence for these propositions.

The author strongly views that information technology and its diffusion in India and throughout the world is the key to the 'New Economy', which is characterised by innovation, interdependence and investment in knowledge capital, and its growth. The growth strategy is based on three C's, namely, core competence, competition efficiency and comparative advantage, which in the broader sense includes productivity improvements, cost efficiency, economies of scale. He, however, does not comment upon the important aspect of flexible specialisation associated with the impact of information technology. Citing example of the Korean economy, which adopted strategies of liberal incentives for foreign direct investment,

intensification of the education policy and subsidies to entrepreneurs competing in the international market (as measures of outward orientation of the export market), the author proposes that as the principle of comparative advantage suggests, India too has to restructure its export trade particularly in the IT services: an urgent transition from mere body shopping to software package development, from the agency system to new start-ups and from old ways to new. He suggests that this should be the new model of policy-making for India. Sengupta believes that diffusion of benefits of export growth could be seen on other sectors of the economy especially in the form of large investment in the small and medium scale industries catering to the export sector, leading to wider growth of the economy.

Technological intensity of the export mix has changed considerably from less to more sophisticated goods and services. Referring to Sengupta and Espana [1994], Sengupta points out that the percentage share of high technology exports in total exports of Japan changed from 22.9 to 62.3 since 1960 to 85, the corresponding change for Korea is from 0.0 to 33.7 and for Taiwan from 1.3 to 32.3 during the period 1960 to 87. The author highlights that this change in percentage share of high technology exports in total exports is virtually non-existent for India. Accordingly, what is needed, according to Sengupta, is a well-developed marketing and distribution network by forging partnerships between the Indian government and the Indian entrepreneurs in the Silicon Valley. Sengupta advocates that the economic policy reforms must be such that they diffuse the gains from the IT sector to the other sectors of the economy. But Sengupta does not describe how this is to be achieved. Taking examples of countries like Korea and Japan, government's ability to combine cooperation with competition is regarded as instrumental in the success of their county's export promotion policies.

There are four types of criticisms that have been made about the development of the personal computer (PC) and software industry in India. First, it has not been useful to the masses at all, they most often being urban centred. Second, the impact of the software sector growth on other sectors and business has been negligible. Third, it has accentuated the brain-drain movement and led to large-scale exodus of trained, skilled manpower from engineering and management institutes. Finally, very few highly successful entrepreneurs from the Silicon Valley return to India to invest heavily to improve export earnings for India.

Based on the estimates made by R. Heeks [1996] on growth rates of software exports, Sengupta concludes that Indian software industry has ample scope of increasing its share in global market and that the consequent employment generation due to this would be substantial. The software sector's impact on the economy is also positively changing very rapidly. According to the estimates by National Association of Software and Services Companies (NASSCOM) during 1999, Indian software exports amounted to about 10.5 per cent of the country's total exports. Sengupta posits that one way to utilize the large talent pool, which often remains domestically un/underemployed in India, is to speed up the research-spending in both the public and private sectors.

The author also briefly analyses, in the third chapter of the book, the contributions of various eminent economists like Adam Smith (market efficiency), Alfred Marshall (scale economies), Joseph Schumpeter (innovation efficiency), Robert Solow (technical progress), Lucas and

Paul Romer (spill-over technology), Ronald Fischer (genetic evaluation theory of growth), to economics of growth. Of the modern growth theories, endogenous growth theory is the latest one. According to the endogenous growth theory (a' la Lucas [1990, 1993] and Paul Romer [1990, 1994], economic efficiency in both physical and human capital and innovations through improvements in skill and technology are the main sources of economic growth which, according to Sengupta, as mentioned above, revolve around the three main principles of comparative advantage, core competence and competitive advantage.

Sengupta in this book also tries to analyse the successful growth experiences of China, the NICs in Southeast Asia (viz., Taiwan, South Korea and Singapore), Japan and the US in terms of both historical and contemporary empirical evidence, as reported by other researchers, to see if there are any economic lessons for growth for India. Some of the striking features of Chinese growth as pointed out by Sengupta are its total factor productivity (TFP) growth resulting in significant productivity gains, the significant role played by the competitive market forces, the setting up of active links of market reforms with the export sector, the opening up of its economy to world trade and liberalisation of trade policies, maintaining a balance between prices and costs, the development of private small and medium enterprises, the Chinese policy on joint ventures between Chinese and foreign firms, and the internationalisation of education sector especially higher education in technical, engineering and management fields. China's emphasis on "brain gain" from returned students rather than on 'brain drain' is a lesson to emulate. Heavy investment in physical and human capital per worker, setting up of export processing zones in countries like Taiwan, promoting backward linkages and providing support to industries outside the zone, skill intensity, hard work and right selection of marketing niche activated the growth process in the High Performing Asian Economies (HPAEs) which include South Korea, Singapore, Taiwan, and Hong Kong (China) also known as the 'four tigers'. Japan's extraordinary growth can also be attributed to similar reasons like openness, liberalisation, high export growth and high rate of technological diffusion across different sectors, high rates of productivity and spillover effects of R&D. As Sengupta notes, two distinctive features of the US growth have been the increase in productivity growth and technological progress in the modern technology-intensive industries and the spill-over effects of R&D knowledge capital from the US to the rest of the world.

Drawing from the experiences of the growth processes in these countries, Sengupta makes a few general recommendations. According to the author, India must open up especially through export promotion, promotion of foreign direct investment and liberalisation of economic reforms. Drawing form the Malaysian experience, he suggests that for India to develop and prosper it must raise its human resource capabilities by appropriate investment in human capital through education and professional training. It seems to be a sound recommendation, as the quality and quantity of the human capital stock in India is very poor. For example the Mean years of schooling in India was 5.1, compared to 10.0 in high-income countries on an average in 2000, according to World Bank [2002]. Thirdly, it must follow an effective policy on monetary and fiscal management. Fourth, it must develop its physical and information infrastructure. And lastly, focus on policy towards agricultural and rural development is important. According to Sengupta, market efficiency and diffusion of knowledge and information technology are the two dynamic forces that are most essential. While

many recommendations seem to be sound, Sengupta does not support his argument with any strong empirical evidence of his own.

Specialisation in world trade in IT services requires a strategy for skill development. This involves, according to Sengupta, stressing upon three main points, viz., the private sector's role in technical, tertiary and management education, removal of gender bias in technical and managerial education and recognition of the fact that skill development and specialisation in IT services is largely based on innovation. The author is also of the opinion that private sector including private business and foreign enterprises within the country have to play a more important role in tertiary, technical and managerial education if India wants to tread on the path of economic growth rapidly. He emphasises that skill development and knowledge capital are as important as the need to invest in primary and secondary education in India. He also argues that the best alternative for this knowledge capital is R&D investment, which improves domestic innovation and provides important linkages for technology transfer from the USA. As he notes, the basic component for long-term growth in the knowledge-based economy depends on the 'absorptive capacity' of the economy and this is provided by education and skill formation in the workforce. Thus, economic policies need to focus on tertiary as well as a primary and secondary education.

Sengupta argues that a new growth strategy for 'the new economy' must be based on four core principles: (a) openness in international trade through expansion and diversification of the IT sector in India, (b) development of innovations in sectors, which have highest comparative advantage in international trade, (c) reorientation and restructuring of the IT operations to exploit new avenues, markets and products through extensive market research, and (d) diffusion of IT innovations in rural and medium enterprises together with training and skill development. He believes that in order to undertake this new growth strategy, improvements in R&D investment plays an important role and that there must be proper centre-state coordination in implementation of policy for skill development. Sengupta is of the view that India may ensure diffusion of technology on a large scale so that it gets geographically evenly spread.

As the author rightly argues, like China, India has a huge economic potential. The need of the hour is to awaken the sleeping giant to efficiently and effectively tap this huge resource potential so that it leaps forward on the path of development and prosperity. India has to move from body shopping to new product development, from low productivity goods to high productivity components and from low-income elasticity goods to high-income elasticity good and services. This, Sengupta, feels is the desirable pattern of shift in the growth of the information and communication sector, which would thereby steer the new economy to greater global heights.

This is a well-written book, in which the author presents his arguments supported by examples of other developed countries of the world, pertaining to new strategies for India's economic growth in the 'new economy'. This, however, may not be a very useful technical textbook for students but a good resource for a wider audience of researchers, policy makers and analysts who try to analyse the growth trends, processes, future prospects and strategies for India's future growth. Lastly, one may not necessarily agree with all the arguments and prescriptions of the author. One may have difference of opinion on the relative emphasis laid by Sengupta, for example, on exports, as a strategy of growth, relative emphasis on IT industry (at the cost of traditional agriculture and

manufacturing sector), as an important development strategy of the Indian economy for the near future. It, however, makes an interesting general reading on Indian economy as it describes in a simple style some new perspectives on the Indian Economy.

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