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STATE INCOME INEQUALITIES AND INTERSTATE  
VARIATIONS IN THE GROWTH OF REAL  
CAPITAL STOCK IN INDIA

by

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ABSTRACT

This paper makes an attempt to analyse the behaviour of regional income inequalities and capital inequalities in India. It also seeks to examine the relationship between the trend in regional income inequality and regional allocation of investment among different states. Part I of the paper presents the estimates of the extent of income and capital inequalities among different states for the years 1960-61 and 1970-71. Part II analyses the interstate variations in capital-output ratio. The final part of the paper examines some alternative approaches to balanced regional development.

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Reduction in regional disparities in the levels of economic development has been one of the explicitly stated objectives of India's economic policy. Various policy instruments such as priority in industrial licensing, incentive schemes for attracting greater private investments to backward areas, greater allocation of resources through plan investments and special programmes for building up infrastructural facilities in backward regions have been used to achieve this objective.\*<sup>1</sup> These measures appear to have been based on the logic that proper regional allocation of investment effort constitutes the major instrument of reducing the extent of economic disparities among regions.

Several interesting questions can be raised in this context. For instance, what has been the change in the extent of regional disparity in the levels of economic development in the recent past?

What is the relationship between regional income inequality and capital inequality? What is the relationship between trend in regional income inequality and regional allocation of investment? The present study makes an attempt to probe into these questions and analyse the behaviour of regional income and capital inequalities using data relating to Indian States. It covers fifteen major states<sup>\*2</sup> and examines the experience of the sixties by considering the data relating to benchmark years 1960-61 and 1970-71.

Measurement of the change in the extent of interstate disparity in the level of economic development requires comparable estimates of per capita state domestic product at constant base period prices. Similarly, measurement of capital inequality among states requires comparable estimates of capital stock valued at constant base period prices. However, preparation of comparable estimates of real capita income and real capital stock in Indian States has hitherto remained largely an unexplored field of research. Comparable estimates of State income at constant prices and capital formation in different states have so far not been attempted at the official level, though they constitute an important part of the regional accounts of the nation.<sup>\*3</sup> The required estimates are, however, available from a recent study analysing the growth experience of Indian States.<sup>\*4</sup> The methodology of estimation and the sources of data used for deriving the estimates of State domestic product at 1960-61 prices and capital

stock at 1960-61 prices in Indian states for the years 1960-61 and 1970-71 are described briefly in the Appendix, and the estimates are presented in two Appendix Tables.

## I

Income and Capital Inequalities among States

The estimates of state per capita income, state per capita stock of capital and state per capita investment, measured at 1960-61 prices, derived from the estimates given in the Appendix Tables, are presented in Table 1.

It can be seen from Table 1 that the levels of per capita income in 1960-61 differ significantly among different states. The lowest per capita income state was Orissa followed closely by Bihar and Uttar Pradesh, whereas West Bengal was the highest per capita income state followed by Maharashtra. To measure the extent of income inequalities among states, we have used three alternative measures, viz, relative range, coefficient of variation, and Ginni Coefficient of inequality. Relative range of state income measured as the ratio between the highest state per capita income and the lowest state per capita income turns out to be 1.96 in the year 1960-61. The coefficient of variation of the state per capita income series is

Table 1

Per Capita Income, Capital Stock and Investment in  
Different States, 1960-61 & 1970-71

(Figures indicate rupees at  
constant 1960-61 prices)

States	Per Capita Income		Per Capita Stock of Capital		Per Capita Investment*
	1960-61	1970-71	1960-61	1970-71	
(1)	(2)	(3)	(4)	(5)	(6)
1. Andhra	292	322	759	835	251
2. Assam	349	358	625	734	362
3. Bihar	228	223	581	741	318
4. Gujarat	372	437	940	1120	510
5. Haryana	360	497	1128	1275	557
6. Karnataka	319	458	703	991	528
7. Kerala	280	299	559	768	410
8. M.P.	261	262	649	794	373
9. Maharashtra	403	407	830	1115	591
10. Orissa	225	269	543	693	323
11. Punjab	374	499	1296	1555	596
12. Rajasthan	279	332	894	916	277
13. Tamil Nadu	355	388	793	936	353
14. U.P.	238	258	697	875	351
15. W. Bengal	442	453	991	1198	529
Total of 15 States	307	340	761	935	403

\*Ratio of increase in real capital stock during the period 1961-71 to the corresponding population in 1961.

Source: Appendix Tables 1 & 2.

21.03%, and the degree of state income inequality as measured by the Gini Coefficient <sup>\*5</sup> works out at 12.93% in the year 1960-61. On the other hand, in 1970-71, Punjab turns out to be the highest per capita income state and Bihar becomes the lowest per capita income state. The ratio of the highest state per capita income to the lowest state per capita income increases to 2.24 for the year 1970-71. This clearly implies that the disparity of income between the richest state and the poorest state has widened during the sixties. Moreover, the coefficient of variation and Gini coefficient of inequality for the state per capita income series in 1970-71 also increase to 25.21% and 14.33% respectively.

It is interesting to observe from the table that exactly seven states, viz., Andhra Pradesh, Bihar, Kerala, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh, lie below the average per capita income in 1960-61 and the same seven states also lie below the average per capita income in 1970-71. Thus, between 1960-61 and 1970-71, no radical transformation seems to have taken place in the relative position of states with respect to the average when the state per capita income is measured in real terms. However, within the broad categories of the above-average income states and the below-average income states, the relative position of several states have undergone marked changes. On the whole, it appears that state income inequalities



have increased between 1960-61 and 1970-71 in real terms. It may be mentioned in this connection that this conclusion is supported by the findings of a recent study made by J.F.J. Toye showing that, judged by the criteria of organized sector employment and foodgrain production per head, interstate inequalities in India have increased.\*6

Considering the estimates of real capital stock in the fifteen Indian states, we find that the per capita availability of capital in each state has increased between 1960-61 and 1970-71, though the extent of increase differs from state to state. Again, Orissa has the lowest per capita stock of real capital and Punjab has the highest per capita stock of real capital in both the bench-mark years, 1960-61 and 1970-71. The ratio of highest per capita capital stock to the lowest per capita capital stock works out at 2.39 in 1960-61 and 2.24 in 1970-71. Thus, the relative range of interstate variations in the per capita real capital stock has narrowed down between 1960-61 and 1970-71. This conclusion is corroborated by the measures of the coefficient of variation and the Gini Coefficient of inequality. The coefficient of variation shows a decline from 27.30% in 1960-61 to 24.94% in 1970-71, and the Gini Coefficient of inequality for state per capita stock of real capital series also shows a decline from 11.57% in 1960-61 to 10.67% in 1970-71. Thus, over the decade 1960-61 to 1970-71, the extent of capital inequality among Indian states seems to have

declined appreciably.

Having derived the measures of state income & capital inequalities, it is worthwhile to compare the extent of income inequality with that of capital inequality among the fifteen states. For the purpose of comparing inequality revealed by two different aggregates, it is the Ginni Coefficient of inequality which appears to be more acceptable as a measure of the overall degree of inequality as compared to the other two measures considered above.\*7 If we compare the Gini Coefficient of inequality for state capital stock with that for state income corresponding to the benchmark year 1960-61, we find that the former is less than the latter, which implies that the extent of capital inequality was less than that of income inequality among Indian states in 1960-61. Moreover, while the income inequality seems to have increased, the capital inequality shows a decline during the decade 1960-61 to 1970-71.

A marginal reduction in capital inequality by itself does not necessarily imply that the total investment has been more equitably distributed among the states during the period 1960-61 to 1970-71. From Table 1 we can see that Andhra Pradesh has the lowest real investment per person and Punjab has the highest real investment per person during 1960-61 to 1970-71. The ratio of the highest per capita investment to the lowest per capita investment is 2.37.

The coefficient of variation for the per capita real investment series among states turns out to be 27.92%. Thus the interstate variation in the state per capita investment series is greater than what is observed for the state per capita income series and state per capita capital stock series. Moreover, it can be seen from the table that, in terms of per capita real investment, eight states, viz, Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh, lie below the average. Thus, except Kerala, all states having below average per capita income in 1960-61 also have below average per capita real investment over the decade 1960-61 to 1970-71.

These findings do not lend much support to the claim that total investment has been more equitably distributed among Indian states during the sixties. On the contrary, it appears that the relatively richer states have received a comparatively larger share of investment during the decade. This is also evident from the value of the coefficient of correlation between the state per capita income in the base year 1960-61 and the per capita real investment during the decade among the fifteen states. It turns out to be positive and as high as 0.73 which is statistically significant at 1% level of significance. This observation relates to aggregate investment including public as well as private investment. A recent

study on interstate redistribution through budgetary transfers has shown that the plan transfers during the period 1956-57 have brought about some redistributive change in favour of low income states.\*<sup>8</sup>

The figures given in this study reveal that, out of the seven states which had a below average per capita income in 1960-61, as many as five states (viz. Andhra Pradesh, Kerala, Madhya Pradesh, Orissa, and Rajasthan) received more than the average per capita budgetary transfers during the sixties. Thus, it appears that, during the period 1961 to 1971, while the public expenditure has been more equitably distributed, the aggregate real investment does not conform to this pattern. This clearly indicates that the private investment has been largely biased in favour of the high income states and it has thereby nullified to a considerable extent the redistributive effect of public expenditures.

The estimates of state domestic product and state capital stock at 1960-61 prices, given in the Appendix can also be used to compare the growth rates of output and real capital stock for different states. Table 2 shows the average annual rates of growth of GDP and capital stock at constant 1960-61 prices over the period 1960-61 to 1970-71. It can be seen from this table that the growth rates of output as well as capital reveal considerable differences among states. However, what is more striking about the figures given in Table 2 is that there appears to be very little correspondence between the growth

Table 2Annual Growth Rates of Real Income and Capital Stock  
1960-61 to 1970-71

States	Compound Rates of Growth Per Annum (in per cent)	
	State Domestic Product	Stock of Capital
1) Andhra	2.93	2.89
2) Assam	3.27	4.29
3) Bihar	1.70	4.46
4) Gujarat	4.26	4.42
5) Haryana	6.19	4.09
6) Karnataka	5.93	5.76
7) Kerala	3.04	5.65
8) M. P.	2.60	4.64
9) Maharashtra	2.55	5.52
10) Orissa	4.09	4.77
11) Punjab	4.95	3.85
12) Rajasthan	4.29	2.73
13) Tamil Nadu	2.94	3.75
14) U. P.	2.66	4.16
15) West Bengal	2.65	4.37
Total of 15 States	3.24	4.34

Source: Appendix Tables 1 & 2.

profiles of output and real capital stock. In fact, the coefficient of correlation between the growth rate of real GDP and real capital stock turns out to be almost zero, its value being as low as 0.01. That there does not seem to be any relationship between growth of capital and growth of output is clearly evident from the two extreme cases of Bihar and Haryana. The former shows a growth rate of GDP of only 1.7% despite a fairly high growth rate of real capital stock (4.46%), while the latter shows a growth rate of 6.19% in GDP with a somewhat lower growth rate of real capital stock (4.09%). Since the growth of output depends on the growth of capital and the incremental capital-output ratio, it follows from the above observation that the interstate profile of capital-output ratio plays a significant part in the determination of the profile of output growth among different states. In the next section, we therefore examine the interstate profile of capital-output ratio.

## II

### Interstate Variations in Capital-Output Ratio

Table 3 shows the estimated capital-output ratio in different states for the bench-mark years 1960-61 and 1970-71. The figures given in this table clearly show that there are significant interstate variations in capital-output ratio ranging all the way from 1.79 in Assam to 3.46 in

Punjab in the year 1960-61 for which the average for the fifteen major states turns out to be 2.48. Eight States, viz., Andhra Pradesh, Bihar, Gujarat, Haryana, Madhya Pradesh, Punjab, Rajasthan and Uttar Pradesh had above average capital-output ratio. In 1970-71, Assam had again the lowest capital-output ratio (2.05), but the highest capital-output ratio was found in Uttar Pradesh (3.39). Thus, over the decade, the range of variation in capital-output ratio has narrowed down. The coefficient of variation in the capital-output ratio series has also declined from 18.96% in 1960-61 to 14.17% in 1970-71. Thus, over the decade, interstate variation in capital-output ratio has considerably declined though on an average the capital-output ratio has increased from 2.48 in 1960-61 to 2.75 in 1970-71. On the whole, the experience in India during the sixties lends support to the hypothesis that capital-output ratio has a tendency to increase in the initial stages of development. Only five out of fifteen states show a decline in the capital-output ratio over the decade. The remaining ten states, and hence the total, show a clear rise in the overall capital-output ratio between 1960-61 and 1970-71.

Moreover, the states having less than average capital-output ratio in 1960-61 also have less than average capital-output ratio in 1970-71. However, there are three states, viz., Andhra Pradesh, Gujarat and Haryana, which had above average capital-output ratio in 1960-61 but have less than average capital-output ratio in 1970-71. The

coefficient of correlation between capital-output ratio series in 1960-61 and in 1970-71 turns out to be +0.5634 which is not significant at 1% level of significance. This only implies that the factors affecting the behaviour of overall capital-output ratio have varied in terms of the extent of their influence in different state economies in India.

Table 3 also reveals that, on an average, the capital-output ratio in the tertiary sector exceeds that in the secondary sector which in turn exceeds its counterpart in the primary sector. Only in Haryana and Punjab in 1960-61 and in Punjab in 1970-71, we find that the capital-output ratio in the primary sector is higher than the one in the secondary sector. This is because the primary sector has a much higher capital-output ratio, whereas the secondary sector has a much lower capital-output ratio in these two states in relation to the average. However, in both these states the capital-output ratio in the primary sector has fallen and that in the secondary sector has risen.

For the total of fifteen states, we find that the capital-output ratio has remained almost unchanged in the primary sector and has increased in the other two sectors over the decade 1960-61 to 1970-71. The same pattern is observed only in two states, viz., Bihar and West Bengal. Only in Karnataka, the capital-output ratio in all the three sectors declined over the decade, whereas in four states, viz.,



Sectoral & Aggregate Capital-Output Ratios (at 1960-61 Prices) in Different States, 1960-61 & 1970-71

States	Average Capital-Output Ratio in 1960-61			Average Capital-Output Ratio in 1970-71			Incremental Capital-Output Ratio (1960-61 to 1970-71)			
	(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)	(9)
	Primary Sector	Secondary Sector	Tertiary Sector	All Sectors	Primary Sector	Secondary Sector	Tertiary Sector	All Sectors		
1. Andhra	1.80	2.26	4.18	2.60	1.64	2.98	3.81	2.59	2.57	
2. Assam	1.04	2.28	3.65	1.79	0.96	2.87	3.88	2.05	2.73	
3. Bihar	1.49	2.56	4.66	2.55	1.52	3.58	6.40	3.33	7.56	
4. Gujarat	1.61	1.98	4.18	2.52	1.42	2.55	4.23	2.56	2.64	
5. Haryana	2.37	1.65	6.03	3.13	1.83	2.49	4.46	2.56	1.87	
6. Karnataka	1.18	2.04	4.33	2.20	1.13	1.77	3.85	2.16	2.12	
7. Kerala	0.76	1.98	4.12	2.00	1.04	2.10	4.42	2.57	4.20	
8. M.P.	1.43	2.59	5.07	2.49	1.62	3.45	5.43	3.03	4.87	
9. Maharashtra	1.02	2.01	3.44	2.06	1.45	2.69	3.71	2.74	5.11	
10. Orissa	1.61	2.78	4.29	2.41	1.33	5.49	3.70	2.57	2.90	
11. Punjab	2.94	1.44	6.49	3.46	2.55	2.17	5.16	3.12	2.56	
12. Rajasthan	2.55	2.77	4.78	3.21	1.88	3.30	4.30	2.76	1.90	
13. Tamil Nadu	1.45	1.98	3.55	2.23	1.39	2.76	3.37	2.41	2.95	
14. U.P.	1.93	2.46	5.45	2.93	2.07	3.82	5.96	3.39	4.90	
15. W. Bengal	1.12	2.16	3.23	2.24	1.11	2.54	3.85	2.65	3.99	
Total of 15 States	1.57	2.19	4.21	2.48	1.58	2.85	4.35	2.75	3.49	

Kerala, Madhya Pradesh, Maharashtra and Uttar Pradesh, the capital-output ratio in all the three sectors increased over the decade. Thus, different states in India differ not only in terms of the magnitude of the sectoral capital-output ratios but also in terms of the pattern of their behaviour over a period of time.

Since the aggregate capital-output ratio in an economy can be looked upon as a weighted average of the sectoral capital-output ratios, the weights being the structure of output in the economy, we can find out the precise contribution of variations in sectoral capital-output ratios and the variation in the structure of output of different state economies in the observed deviation of the aggregate capital-output ratio of the state from the average in a given year.<sup>\*9</sup> Table 4 presents the average contributions<sup>\*10</sup> of these two factors in the observed deviation of the aggregate capital-output ratio from the <sup>National</sup> average in the years 1960-61 and 1970-71 for each state.

On the basis of the estimated contributions of the two types of factors shown in this table, we can classify the fifteen states according to favourable/unfavourable<sup>\*11</sup> structure and sectoral capital-output ratios in the two years as shown in Table 5.

Table 4

Contributions of Output Structure and Sectoral Capital-Output  
Ratios to the Inter-state Variation in Aggregate  
Capital-Output Ratio

States	1960-61			1970-71		
	Observed Deviation from the Average	Average Contribution of Structure of Output	Sectoral Capital-Output Ratios	Observed Deviation from the Average	Average Contribution of Structure of Output	Sectoral Capital-Output Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Andhra	+0.12	-0.16	+0.28	-0.16	-0.04	-0.12
2. Assam	-0.69	-0.25	-0.44	-0.70	-0.26	-0.44
3. Bihar	+0.07	-0.08	+0.15	+0.58	-0.17	+0.75
4. Gujarat	+0.04	+0.09	-0.05	-0.19	0.00	-0.19
5. Haryana	+0.65	-0.17	+0.82	-0.19	-0.26	+0.07
6. Karnataka	-0.28	-0.07	-0.21	-0.59	+0.03	-0.62
7. Kerala	-0.48	0.00	-0.48	-0.18	+0.20	-0.38
8. M.P.	+0.01	-0.21	+0.22	+0.28	-0.19	+0.47
9. Maharashtra	-0.42	+0.12	-0.54	-0.01	+0.32	-0.33
10. Orissa	-0.07	-0.21	+0.14	-0.18	-0.38	+0.20
11. Punjab	+0.98	-0.17	+1.15	+0.37	-0.20	+0.57
12. Rajasthan	+0.73	-0.05	+0.78	+0.01	-0.21	+0.22
13. Tamil Nadu	-0.25	+0.05	-0.30	-0.34	+0.08	-0.42
14. U.P.	+0.45	-0.13	+0.58	+0.64	-0.27	+0.91
15. W. Bengal	-0.24	+0.29	-0.53	-0.10	+0.33	-0.43

Source: Table 3

Table 5

Classification of States according to the Effect of Output Structure and Sectoral Capital-Output Ratios on Aggregate Capital-Output Ratio

Classification	1960-61		1970-71	
	Favourable Sectoral Capital-Output ratios	Unfavourable Sector Capital Output Ratios	Favourable Sectoral Capital-Output ratios	Unfavourable Sectoral Capital Output ratios
Favourable Structure	Assam, Karnataka, Kerala	Andhra, Bihar, Haryana, M.P., Orissa, Punjab, Rajasthan, U.P.	Andhra, Assam, Gujarat	Bihar, Haryana, M.P., Orissa, Punjab, Rajasthan, U.P.
Unfavourable Structure	Gujarat, Maharashtra, Tamil Nadu, W. Bengal	-	Karnataka, Kerala, Maharashtra, Tamil Nadu, W. Bengal	-

The classification given in Table 5 shows that over the period 1960-61 to 1970-71, only in Gujarat output structure changed from unfavourable to favourable, whereas the output structure in Karnataka and Kerala turned from favourable to unfavourable. On the other hand, the sectoral capital-output ratios in only Andhra Pradesh turned from unfavourable to favourable over the years 1960-61 to 1970-71.

Alternative Approaches to Balanced Regional Growth

The direction and magnitude of change in the extent of income inequality depends on the extent of growth differential revealed by state per capita income. The growth of state per capita income is determined primarily by two factors, viz. per capita real investment and the incremental capital-output ratio in the State. The growth experience of Indian States during the sixties shows that there are significant interstate variations in the incremental capital-output ratio. It varies from 1.87 in Haryana to 7.56 in Bihar. The average value of incremental capital-output ratio observed for the fifteen states taken together turns out to be 3.49. Six states, viz. Bihar, Kerala, Madhya Pradesh, Maharashtra, Uttar Pradesh and West Bengal, have an incremental capital-output ratio which lies above the national average whereas the remaining nine states show a below-average incremental capital-output ratio. The coefficient of variation revealed by the incremental capital-output ratio is as high as 45 per cent.

The profiles of incremental capital-output ratio and real investment observed during the sixties have, as already noted above, resulted in the profile of output growth which shows an increase in the extent of state income inequality during the period 1960-61 to 1970-71.

It is interesting to examine the implications of three types of policy alternatives in this regard. These alternatives are: (a) equalising the growth of state per capita income, given the actual profile of incremental capital-output ratio and the aggregate growth of output in the economy as a whole; (b) equalizing per capitalreal investment, given the actual profile of incremental capital-output ratio and the aggregate real investment in the economy as a whole; and (c) equalizing the incremental capital-output ratio, given the actual profile of real investment and the aggregate growth of output in the economy as a whole.

Each of the three alternatives aims at striking an overall regional balance in the growth of state economies. The difference, however, lies in the criterion that is used to define 'balance'. The first alternative aims at achieving regional balance in the growth of state per capita income. The second alternative aims at achieving regional balance in the per capita real investment. The third alternative aims at achieving regional balance in the overall returns on investment. It is interesting to observe that, out of these three alternatives, the first two alternatives are more readily amenable to direct policy formulation and control as compared to the third alternative, which involves equalisation of the incremental capital-output ratio for different states.

Each of the first two alternatives, however, involves a certain trade-off. Consider, for instance, the first alternative. It involves equalising the growth of state per capita income, taking the actual interstate profile of incremental capital-output ratio and the observed aggregate growth of output for the economy as a whole as given. This alternative, if successfully implemented, will result in an interstate profile of per capita income for the year 1970-71 that is shown under Alternative I in Table 6. This profile indicates the same extent of state income inequalities in 1970-71 as that observed in 1960-61. Thus, the alternative I leaves the state income inequalities unchanged over the period 1960-61 to 1970-71, the Gini Coefficient for both years being 12.9 per cent. However, to achieve this objective, it is necessary to have interstate profile of investment which will be significantly different from the actual profile observed during the sixties. In this context, what is important to note is that the total investment requirement for the fifteen states taken together turns out to be much larger than the actual investment undertaken during the period, the former being Rs.19286 crores as against the latter which is only Rs.17185 crores. This implies that to achieve the observed growth of aggregate output by simultaneously maintaining the extent of state inequalities at its initial level by equalising the growth of state per capita income

Table 6

Comparative Inter-State Profiles of Real Investment and Per Capita Income Corresponding to  
Alternative Redistributive Policy Targets

States	Observed Values		Alternative I		Alternative II		Alternative III	
	Invest- ment (Rs. in lakhs)	Per Capita Income (in rupees)	Invest- ment (in Rs. lakhs)	Per Capita Income (in rupees)	Invest- ment (in Rs. lakhs)	Per Capita Income (in rupees)	Invest- ment (in Rs. lakhs)	Per Capita Income (in rupees)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Andhra	90346	322	89773	322	145113	371	90346	301
2. Assam	43009	358	54335	384	47880	370	43009	337
3. Bihar	147865	223	269726	251	187339	232	147865	263
4. Gujarat	105143	437	85985	410	83211	406	105143	401
5. Haryana	42260	497	23295	397	30612	436	42260	393
6. Karnataka	124561	458	58593	351	95119	410	124561	379
7. Kerala	69341	299	78103	308	68169	297	69341	315
8. M.P.	120713	262	172320	288	130547	267	120713	286
9. Maharashtra	233937	407	329774	444	159506	378	233937	449
10. Orissa	56709	269	43132	248	70770	291	56709	254
11. Punjab	66323	499	36221	412	44908	437	66323	448
12. Rajasthan	55779	332	43782	307	81279	384	55779	280
13. Tamil Nadu	118831	388	122224	391	135850	402	118831	373
14. U.P.	258965	258	276037	262	297396	267	258965	283
15. W. Bengal	184763	453	245349	487	140846	428	184763	468
Total of 15 States	1718545	340	1928649	340	1718545	340	1718545	340



would require an increase in aggregate investment by 12 per cent over the amount actually undertaken.

As against this, Alternative II involves the equalisation of per capita real investment among different states, taking aggregate volume of investment and the observed interstate profile of incremental capital-output ratio as given. The interstate profiles of per capita real investment and the corresponding per capita income for the year 1970-71 that would result from Alternative II are shown in Table 6. The profile of per capita income corresponding to Alternative II shows a significant decline in the state income inequalities in the year 1970-71 as compared to the year 1960-61, the Gini Coefficient for the year 1970-71 being 11.46 per cent as against the Gini Coefficient of 12.92 per cent observed in 1960-61. However, this alternative results in a slightly lower amount of growth of real income as compared to what has been actually observed. The growth of real income observed during the period 1960-61 to 1970-71 is Rs. 4932 crores, whereas the growth in real income corresponding to alternative II is Rs. 4925 crores at 1960-61 prices.

Finally, we may consider Alternative III. This alternative involves equalisation of the incremental capital-output ratio taking the actual interstate profile of real investment and the observed growth of total output as given. Thus, the alternative III does not

require any additional investment and it also leaves the growth of aggregate output unchanged. The interstate profile of per capita income for the year 1970-71 corresponding to alternative III is shown in Table 6. This profile shows a significant decline in the extent of state income inequalities in the year 1970-71 as compared to the year 1960-61, the Gini Coefficient for 1970-71 being 11.71 per cent as against the corresponding figure of 12.92 per cent observed in 1960-61. The outcome associated with alternative III clearly shows that even the existing pattern of allocating investment among different states would have resulted in a considerable decline in the state income inequality, had the overall productivity of this investment been more or less equal in different states.

#### CONCLUSION

The main conclusion that emerges from the above analysis is that the problem of reducing the state income inequalities cannot be tackled merely through certain changes in the pattern of allocation of investment among different states. It also requires definite steps to be taken in the direction of reducing the disparity between the productivity of investment in the backward states on the one hand and the advanced states on the other hand. It appears from the above analysis that during the period of sixties, the policy towards reducing state income inequalities concentrated mainly on making certain changes in the investment allocation among states and did not perhaps pay due

attention to the equally important aspect of reducing the wide interstate disparity in the overall returns on proposed investment.

It is evident that equalising real investment per person among different states would call forth significant changes in the pattern of allocation of investment among states, which may not be feasible. In view of a variety of other considerations, the investment reallocation for reducing the regional imbalances beyond a certain level is likely to involve certain constraints. Exclusive reliance on this method may not, therefore, yield impressive results. In order to be effective, investment reallocation must be accompanied by the measures that bring about a significant improvement in the returns of investment especially in the economically backward states. It is the latter aspect, which alone can ensure a reduction in regional imbalances without adversely affecting the overall rate of economic growth for the country as a whole.

APPENDIXESTIMATES OF STATE DOMESTIC PRODUCT AND CAPITAL STOCK1. STATE DOMESTIC PRODUCT:

Comparable estimates of State Domestic Product (SDP) at 1960-61 prices are obtained from the set of comparable estimates of SDP by industry by Origin prepared by Central Statistical Organisation (CSO) and the estimates of SDP for different States prepared by the respective State Statistical Bureaus (SSBs). The CSO estimates are available at current prices for three years 1967-70. These estimates relating to each of the sixteen sectors have been carried forward to 1970-71 and backward to 1960-61 by applying the corresponding sectoral growth implicit in the estimates of SDP by industry of origin at current prices prepared by respective SSBs. The corresponding estimates of SDP at 1960-61 prices have been derived by deflating the sectoral current price figures with the help of sectoral price indices implicit in the set of estimates of SDP by industry of origin at current and constant prices prepared by respective SSBs.<sup>\*12</sup> The estimates of SDP at 1960-61 prices, so derived, are presented in Appendix Table 1.

## 2. STATE CAPITAL STOCK:

For estimating capital stock at 1960-61 prices in each state, the state economy is divided into six segments, viz, (i) agriculture, (ii) registered manufacturing, (iii) unregistered manufacturing, (iv) electricity, gas and water supply, (v) residential dwellings, and (vi) other sectors.

(i) Agriculture: For the purpose of estimation, capital stock in agriculture is classified into the following six components: (a) public irrigation, (b) Private irrigation including land improvement, (c) farm houses, (d) agricultural implements and machinery (e) livestock, and (f) working capital in agriculture. The estimates of capital stock in public and private irrigation at all India level are available for the benchmark year 1960-61 from a recent study.\*13 The same have been distributed among different states in proportion to area irrigated through public irrigation and private irrigation respectively during the year 1960-61. The figures, so derived have been carried forward to the year 1970-71 with the help of the index of net area under public and private irrigation respectively in each state. The data on area irrigated by source in different states are obtained from various editions of Indian Agriculture in Brief, Ministry of Food & Agriculture, Government of India.

The estimates of capital stock in farm houses and agricultural implements and machinery in different states for the benchmark years 1960-61 and 1970-71 have been derived from the data available from (a) "All India Rural Debt and Investment Survey, 1961-62," RBI Bulletin, June 1965, and (b) All India Debt and Investment Survey, 1971-72, RBI, 1976. The data available from these two surveys have been suitably adjusted (1) to include only that part of the value of assets which is actually used in farm business, (2) to make the estimates relate to 31st March of 1961 and 1971 respectively and (3) to cover the corresponding value of assets of the urban households also. The estimates relating to the year 1970-71 have been deflated with the help of the price indices for buildings and construction and machinery and equipment in the case of farm houses and agricultural implements and machinery respectively. The estimates of the value of livestock at 1960-61 prices have been derived from the data available from the above mentioned two surveys by RBI and the physical index of total livestock for each state obtained from the Livestock Census 1961 and 1971 after making the necessary adjustments. The stock of working capital in agriculture is derived by assuming that it forms one-tenth of the corresponding net product originating in agriculture valued at 1960-61 prices.

(ii) Registered Manufacturing: The estimates of capital stock in this sector are derived from the data available from various volumes of Annual Survey of Industries (ASI) relating to the years 1960- to 1970 and various reports of National Sample Survey (NSS) devoted to the sample sector industries. The figures of capital stock reported by ASI represent the depreciated book values of capital assets. The same have been, therefore, adjusted for price changes to arrive at the estimates of net capital stock at 1960-61 prices by following the methodology outlined in a recent study.<sup>\*14</sup> Since the ASI gives data relating to the reporting units only, the estimates derived from the data given by the ASI census and sample sectors have also been adjusted to correspond to the coverage implicit in the estimates of state income originating in the registered manufacturing sector.

(iii) Unregistered Manufacturing: The estimates of capital-output ratio at 1960-61 prices relating to this sector at all India level are available for the benchmark years 1960-61 and 1970-71 from a recent study.<sup>\*15</sup> The estimates of capital output ratio at 1960-61 prices relating to the ASI sample sector industries have been prepared for different states for the years 1960-61 and 1970-71. By applying the interstate profile of the capital-output ratio in ASI sample sector industries for the years 1960-61 and 1970-71 to the given All India estimates of capital-output ratio yields the estimates of the capital-output ratio and hence the estimates of net capital stock

at 1960-61 prices in the unregistered manufacturing sector for different states relating to the two years.

(iv) Electricity, Gas and Water Supply: The estimates of capital stock in this sector are based on the data relating to the industry groups 511 and 512 reported in various annual reports of ASI. The basic methodology of estimating capital stock in this sector is the same as the one adopted in the case of registered manufacturing sector.

(v) Residential Dwelling: The estimates relating to the value of residential dwellings at 1960-61 prices in rural areas for the years 1960-61 and 1970-71 have been obtained from the same sources of data and by following the same methodology as in the case of farm houses. The estimates of the value of residential dwellings in urban areas have been derived by distributing the all India aggregate estimated by CSO in proportion to urban population in different states.

(vi) Other Sectors: This category include forestry & fishing, mining & quarrying, construction, railways, communication, transport by other means, trade, hotel & restaurants, banking & insurance, and other services. The estimates of capital stock relating to each of these sector in different states for the years 1960-61 and 1970-71 are derived by applying the corresponding capital-output ratios at 1960-61 prices estimated at all India level to the state income



at 1960-61 prices originating in each of these sectors in the two years respectively.\*16

The estimates of net capital stock at 1960-61 prices in different states, so derived, are presented in Appendix Table 2.\*17

NOTES AND REFERENCES

- \*1 For details regarding specific schemes, programmes and plan outlays for backward area development adopted in earlier plans, see Draft Five Year Plan 1978-83, Planning Commission, Government of India, 1978; ch.6.
- \*2 The criterion adopted for the purpose of including a particular state or Union Territory in the present study is that the population of that particular state or Union Territory must exceed at least 1% of the total population of the country.
- \*3 The Committee of Regional Accounts has recognised this crucial gap in the availability of data at the regional level and recommended the preparation and presentation of estimates relating to state income and capital formation at current as well as constant prices in all the states. Cf. The Committee On Regional Accounts: First Report, issued by CSO, Ministry of Planning, Government of India, November 1974; and The Committee on Regional Accounts: Final Report issued by CSO, Ministry of Planning, Government of India, September 1976.
- \*4 Ravindra H. Dholakia. Interstate Variations in Economic Growth In India, Ph.D. Thesis, M.S. University of Baroda, April 1977.
- \*5 The Gini Coefficient can be calculated on the basis of the Lorenz Curve. It is defined as the ratio of the difference between the line of absolute equality (the diagonal) and the Lorenz Curve to the triangular region underneath the diagonal. Cf. A.K. Sen: On Economic Inequality, Oxford University Press, 1975, ch.2.
- \*6 J.F.J. Toye: "Structural Changes in the Government Sector of the Indian States, 1955-70", in Journal of Development Studies, Vol.9, No.2, January 1973.
- \*7 The other two measures that can be considered are: The relative range and the coefficient of variation. The former takes into account only the two extreme observations and ignores all other intermediate observations. While the latter involves arbitrary squaring procedure and concentrates heavily on differences vis-a-vis the mean.

On the other hand, Gini Coefficient is a more direct measure of inequalities taking note of differences between every pair of observations. For further discussion on this topic, see A.K. Sen: On Economic Inequality, op.cit.

- \*8 C.f. I.S. Gulati and K.K. George: "Interstate Redistribution through Budgetary Transfers", Economic and Political Weekly, Vol.13, No.11, March 18, 1978.
- \*9 The aggregate capital-output ratio for the total of the fifteen states in a given year is referred to as the average capital-output ratio in that year.
- \*10 There are two concepts of the contribution of a given factor in the observed deviation - (i) partial contribution which is obtained by allowing only that particular factor to vary holding all other factors constant, and (ii) total contribution which is obtained by allowing all other factors to vary holding only that particular factor constant. In both these concepts there is a residual representing cross effect of the factors. The average contribution of a factor, on the other hand, is derived as a weighted average of these two types of contributions of the factor, the weights being selected in such a way that the residual turns out to be zero. For further details, see Ravindra H. Dholakia: "Determinants of Relative Growth of Cities In India". Vishleshan, Vol.2, No.2, June 1976; and Ravindra H. Dholakia: Interstate Variations in Economic Growth in India, op.cit. ch.6.
- \*11 A non-positive average contribution of a factor in the observed deviation of the state capital-output ratio from the average in a given year is regarded as favourable effect of that particular factor on the aggregate capital-output ratio. Similarly, a positive average contribution is regarded as an unfavourable effect of the factor.

- \*12 For further details, see, Ravindra H. Dholakia: Interstate Variations in Economic Growth in India, (Ph.D. Thesis, M.S. University of Baroda, April 1977) ch.2 and Ravindra H. Dholakia: State Income Inequalities in India and Interstate Variations in Price Movements," in Artha Vikas, Vol.XIV, No.1, Jan-June, 1978.
- \*13 Bakul H. Dholakia: The Sources of Economic Growth in India, (Baroda, Good Companions, 1974), p.159.
- \*14 Bakul H. Dholakia: Measurement of Capital Input and Estimation of Time Series Production Functions in Indian Manufacturing," in Indian Economic Journal, Vol.24, No.3, Jan-March, 1977; see also, Ravindra H. Dholakia: "Net Stock of Real Capital in Registered Manufacturing—An Interstate Analysis", (Mimeo).
- \*15 Uma Datta Roy Choudhury: "Industrial Breakdown of Capital Stock in India," in Journal of Income and Wealth, Vol.I, No.2, April 1977.
- \*16 The estimates of capital output ratio at all India level for these nine sectors are obtained from the following studies: (i) Uma Datta Roy Chaudhury: "Industrial Breakdown of Capital Stock in India," op.cit.; and (ii) Bakul H. Dholakia: The Sources of Economic Growth in India.
- \*17 For further details regarding the estimation of capital stock in Indian states, see Ravindra H. Dholakia: Interstate Variations in Economic Growth in India; op.cit., ch.5

Appendix Table 1

## Comparable Estimates of State Domestic Product At Constant 1960-61 Prices

(Rupees in lakhs)

States	Year 1960-61				Year 1970-71			
	Primary Sector	Secondary Sector	Tertiary Sector	All Sectors	Primary Sector	Secondary Sector	Tertiary Sectors	All Sectors
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Andhra	57451	15136	32421	105008	69746	23925	46528	140199
2. Assam	26564	5838	9090	41492	31757	12068	13417	57242
3. Bihar	56651	20890	28321	105862	61462	30188	33766	125416
4. Gujarat	30684	22074	24081	76839	51304	30028	35354	116686
5. Haryana	16058	4677	6613	27348	28128	10442	11335	49905
6. Karnataka	41702	12639	20984	75325	57996	30755	43374	134125
7. Kerala	25083	7394	14773	47250	24994	14456	24307	63757
8. M.P.	49230	15530	19621	84381	55759	24886	28501	109146
9. Maharashtra	66345	41334	51592	159271	56791	68038	80233	205062
10. Orissa	24523	5714	9283	39520	35107	9351	14601	59059
11. Punjab	21901	9578	10203	41682	36637	14157	16813	67607
12. Rajasthan	30481	10085	15584	56150	49574	11890	24066	85530
13. Tamil Nadu	58888	21950	38848	119686	66056	38040	55928	160024
14. U.P.	104688	24457	46137	175282	131258	35470	61370	228098
15. W. Bengal	49125	45435	59714	154274	58277	62399	79852	200528

Source: See the Appendix

Appendix Table 2

Comparable Estimates Of Net Capital Stock Valued At Constant 1960-61 Prices In Different States

(Rupees in lakhs)

States	Year 1960-61			Year 1970-71				
	Primary Sector	Secondary Sector	Tertiary Sectors	All Sectors	Primary Sector	Secondary Sector	Tertiary Sector	All Sectors
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Andhra	103567	34147	135382	273096	114637	71261	177544	363442
2. Assam	27702	13286	33171	74159	30484	34602	52082	117168
3. Bihar	84359	53578	131845	269782	93665	107931	216051	417647
4. Gujarat	49333	43797	100761	193891	72950	76437	149647	299034
5. Haryana	38097	7700	39866	85663	51438	25959	50526	127923
6. Karnataka	49127	25811	90775	165713	65579	57829	166866	290274
7. Kerala	19081	14675	60812	94568	26049	30315	107545	163909
8. M.P.	70438	40162	99441	210041	90183	85963	154608	330754
9. Maharashtra	67949	83053	177279	328281	82075	182713	297430	562218
10. Orissa	39579	15883	39847	95309	46671	51371	53976	152018
11. Punjab	64382	13795	66169	144346	93301	30659	86709	210669
12. Rajasthan	77851	27910	74463	180224	93216	39202	103585	236003
13. Tamil Nadu	85484	43446	138059	266989	91893	105172	188755	385820
14. U.P.	202436	60156	251361	513953	271560	135644	365714	772918
15. W. Bengal	55146	98217	192846	346209	64840	158579	307553	530972

Source: See the Appendix