Chapter 7

Conclusions

The focus of this study was on the spatial distribution of public investment and its impact on regional growth, over the period 1965-66 to 1994-95. The study had essentially four broad strands of analysis: (a) to determine the pattern of regional growth and whether regional disparities increased in India or if there was any convergence of regional incomes (b) to determine the regional distribution of public investment and whether there was any association between the distribution of investment and regional incomes (c) to determine the impact of public investment on the regional economic systems and to investigate possible relationships between the magnitude of impact and the structure of the regional economies and (d) to determine the relationship between public investment in infrastructure and the regional incomes and whether this relationship is affected both by the nature of investment and the level of development of the different regions.

Section 7.1
Summary of Findings

Regional growth in this study was defined solely in terms of growth of Net State Domestic Product (NSDP) over the reference period, as it was the single most important variable for determining the level of economic development. The growth performance of the different states was extremely varied over the period of the study, with Maharashtra exhibiting the best growth performance over the period 1965-66 to 1994-95- experiencing high growth in four quinquenniums and medium growth in two others. West Bengal showed the most improvement between the two halves of the period, from being a low growth state in the first half (ahead of only Assam in the 16 states) to a medium growth state in the second half (behind only Maharashtra and Tamil Nadu). Jammu and Kashmir showed the sharpest deceleration, from being a high growth state in the first fifteen years (fourth ranked in terms of growth) to low growth in the second half as well as becoming bottom ranked in this period. Gujarat and Tamil Nadu were the most consistent states maintaining medium growth rates above the PCNDP growth rate in both halves. Orissa was also consistent with medium growth rates in both halves, though this rate was below the growth rate of PCNDP. Bihar again was consistent, being the only state to maintain low growth rates in both sub-periods.
The movement of regional disparities was analysed with the help of three measures— the weighted coefficient of variation, $\sigma$ convergence and the deflated average distances derived from the distance matrices for the different periods. There was an increase in regional disparities over the entire period and this worsening did not occur uniformly over the period. The decade of the seventies witnessed a remarkable increase in disparities, as did the ten years between 1985-86 and 1994-95. The first half of the nineties, in fact, saw the maximum aggravation with the CVw increasing substantially, while the two sub-periods 1965-66 to 1970-71 and 1981-82 to 1985-86 witnessed only marginal movements of the CVw.

Dispersion of incomes witnessed a steady increase over both the 15-year sub-periods with the $\sigma$ values increasing from 0.2526 in 1965-66 to 0.3147 in 1980-81 and from 0.2949 (new series) in 1980-81 to 0.3850 in 1994-95. The results were similar to those indicated by the coefficient of variation. The decade of the seventies as well as the ten years after the mid-eighties saw the highest increase in disparities while the second half of the sixties and the first half of the eighties witnessed the least increase.

The basic hypothesis emerging from the neo-classical growth model that, under certain conditions, the per capita growth rate tends to be inversely related to the starting level of output or income per person and consequently, if the economies were similar in respect of preferences and technology, then poor economies grow faster than the rich ones was tested for sixteen regions of India. The results were entirely consistent with the pattern of regional disparities revealed by the coefficient of variation and the values of $\sigma$ over the same periods. The richer Indian states seemed to have grown faster than the poorer states in both the 15-year sub-periods (1965-66 to 1979-80 and 1981-82 to 1994-95) and this was true for two out of the three quinquennia in each sub-period as well. Only the second half of the sixties and the first half of the eighties saw not a convergence, but both the rich and the poor states growing at roughly similar rates.

The states with the maximum distance between them for all the six quinquenniums were Punjab and Bihar, while the states with the minimum distance between them were different in each of the periods. Importantly, the average distance between states—deflated by the weighted mean of PCNDP over the period (or of the PCNSDP of the sixteen states over the period), in order to eliminate the increase due to growth of
PCNSDP over time- increased over the time periods supporting the hypothesis of growing regional disparities over time.

The investment by the Centre in the non-departmental enterprises was clearly an extremely important component of the investment in states. From 1981-82 onwards, all the three major forms of central transfers- tax shares, grants and loans- were lower in magnitude than central investment. Also, both total and developmental capital outlays of the states were lower than central investment from 1981-82 onwards. It was, therefore, evident that the investment by the Centre in the non-departmental industrial and commercial undertakings played an extremely important role in capital formation in the states and this role became even more emphasised in the latter half of the period.

Analysis of the pattern of distribution of central investment in the fifteen states seemed to suggest that different states had benefited unevenly over the period. Andhra Pradesh, Gujarat, Uttar Pradesh and Maharashtra appeared to have clearly improved their relative positions in terms of share of central investment with Maharashtra benefiting the most, while Orissa, Tamil Nadu and West Bengal were the states whose positions had clearly worsened with West Bengal being affected the most adversely. Andhra Pradesh, Gujarat, Uttar Pradesh and Maharashtra were also the states that had improved their relative positions in terms of per capita investment.

Central investment –neither in a ‘stock’ nor in a ‘flow’ form – appeared to be negatively related to the income of the fifteen states over the period considered for the study. Increase in gross block, representing addition to existing capital stock and, therefore, a variable indicative of policy priorities, appeared unassociated with income per capita – except for a brief period at the beginning. The distribution of central investment over the period of the study, therefore, could not be called progressive in terms of the criteria used in the study and the need to reduce regional inequalities in growth and incomes had been clearly over-shadowed by the other objectives assigned for the central public sector enterprises.

The impact of public investment on output was clearly different in the regions considered in the study. Gujarat experienced the highest impact, followed by Maharashtra and Kerala while Jammu and Kashmir experienced the lowest impact,
followed by Rajasthan and Uttar Pradesh. The highest impact on value-added was on Kerala followed by West Bengal and Andhra Pradesh while, again, Jammu and Kashmir experienced the lowest impact, followed by Uttar Pradesh and Bihar.

The picture in respect of impact on output was somewhat altered when import leakage from the regional systems was taken into account. However, the alterations in ranking, post-leakage, were much more severe in respect of impact on value-added. There was no association between the ordering of states before and after import leakage was allowed for in the latter case.

It is clear, therefore, that any assessment of the effectiveness of public investment, in terms of impact on output and value-added, has to be net of import leakage from the regional system. Investment decisions based on ordering of states in terms of pre-leakage impact multipliers could lead to growth patterns divergent from that originally envisaged.

A different attribute of impact related to its dispersal across the sectors of the regional system. Jammu and Kashmir had the largest number of zero-impact sectors (21), followed by Rajasthan with fifteen. Both of the states had only three sectors experiencing impact of over one percent. Tamil Nadu had the largest number of sectors (22 out of a total of 24) experiencing some level of impact. A comparison of the standard deviation of the impact on output across all the sectors, before and after import leakage, revealed that the degree of concentration increased after leakage for all the states.

The loss of impact experienced by the regional systems seemed to be independent of the level of development of the state economies. This was also true in respect of the magnitudes of the multipliers in the sense that both the more developed as well as the lesser developed states experienced high as well as low levels of impact. No general conclusion could be drawn as to the unsuitability of capital-intensive investment projects in backward regions or conversely, to their suitability for the more developed regions.
An examination of the range of the multiplier values across enterprises revealed a tremendous variation in growth potential associated with the same absolute quantum of investment in different enterprises in different states. Therefore, if public investment across space is to be an effective instrument of policy for reducing disparities then it is the figures of investment adjusted for impact and leakage, and not the absolute quantum of unadjusted investment, that has to be biased towards the backward regions.

No relationship emerged between income of the states and the magnitude of impact as measured by the impact multipliers. It would appear that there was no discernible attempt to bring about a reduction in regional disparities in growth via policies based on the specific nature of investment and its relation to the structure of the regional systems.

There seemed to be a clear association between the impact on output generated by industries/sectors in which the investment took place and the magnitude of its backward linkages with the remainder of the regional economy and its even spread over the system. The results were not so clear in respect of forward linkages.

In analysing the differential impact of infrastructural investment across different categories of states the estimated equations for all the three years explained a high proportion of the variation in regional incomes and the F-statistic was significant at the 99-percent confidence level throughout. The models where the infrastructure variables were entered separately as PIDI, SIDI and FIDI had greater explanatory power than models where infrastructure was entered as one variable (OIDI). This would seem to be indicative of the fact that infrastructure should not be treated as a homogeneous variable. Finally, models with the infrastructure dummies gave a better fit indicating that the impact of infrastructure was influenced by economic characteristics of the recipient region.

The SIDI slope dummy was negative and significant for all the reference years indicating a relatively lower impact of social infrastructure in the intermediate regions. The intercept dummies were positive throughout, and significant in two out of the three years, indicating higher income levels for the intermediate group of states. The physical
infrastructure slope dummy had a positive sign throughout, though significant only in 1970-71.

Section 7.2
Limitations of the Study
The first relates to the assumption of stability of technical coefficients underlying a part of the study. Impact analysis in chapter 5 is based on the use of the input-output tables, which while relating to the year 1965, have been utilised for analysis over the entire period 1965-66 to 1994-95. How valid is this assumption of constant technology over the period?

The input-output tables representing the state economies were in the 86-sector format with each sector, on an average, representing a number of industries, which in turn represented a very large number of firms/enterprises. The sector technical coefficients were derived as a weighted average of the industries’ coefficients, which were in turn derived as weighted averages of the individual firms. The entry of firms with different technologies may, therefore, be expected to have only an extremely limited impact on the industry technical coefficients derived as an average and a still lower impact on the sector coefficients.

The above argument is reinforced by the fact that the entire Indian economy, over the period considered for the study, was far from being a free-market economy, with pervasive controls on the market- the public sector dominated Indian industry, free entry and exit of firms was circumscribed, a comprehensive licensing policy was in place, the external sector was subject to rigid controls. Domestic research and development activities were limited with dissemination of domestically developed technology being negligible while import of foreign investment and technology was highly restricted even when available.

That all these conditions militated against rapid technological change in the Indian economy is borne out by the Central Statistical Organisation (CSO), Government of India. The CSO had prepared Input-Output Transactions Tables for the years 1968-69 (published in 1978), 1973-74 (1981), 1978-79 (1989), 1983-84 (1990) and 1989-90 (1997) and reported that there have been only “marginal changes at the sectoral levels in
the detailed as well as broad group level of classification" during the periods\(^1\). It went on to say “it is, however, difficult to say definitely whether these changes are partially attributed to use of fresh data particularly the results of follow-up surveys of Economic Census relating to manufacturing covered in the DME Survey, 1989-90, NDME & OAE survey in the 45\(^{th}\) Round of NSSO or due to technological changes”. The assumption of stable technical coefficients over the period, therefore, does not seem unreasonable.

A second aspect relates to the input vectors for the fifty-nine public sector enterprises, which were derived from the reports of the ASI. The ASI data were at the four-digit industry level and, therefore, represented the industry average and not the individual enterprise. The issue essentially is that of how representative will this average be of the input structure of the PSE, especially in a situation where the new firm is utilising new technology very different from that used by the existing firms. The possibility of induction of radically new technology in context of the Indian economy in the relevant period has already been examined. In addition, the alternative- obtaining data directly from the different enterprises- presented its own set of problems. The Annual Reports of the PSEs did not have the required information. The problem became much more acute in case of enterprises having more than one production unit as published reports of the enterprise related to the enterprise as a whole and not the individual units whereas the requirement of this study was the input structure of individual production units. Ramdhyani’s study of the impact of Scooters India Limited (SIL) on the economy of Uttar Pradesh suggested that the required information may not have been available even if the production units had been approached directly. His report, published in 1984, revealed that information relating to the inputs used in SIL was not available for years previous to 1979-80 and this information could not be obtained even though the unit commenced production only in 1974-75 (page M-134). It should be noted that SIL was only a single unit enterprise.

The above suggested that approaching the enterprises/production units directly for the necessary information, in addition to comprising an gigantic and complex task, would have been of doubtful value, especially as the required data in case of many enterprises

related to periods as much as 25-30 years ago. The obtaining of the necessary data from the ASI reports, therefore, was the only practical alternative.

The third aspect relates to the fact that the input-output tables of 1965 did not incorporate ancillaries that were set up along with the PSEs in the period 1965-66 to 1994-95 to supply inputs to the PSEs themselves, with the proportion of inputs provided varying from enterprise to enterprise. The provision of inputs that were already being produced in the state was already reflected in the input-output matrices. However, insofar as the ancillaries provided substitutes of non-competitive imports, the derived post-leakage multipliers are underestimated.

Section 7.3
Conclusions and Policy Implications
There was no convergence of regional incomes in India over the period 1965-66 to 1994-95. In fact, the ten years between 1985 to 1995 saw a remarkable increase in disparities with the first half of nineties witnessing maximum aggravation. This pattern of worsening disparities would clearly seem to suggest the need for a higher level of governmental intervention in the form of specific economic policies directed towards ensuring convergence.

Investment by the centre in non-developmental enterprises played an extremely important role in capital formation in the states and this role became even more important in the second half of the period. However, distribution of this investment could not be termed progressive with increase in capital stock in states appeared to have no association with per capita income of the states. There is, therefore need to ensure that a greater proportion of central investment is directed towards the poorer states. This is especially necessary in context of the ongoing liberalisation process where, with the dilution of policies influencing location of private investment, the more developed states may be expected to attract most of the private capital.

The impact of public investment was clearly different in the various regional systems, as was the dispersion of its impact over the sectors constituting the system. There was tremendous variation in the growth potential associated with the same absolute quantum of investment in different enterprises in different states. This has implications for the
policy role assigned to public investment across space as an instrument for reducing regional disparities about which the perception of policy-makers has been mixed.

The third FYP had the following observations: “Instances of areas around massive projects where no great impact on the levels of living of people is to be observed” (p 143) and “while in the selection of sites for basic capital and producer goods industries, proximity to raw materials and other economic considerations have naturally been important, it was felt that in a wide range of consumer goods and processing industries it was possible to foster regional patterns of development” (p 146). The revised draft sixth FYP (1978-83) commented adversely on the strategy of industrial location of public enterprises: “the evidence suggests that capital intensive industry is not by itself the sort of growth catalyst that backward areas need” (p 195).

In the light of the results generated by the study, the above statements, to the extent they suggest that some projects have had little regional impact, are justified. However, the broad policy conclusion that large projects should not be located in backward regions is not appropriate. The results seem to suggest that both the more developed states with complex economies and the less developed states have been the recipient of investment in enterprises with low levels of impact. On the other hand, both categories of states have also received high-impact investment. What seems to have been important is the degree of linkage of the enterprises with the regional systems, which reduces the leakage of benefits away from the regional economies.

The results suggested that any assessment of the effectiveness of public investment, in terms of impact on output and value-added, has to be net of import leakage from the regional system. Investment decisions based on ordering of states in terms of pre-leakage impact multipliers could lead to growth patterns divergent from that originally envisaged.

There seemed to be a clear association between the impact on output generated by industries/sectors in which the investment took place and the magnitude of its backward linkages with the remainder of the regional economy and its even spread over the system. The results were not so clear in respect of forward linkages. The observed interdependence between high magnitudes of impact and investment in key (backward
linkage) sectors, therefore, provides a principle, which enables choice to be made among
different public enterprises for investment in a specific state, if high impact levels are a
desired and pre-dominant objective.

The draft Ninth FYP seems to have reallocated the task of reduction of regional
disparities back to the public sector: "it will be necessary to deliberately bias public
investment in infrastructure in favour of the less well-off states" (p 16). However, given
the large variation in growth potential associated with the same absolute quantum of
investment in different enterprises in different states, if public investment across space is
to be an effective instrument of policy for reducing disparities then, in addition to the
quantum of investment associated with an enterprise, the following factors also have to
be considered;
(a) the nature of the output and the input structure of the enterprise in which investment
    is to be undertaken.
(b) the impact of a specific enterprise on the specific state in which it is to be located.
(c) the import leakage from the estimated impact on the regional system.

The above considerations relate to what may be termed as the assessment of the
'compatibility' of a specific investment to the structure of the regional system which is
to receive this investment. However, if there is to be an overall policy of utilising public
investment for correcting disparities in regional growth, certain additional factors have
also to be considered simultaneously;
(d) investment taking place in other public enterprises in other states.
(e) comparison of impact multipliers (post-leakage) associated with these other public
    enterprises in other states.
(f) deriving a measure of 'investment modified for impact and leakage' (IMIL) for the
    entire set of enterprises in which investment is to be undertaken. This measure, it
    should be noted, would hold true only for a specific enterprise to be located in a
    specific state at a specific point (or interval) in time.

It is the figures of IMIL, and not the absolute quantum of unadjusted investment, that
has to be biased towards the backward regions.
Infrastructure should not be treated as a homogeneous variable as it has a differential impact on different regions. Also, impact of investment in infrastructure is influenced by the economic characteristics of the recipient regions. The year 1970-71 may be said to have represented Phase 1 of the Hansen hypothesis. An immediate implication for policy was that by concentrating on physical infrastructure in the intermediate regions and social infrastructure in the lagging regions, any trade-off in terms of an overall lower national growth for greater regional equality could have been minimised. Prospects of concentrating on one or the other forms of infrastructure in the two categories of states also existed at the later points in time.

Therefore, the possibility of initiating a strategy of unbalanced growth, in varying forms at different points in time, clearly existed over the period analysed. The primary resistance to such a strategy of concentrating of one kind of infrastructure in certain regions, and that too for not insubstantial periods of time, could come from regional pressures for quick equalisation of all forms of infrastructure. However, formulators of policy, interested in the possibility of reduction of regional disparities in incomes without any major adverse impact on the overall growth of the national income, may find it useful to examine the 'suitability' of different forms of infrastructure investment in different recipient regions with varying socio-economic characteristics.

With the dilution of policies influencing the location of private investment as a result of the on-going process of liberalisation, private capital is more likely to be attracted towards the better developed states, with the consequence that market based growth may well elude the lesser developed regions. The distribution of central public investment over space could emerge as a powerful policy instrument for correcting the growing regional disparities in India, if the above considerations are effectively integrated into the overall policy framework.