Chapter 1
Introduction

A major issue, which is associated with the development process of a nation, is the problem of regional disparities and the causes and behaviour of such disparities. While the existence of such inequalities in large and diverse economies is well established, what has and is being contended is whether the existence and the free operation of market forces leads to the ultimate convergence of the levels of regional development or alternatively, whether there is need for governmental intervention in the form of specific economic policies directed towards ensuring such convergence.

In India, the draft ninth Five-Year Plan (FYP) has acknowledged that “growth has not been as regionally balanced as it should have been” and goes on to state that planned intervention is required to ensure that large regional imbalances do not occur\(^1\). Accepting that with dilution of policies influencing location of private investment, capital is more likely to be attracted towards better developed states with the consequence that market based growth may well elude regions which are inadequately integrated to the wider growth process, the document further states that “it will be necessary to deliberately bias public investment in infrastructure in favour of the less well-off states” (p 16).

The relation between investment and economic growth is well established in economic theory. In India, public investment has been a powerful instrument of policy, both due to its magnitude relative to private investment and the nature of the sectors in which this investment was concentrated. However, several issues need to be examined before it can be used effectively as an instrument for reducing regional disparities. The more important among these issues are (a) the causal mechanisms by which public investment affects regional growth (b) the heterogeneity of the different components of public investment and (c) the heterogeneity, in terms of socio-economic development levels, of the recipient regions.

In India, public investment is primarily at the level of the centre and the states, and investment at both levels may be further categorised as between investment in infrastructure and directly productive activities. Investment in infrastructure is in turn composed of investment in physical, social and financial infrastructure. As the different kinds of investment may be postulated to have differing impact on regional growth, any policy of utilising public investment for influencing regional growth patterns in India, has to take into account this lack of homogeneity. Another aspect that has to be considered is the varying levels of socio-economic development of the states, which could affect, to varying degrees, the ability of the regions to absorb and retain the beneficial effects of public investment.

The focus of this study is on the spatial distribution of public investment and its impact on regional growth, over the period 1965-66 to 1994-95, where these issues, along with several others, are examined.

In addressing the issue of regional disparities in context of India, the first step has to be an exploration, at the level of theory, of the conflicting schools of thought on the possibility of convergence followed by an examination of the empirical evidence on ultimate convergence generated by other studies, especially with reference to India. This is reported in the next section. In the subsequent three sections, some basic literature which affect the choice of objectives and the methodology underlying analysis of impact of public investment on regional growth are reviewed.

Section 1.2.A
Regional Growth, Disparities and Convergence
Regional growth theories offer different conclusions in respect of the issue of convergence or divergence. The neo-classical theory predicts convergence in regional per capita incomes whereas the cumulative causation theories predict divergence. In the neo-classical growth models for closed economies as formulated by Solow (1956)\(^2\),

Swan (1956)\(^3\), Cass (1965)\(^4\) and Koopmans (1965)\(^5\), the per capita growth rate tends to be inversely related to the starting level of output or income per person. In particular, if economies are similar in respect of preferences and technology, then poor economies grow faster than rich ones. The crucial element for convergence in the neo-classical model is diminishing returns to capital.

The circular and cumulative causation principles formulated by Myrdal predict divergence of per capita incomes. He argued that “the play of forces in the market normally tends to increase rather than decrease the inequalities between the regions’ (1957:26)\(^6\). Growth in the prosperous areas influences the rate of growth in the lagging regions via favourable spread effects and unfavourable backwash effects with the latter normally outweighing the former. With free trade of an inter-regional system operating to the disadvantage of the poor regions, regional growth is a disequilibrating process. Kaldor (1970)\(^7\) formulated a variant of the cumulative causation hypothesis, which was formalised in terms of a model by Richardson (1973:30-34)\(^8\). Kaldor’s model involving the rate of growth of world demand for the region’s products and the movement of ‘efficiency wages’ in the region relative to the other producing regions predicts divergence.

Most regional economists seem agreed that inherent tendencies for increasing regional disparities exist in the early stages of economic development of a nation. Where there is disagreement is on whether the free operation of market forces would lead to ultimate convergence i.e. the hypothesis of an inverted U-shaped curve. Hirschman (1988:183-184) stated that “an economy.... will first develop within itself one or several regional centers of economic strength” and “...interregional inequality of growth is an inevitable concomitant and condition of growth itself”\(^9\). From the higher growth regions there are

likely to be favourable 'trickle-down' effects as well as unfavourable 'polarisation' effects on the lagging regions. He seemed to postulate a greater role for the former than the latter though "....if the market forces that express themselves through the trickling-down and polarisation effects result in a temporary victory of the latter, deliberate economic policy will come into play to correct the situation"(190). Williamson (1965) identified four factors - labour migration, capital migration, interregional linkages and central government policy- which increase regional income disparities in the initial stages of development but which work towards regional convergence when a threshold level of national development is reached.

Easterlin's (1957) study seems to suggest that convergence is not inevitable since the disequilibrating forces working against it are normally dynamic in nature whereas Kuznet's (1958) empirical work would seem to suggest the opposite. Von Boventer (1975:15) stated that "it is impossible to generalise about the relative rates of growth of various centres ... at first due to a predominance of the agglomeration factor, the biggest centres have the highest growth rates while later on in the process of concentrated dispersion, smaller centres grow faster than before and in (relative terms) possibly faster than their bigger predecessors."

The basic theoretical parameters of growth theories and the underpinnings of the debate about ultimate convergence and the possibility of the reverse U-shaped curve of regional incomes were established early. Current work on the convergence hypothesis is largely empirical and controversial due to three competing hypotheses:

(a) the Absolute Convergence Hypothesis which is essentially that per capita incomes of countries converge to one another in the long-run independently of their initial conditions. Since an economy's long-run equilibrium depends on its structural characteristics (technologies, preferences, population growth, government policies,
factor market shares etc.) absolute convergence requires convergence in structural characteristics as well\(^{15}\).

(b) the *Conditional Convergence Hypothesis* which postulates convergence of per capita incomes of countries in the long-run independently of their initial conditions, if their structural characteristics are identical. This would also seem to suggest that among such countries, the lower the levels of output per capita, the higher the rate of growth.

(c) the *Club Convergence Hypothesis* which is that per capita incomes of countries that are identical in their structural characteristics converge to one another in the long-run provided that their initial conditions are similar as well i.e. countries converge to one another if their initial conditions are in the basin of attraction of the same steady-state equilibrium\(^{16}\). This hypothesis would seem to be consistent with phenomena like polarisation, persistent poverty and clustering.

Some of the more important later works on convergence include that of Barro (1991), who analysed growth experiences of 90 countries from 1960-1985 basically using regression tools with the dependent variable being the growth rate of real per capita GDP for 1960-1985 and the independent variable being the log of 1960 per capita GDP \((y_{1960})\). The main finding was a lack of close relationship between the growth rate and \(\log(y_{1960})\). In fact there seemed to be a small tendency for the initially rich countries to grow faster than the poor ones after 1960\(^{17}\).

Zind (1991) tested per capita income convergence between 89 Less Developed Countries in Africa, Asia and Central and South America for the period 1960-1980 and reported income convergence within a smaller sub-sample of 30 countries which were basically MDCs and a limited number of higher per capita income LDCs\(^{18}\). Barro and Sala-I-Martin (1992) studied convergence across the 48 contiguous U.S. states using the neo-classical growth model as a framework using data on personal income since 1840.


\(^{16}\) Ibid, page 1056.


and on Gross State Product since 1963. The study provided evidence of convergence but the findings can be reconciled quantitatively with the neo-classical model only if diminishing returns to capital set in very slowly19.

Levine and Renelt (1992) using a data set relating to 119 countries found strong negative partial correlation between the average annual growth rate of GDP per capita and initial incomes over the period 1960-1989 which “offered qualified support for conditional convergence hypothesis”20. Chatterji et al (1993) constructed an econometric model to explain the level of real GDP per capita in 1985 in terms of the level in 1960 and concluded that the steady state equilibrium value of real GDP per capita represents a non-convergent equilibrium the more politically free countries are less likely to converge to a common steady state21.

Knight et al (1993) tested the neo-classical growth model using panel data relating to 98 countries for the period 1960-1985. He concluded that the rate of conditional convergence to be approximately the same as predicted by the Solow-Swan model22. Again, Holtz-Eakin (1993) examining the growth patterns of the U.S. states over the period concluded that the “empirical analysis provides qualitative support for the Solow model of economic growth and there is strong evidence of convergence”23.

Another study of growth of the U.S. states by Bishop, Formby and Thistle (1994) analysed regional income distribution for convergence in the 1970s. Their finding that the southern states of the U.S. substantially converged to the rest of the nation in the 1970s agreed with other studies on the U.S. south. However, the study also revealed that while this was happening the income distributions of the Non-South regions were

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diverging\textsuperscript{24}. Evans and Karras (1996) using state level data for the period 1970-1986 found "strong evidence that the contiguous 48 U.S. states converge rapidly towards levels that are far apart"\textsuperscript{25}.

The empirical evidence on ultimate convergence, therefore, seems to be inconclusive and dependent on factors like choice of regions, the reference time period, factors identified as the basic determinants of regional growth differentials, methodological differences and the data sets utilised. It may well be that the issue is capable of being settled only within the given empirical framework of each study.

Section 1.2.B
Regional Growth, Disparities and Convergence: Studies on India

Nair (1971), in one of the earlier studies, used three measures- quotients of disparity, COV of PC incomes and the state income relative- to determine inter-state differentials for the period 1950-51 to 1960-61. Though there was some decrease in disparities over the period, he concluded that the poorer states were lagging far behind other states in industrialisation and productivity and that economic changes in the period were not conducive to reduction in disparities\textsuperscript{26}. Rao (1973) constructed a composite index of development based on co-variation in various indicators of development and classified the states into three categories- the most developed, not so developed and the least developed. Comparing the groups between the early fifties and the early sixties, he observed that the groups continued to contain broadly the same states and concluded "regional disparities have not been reduced in the course of 15 years of planning"\textsuperscript{27}.

A study by Mathur (1983) covering the period 1950-51 to 1975-76 concluded that the 25-year period "started with a narrowing down of regional income disparities, but the latter half was characterised by a reverse trend, suggesting a broadly U-shaped curve of

regional inequalities"\(^28\). Analysis at the three-sector level indicated that this was primarily the result of the movements of the primary and tertiary sectors while the secondary sector exhibited an inverted U-shaped path. If, however, the tertiary sector becomes more aligned with the secondary sector and the latter continued its declining trend of disparities then, with a greater proportion of national income accruing from the secondary sector with economic development, the trend of regional disparities could change.

Dholakia (1985:169), using weighted coefficient of variation to measure state inequalities in per capita SDP and other aggregates concluded that “the state product inequalities have clearly increased during the period 1960-61 to 1979-80 not only in money terms but also in real terms”\(^29\). Singh (1985) examined regional disparities in income over the period 1951-1981 using techniques like coefficient of variation, range and maximum/minimum ratios and found that the first decade of planning witnessed a narrowing of inter-state income disparities but this trend reversed in the next two decades\(^30\).

Rao (1985) in a study covering the period 1960-61 to 1979-80 and using coefficient of variation and Gini coefficients, concluded that both tools indicated rising disparities except in 1965-66 when there was a marginal decrease\(^31\). George (1988:1), in a study covering the period 1950-51 to 1982-83 and using coefficient of variation of per capita State Domestic Product from the national/all-state averages as well as distances between the all-state average and the top income state and between the lowest income and the highest income states reached a conclusion that “regional disparities have only widened during the plan era…”\(^32\).


Dandekar (1992), examining regional disparities in development over the period 1960-61 to 1988-89, concluded that (a) the states which were at the bottom in 1960-61 have, by and large, remained so in 1988-89 and (b) over the years the range between the highest and the lowest has also increased.\textsuperscript{33} Choudhry (1992:42) covering the period 1967-68 to 1985-86 and using Ranks, Relative Range and Gini Coefficient found "no definite sign of decrease though a tendency towards reduction particularly in the eighties is suggested by the results"\textsuperscript{34}. Sarker (1994) analysed the regional imbalances in the development of 15 major states covering the period 1960-61 to 1986-87 using 14 development indicators.\textsuperscript{35} He concluded that in terms of average 'euclidean distance' and the coefficient of variations of the first principal component scores of the constructed composite index and the combined component scores (the development index) the disparities increased till 1980-81 and thereupon reduced.

Das and Barua (1996) examined the pattern of regional disparities for the period 1970-1992 primarily using the Theil index of inequality. They concluded on the basis of trend analysis that "inter-state inequality is rising in India in almost every sphere of economic activity particularly in the organised industry"\textsuperscript{36}. Marjit and Matra (1996) covering the period 1961-62 to 1989-90 and examining convergence in terms of the standard Solow model concluded that (a) there is no evidence that the states in India have been converging in terms of their per capita SDP and (b) the simple 'Solow type' conclusion whereby the regional convergence follows from the basic law of diminishing returns cannot be sustained\textsuperscript{37}. However, the conclusion reached by Cashin and Sahay (1996) in a study examining disparities over the period 1961-1991 was different from the above in that the authors concluded that there has been convergence in real per capita SDP across

\textsuperscript{34} Choudhry, Uma Datta Roy (1992): Inter-State and Intra-State Variations in Economic Development and Standard of Living, mimeo., NIPFP, New Delhi.
Ghosh, Marjit and Neogi (1997), analysing regional divergence using measures of real PCNSDP derived with the help of state level deflators, concluded that Indian states have significantly moved apart during the last 30 years\textsuperscript{39}. Ghosh and Prabir De (1998) while examining the role of infrastructure in regional development concluded that “there are reasons to believe that the poor states have remained poor and the rich states have remained rich after 50 years of independence. Moreover, inter-states disparity in income had declined upto the 1970s, and it has been rising steadily since then, particularly during the post-liberalisation period\textsuperscript{40}. Their study covered the period 1960-61 to 1994-95.

Rao, Shand and Kalirajan (1999:772) have criticised the conclusion by Cashin and Sahay (1996) as (a) the special category states as well as Delhi were included in their study and (b) the estimated convergence coefficients were not significant in the basic equations or in the equations with primary sector share\textsuperscript{41}. Their own study covering the 14 major states from the mid-sixties onwards revealed that per capita incomes have shown divergence and inter-state disparities have been accentuated. Growth of per capita SDP in the states in India was positively related to their initial levels. Further, the increases in divergence and dispersion have been much sharper in the initial years of liberalisation.

The empirical evidence on the reverse U-shaped relationship between economic growth and inter-regional inequalities and the possibility of ultimate convergence in India, while mixed seemed, on balance, against it. Results of different studies again seemed to be dependent on factors like the reference time period, factors identified as the basic determinants of regional growth differentials, methodological differences and the data sets utilised.


In the following three sections, some basic literature which affect the choice of objectives and the methodology underlying analysis of impact of public investment on regional growth are reviewed.

**Section 1.3**

**Linkages, Key Sectors and the Morphology of Growth**

In his seminal work Rosenstein-Rodan (1943), focusing essentially on the strategy for industrial growth, suggested that the entire industry to be created be treated and planned as one huge firm or trust because complementarity of different industries (a) reduces costs by decreasing risk of not being to sell and this constitutes a case of ‘external economies’ (b) creates Marshallian economies external to a firm in a growing industry and (c) creates economies external to one industry due to the growth of other industries\(^{42}\). He identified Social Overhead Capital as the most important instance of indivisibility and, therefore, of external economies on the supply side due to its four characteristics- indivisibility in time, high minimum durability (lumpiness), long gestation periods, and need for a minimum social overhead capital mix. He also postulated that a ‘big push’ would be required to jump over the economic obstacles to development.

Nurkse (1953) suggested that when domestic markets are limited because of mass poverty due to low productivity, a possible solution to the problem of capital formation could be a balanced pattern of investment in a number of different industries, so that people working more productively, with more capital and more advanced techniques, become each others customers\(^{43}\). While an increase in output in one industry/firm does not create its own demand, ‘......an increase in production over a wide range of consumables, so proportioned as to correspond with the pattern of consumers’ preferences, does create its own demand’ (12). Each industry is therefore expected to advance along an expansion path determined by the income elasticity of demand for its


products. He related his arguments essentially to private investment, which needs the inducement of growing markets, and not state investment, which can go ahead without any market incentives. The doctrine of balanced growth also took increased supplies of capital for granted.

Hirschman (1958) argued that in most developing countries there are imperfections in the factor and product markets as well as a shortage of entrepreneurial talent\(^44\). In a situation where allocation of resources depend largely on the atomistic responses of entrepreneurs, investment opportunities will be missed and to overcome this Hirschman suggested a form of disequilibrium development strategy, of severe shortages and/or excessive supplies in some product markets which would in turn induce local entrepreneurs to invest either to supply products strongly demanded or utilise products that are in excess supply.

Hirschman distinguished between backward linkages and forward linkages and suggested methods for measuring them for each industrial activity. A sector is linked with the other sectors which supply inputs to it and with those which use its output as their own inputs and therefore the expansion of a sector provides stimulus for the expansion (or initiation) of production of input supplying industries as well expansion of sectors utilising its output by greater availability (or cheapening) of its own output. The former is termed the backward linkage effect and the latter the forward linkage effect.

This aspect of interdependence arising through technological linkages between sectors in an economy has led to the exploration of the concept of 'key' sectors defined in terms of sectors possessing powerful linkages and consequently being in a position to induce the expansion of other sectors (or even the initiation of new industries). The key sectors, it has been argued, can initiate and/or accelerate the growth process through a sequential process of inducements. To quantify the linkages and to give key sectors operational meaning the Leontief input-output matrix has been widely used as an empirical tool. Chenery and Watanabe (1958)\(^45\) used the direct coefficients matrix to define backward

\(^{44}\) Hirschman, A (1958): *op cit*

and forward linkages while Rasmussen’s (1957)\textsuperscript{46} definition of the linkages is based on the Leontief Inverse Matrix\textsuperscript{47}.

Bharadwaj (1966) pointed out that ‘... the inducement to expand output... depends upon the absolute level of demand for its output and hence the potential inducement provided by a high backward linkage effect has to be corrected for the probability that these inducements, in fact, would prove to be effective, in the sense that the absolute level of demand generated is at least equal to the minimum economic size for the given industry’ (317-18) and that the backward linkage criterion ‘can have very little value in itself without explicit consideration regarding in which sector, in what magnitudes and at what cost the linkage effects are propagated’ (319)\textsuperscript{48}.

Yotopoulos and Nugent (1973) developed tests for both Balanced and Unbalanced Growth in terms of weighted indices measuring dispersion around a criterion of balance\textsuperscript{49}. They also developed a ‘Hirschman-Compliance Index ($\rho_{Hi}$)’ to test the Hirschman hypothesis that emphasis on high-linkage sectors lead to higher rates of growth than emphasis on low-linkage sectors. The index $\rho_{Hi}$ is provided by the country specific correlation coefficient between the sectoral total linkage indices, $L_{Tj}$, and a country’s sectoral rate of growth, $g_{ij}$; that is

$$\rho_{Hi} = \rho (L_{Tj}, g_{ij})$$

where $i$ and $j$ denote country and sector respectively and $L_{Tj}$ is the column sum of sector $j$ in the Leontief Inverse matrix. The null hypothesis would be rejected by significantly positive correlation between the overall country growth rates, $G_i$, and the Hirschman-Compliance Index, $\rho_{Hi}$. A weighted index was also derived

$$\rho_{Hi} = \rho (L_{Tj}\beta_j, g_{ij}w_{ij})$$

where $w_{ij}$ is the relative importance of a sector in a country’s economy and $\beta_j$ the income elasticity of sectoral composition. A modified formulation with an additional constraint- that there is an acceptable degree of imbalance instead of no limits on the

\textsuperscript{46} Rasmussen P. (1957): \textit{Studies in Inter-sectoral Relations}, North Holland, Amsterdam.
\textsuperscript{47} A detailed exposition of these definitions follows in Section 3.1, Chapter 3.
desirable degree of imbalance (as in the above) was also proposed as a balanced growth version of the linkage hypothesis.

Panchamukhi (1975) pointed out some limitations of the Yotopoulos and Nugent approach: (a) input coefficients are generally specified in value terms and thus relative prices could distort the picture of the linkage in physical terms, (b) differences in the input coefficients may be due to the differences in the product mix rather than in the technology, (c) input coefficients imply a linear homogeneous production function, whereas linkages may be leading to economies of scale in vertical or horizontal integration in the production relationships and (d) the level of aggregation in the sector specification in the input-output model could affect the linkage coefficients.50

The exercise by Yotopoulos and Nugent was also criticised on grounds of non-weighting of \( L_{ij} \) (Laumas: 1976)*, non-inclusion of forward linkage effects in \( L_{ij} \) (Boucher: 1976 and Jones: 1976)* and mis-specification of \( L_{ij} \) as it is not based on domestic coefficients (Riedel: 1976)*. Most of the criticism, except that of non-weighting of \( L_{ij} \), was refuted successfully by Yotopoulos and Nugent (1976)51*

Diamond (1976)52 suggested that if the term ‘linkage’ describes inter-connection between sectors then the focus should be indirect effects even when operating with the Leontief Inverse matrix and recommended two transformations of the Inverse \( Z = (I-A)^{-1} \). If the technological linkages are net of the initial injection, then \( Z' \) should be used where

\[
Z' = (Z-I)
\]

and if the focus is on an industry’s effects on other sectors, then all the feedback effects to the originating sector should be excluded by operating with the transformation

\[
Z'' = (Z-Z^*)
\]

where \( Z^* \) is a diagonal matrix formed from the elements \( Z_{ii} \). He noted that when analysis was carried out using all three matrices \( Z, Z' \ and \ Z'' \), typically incompatible ranking of

industries could be derived. He also suggested the introduction of an explicit preference function by taking some normalised coefficient, $\lambda_i$, as a policy weighting and then deriving a 'policy matrix', $P$, by pre-multiplying $Z$ by a diagonal matrix of these coefficients. Key sectors can then be identified for different policy perspectives by operating on the different $P$ matrices derived with the alternative policy weights.

McGilvray (1977) pointed out that if weights used (for the Rasmussen backward linkage) are based on the ratio of demand for each commodity input to the output of that commodity at the minimum operating capacity such that

$$V'_{ij} = f(r_{ij}, w_{ij})$$

and

$$w_{ij} = g(a_{ij}X_j, K_j)$$

where $V'_{ij}$ is the weighted index of backward linkage, $K_i$ is the minimum economic operating capacity in sector 'i' and $X_j$ is the level of output in sector $j$, then the matrix of weights $[w_{ij}]$ is a function of the levels of output assumed for each sector, and will change as sector outputs change. Also, if actual final demands or outputs used to determine weights, then the measures of linkage reflect ex-post linkages in the system rather than the ex-ante or potential linkages and the ex-ante market disequilibria created by the development of certain key sectors. He also suggested that means of incorporating factors such as comparative advantages, import substitution and export possibilities in the measures of linkages and the identification of key sectors be explored. McGilvray termed the Yotopoulos and Nugent test of the Hirschman linkage hypothesis inadequate, as 'the linkage hypothesis does not imply that key sectors will necessarily grow faster than other sectors; if the strategy is successful, the fastest growing sectors may be those which are most closely linked to the key sectors and not the key sectors themselves' (54-55) and also that it is incorrect to assume that variations in sectoral growth rates demonstrate a linkage-based growth strategy.

Hewings (1982) in a review of the problems associated with key sector identification and its application at the regional and developing country levels concluded that there is need to integrate the concept of key sectors to the 'complex interactions between capital expansion, productivity growth, in-migration, and various accelerator-multiplier effects

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in an open economy' (191)\(^{54}\). In context of regional development, there is demonstrable need for an integrated approach to key sector identification, project selection, monitoring and evaluation.

Section 1.4.A
The Firm and the Region
The traditional input-output theory treated the impact of a firm’s operations as that of the sector of which it was a part. Tiebout (1967) suggested separate treatment for the firm essentially on the basis of product mix as 'no matter how disaggregated the sector, any sector is still the industry average' and 'insofar as sectoring proceeds on the basis of similarity of input requirements, there is no a priori reason why output distributions will be similar'(260)\(^{55}\). He suggested the insertion of the firm by itself into the interindustry tables by creating a row of direct coefficients showing the amount each industry requires from it per unit of output. The input side was ignored by Tiebout, as from the viewpoint of an individual firm- 'unless the firm is quite large, they probably are not particularly interested in their impact on others' (261). The direct and indirect impact of a one unit change in final demand for the firm can be obtained by multiplying its row vector of direct coefficients by the corresponding entries in the various column vectors in the Leontief Inverse. The Tiebout method, therefore, did not involve the calculation of a new Inverse with the firm added as a row.

Hewings (1971) reiterated the point made by Tiebout about the treatment of an individual firm as 'each sector in the table represents an industry average (weighted or otherwise) and is certainly not representative of all firms in the region within that particular sector' (15)\(^{56}\). For measuring the impact of a new firm, he suggested incorporation of data from the firm’s accounts in terms of a separate row and column in


Greytak (1972) pointed out three problems, which if not resolved satisfactorily, could cause the divergence of the direct input and multiplier coefficients calculated for the firm by simply inserting it into the input-output table, from the inter-industry coefficients calculated from the original direct requirements matrix. The problems related to (a) firms highly dependent on wholesalers for the distribution of their products (b) a multi-product firm whose secondary production is large and considerably different from its primary output and (c) the problem of distinguishing between sales on current and capital account as capital purchases by producing industries are shown in final demand vectors whereas current sales would be a part of inter-industry matrix.

Problems (a) and (c) highlighted by Greytak relate essentially to the row coefficients of the input-output table. Katz and Burford (1981) developed a method of deriving multiplier information for an individual firm, which required only the column coefficients of the firm without the row coefficients. Their solution was to determine the firm’s proportion of inter-industry expenditures to each of the ‘n’ industries in the original ‘n x n’ direct coefficients matrix and then insert the firm’s input coefficients as the \((n + 1)^{th}\) column while a row of zeros was added as the \((n + 1)^{th}\) row. This method also enabled incorporation of information for a particular firm in an aggregated input-output model to obtain a close estimate of the actual output multiplier for that firm or industry.

Billings and Katz (1982) tested this solution by assuming that any industry in an input-output model was a firm, extracting it, and then adding the column to the matrix together with a row of zeros and the results showed that this procedure made very little difference to the multiplier values.
Richardson (1985) justified the treatment of the entry of a new firm in the same way as that of a new industry into a region by adding another column and row to the input-output matrix because 'industry averages can be very misleading, especially in light of the likelihood that the new firm is more efficient than the industry average' and also, as 'more than 90 percent of the multiplier impact occurs before the end of the first round, a simple solution is to assume that the row coefficients for the firm are all zeros' (633).

Section 1.4.B
The Firm and the Region: Studies on India

While there have been several studies on the effect of location of public enterprises on regional development, they have been essentially micro-level studies which have analysed impact at the local level (primarily Tehsil and district level) and which have not utilised the methodology outlined in the above section. Mohsin (1964) examining the impact of the establishment of the railway locomotive works in Chhittaranjan, West Bengal, found evidence of large-scale displacement of the local population from their land without adequate compensation. Further, only a small proportion of them were absorbed into the permanent labour force of the plant and the majority had to seek employment as casual labourers.

Satyanarayana and others (1973) examining the impact of mining projects in Kiruburu and Bailadila in Orissa and Panna in Madhya Pradesh, concluded that there were indirect benefits to the region from the development of transport and communication, expansion of trade and commerce, opening of schools, provision of safe drinking water etc. as well as benefits to the state governments' exchequer via royalties, indirect taxes and so on. However, the bulk of employment benefits did not go to the local residents as the highly mechanised nature of the projects required considerable technical knowledge and mechanical skill.

The study by A.N. Sinha Institute (1975) on the impact of the Rourkela Steel Plant on the regional economy (Sundergarh district of Orissa) concluded that in terms of

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employment in the plant as well as in other private sector industrial units that grew due to the spread effects of the plant, the upper-income groups which are better educated occupied the permanent and the better paid jobs whereas the landless labourers were employed in very low paid and casual jobs. In agriculture, despite existing irrigation facilities and creation of large demand for vegetables and pulses in the Rourkela township, use of advanced inputs like HYV seeds and chemical fertilisers had not taken place. Wage rate in agriculture was found to be to be extremely low compared to the market wage rate in Rourkela. While there had been local benefits arising out of the expansion of services like trade and commerce, transport, communication due to the plant, the forward linkages had not materialised fully due to the pricing policy. The development of the ancillary units in the region had been retarded, as the plant did not follow a consistent policy with regard to the purchasing of their products.

Wadhwan (1979) in an evaluation of the role and performance of the public sector steel industry in India, stated that ‘being located at green field sites and in hitherto undeveloped areas these plants have been conceived of as catalysts of growth for promoting balanced regional development’ and that regional dispersal of the large steel plants has effectively promoted exploitation of local resources and gainful employment to weaker sections of society with more than 500 medium and small-scale units having come up around the steel townships. In case of the Bokaro Steel Plant, one out of every fourth employee are persons displaced as a result of acquisition of land for the project.

The Bharat Aluminium Company (BALCO)’s study (1979) of its project at Korba in Madhya Pradesh revealed employment profiles in favour of people from the region in different categories of employment. About two-thirds of the total employed were from the state. Only in the case of officers whose recruitment was on All-India basis did the proportion come down to about two thirds.

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Kundu, Misra and Meher (1986) examining the impact of Bharat Heavy Electricals Ltd. (BHEL), Bhopal, identified several positive effects from the operation of the plant which commenced production in 1960-61. The plant had 52 ancillary units in Bhopal and ‘the pattern of industrial growth in Bhopal shows that about 50 percent of the units belonging to engineering, electrical and electronic industries have come up due to the existence of the BHEL unit’ (119). The impact extended to different small-scale units in parts of Madhya Pradesh and India. The study also identified some negative features. The villages around Bhopal continued to be as backward as before and, surprisingly, even un-electrified though BHEL produces electrical equipment. The weaker sections remained uneducated and the villagers felt that they have not been adequately compensated for the loss of cultivable land. The authors concluded that the overall impact of BHEL (Bhopal) on the regional economy was positive although a large part of the backwash effects could and should have been resolved.

Ramadhyani’s (1984) work is different from the micro-level studies examined earlier. He analysed the linkages of a public sector unit- Scooters India Ltd. - in the city of Lucknow in the industrially backward state of Uttar Pradesh and his methodology was basically identical to what was examined in the earlier section (1.3). The unit commenced production in 1975 and while its two main products were two- and three-wheeler scooters, the company also manufactured scooter power packs. The input-output model used was a 64-sector model of Uttar Pradesh for the year 1970-71 and the methodology was that outlined by Katz and Burford (1981). Impact analysis was carried out for the year 1979-80 by estimation of sectoral output, value-added and employment multipliers. The author concluded that the regional employment and value-added impact of the scooter plant was less than 25 percent of the total value-added and employment generated and that ‘industrial plans of less developed regions should, therefore, give priority to those industries which have high values of regional rather than sectoral linkages’ (M-140).

Section 1.5.A
Public Investment and Regional Growth

On a theoretical level, one of the earliest studies on the role of public capital was by Hirschman (1958) who identified regional allocation of public investments as the most obvious way in which economic policy affects the rates of growth of regions. He distinguished three principal patterns of such allocation: dispersal, concentration in growing areas, and attempts to promote the development of backward areas. Dispersion is necessitated by political factors as well as shortages of capital and entrepreneurial and managerial skills whereas the second phase of concentration is attributed to, among others, the availability of international development capital, ‘demonstration effects’ as well as the ‘serious shortages of electric power and water supply as well as in housing and transportation bottlenecks’ (192). Public investment here is determined by ‘the volume of private investment and the general rise in income in the developing areas...’ (193). Phase three results due to greater availability of funds and an attempt to counteract in part the polarisation effects that result from the operation of market forces.

Hansen (1965) divided public capital into overhead capital and direct productive capital—the latter consisting of fixed capital directly associated with production and the former all other fixed capital consisting of Social Overhead Capital (SOC) and Economic Overhead Capital (EOC). EOC is ‘primarily oriented towards the support of directly productive activities or towards the movement of economic goods’ and consists of transport and communication, irrigation, power and water supply, harbours etc. while SOC is designed to enhance human capital and consists of such things as education, public health facilities, law and order, fire services etc. He argued that the impact of public capital is dependent both the type of capital and the economic characteristics of the recipient region. Social overhead capital is expected to have the greatest impact on the lagging regions whereas economic overhead capital is most effective in intermediate developed regions (regions with raw materials, qualified labour, cheap power etc.).

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68 Hirschman A. (1958): op cit
Mera (1973) estimated production functions with three factors of production- labour, private capital and social capital- for 46 prefectures in Japan aggregated into 9 regions utilising Ordinary Least Squares estimates and making due allowances for measurement of scale, differences in the technological functional relationships over regions and over time. Social capital proved to be significant in the production process in each sector-production elasticity of social capital in the primary sector was estimated at 22 percent, for the secondary sector about 20 percent without social capital in transport and communication, and more than 50 percent with it, and in the tertiary sector in the range of 12 to 18 percent. Mera noted that the ‘estimates are tentative in the sense that they are sensitive to the specification of the estimating equation’ (183).

Haveman (1976) defining regional development as an increase in the economic welfare of a region’s residents, identified five possible strategies involving public policies for a region’s development: (a) augmenting demand for the region’s output \( (Oi) \) (b) augmenting the ability of the region to produce its output (c) direct intervention of the public sector to alter the regional price of either \( Oi \) or the inputs to \( Oi \) (d) direct cash transfers to individuals in the region and (e) altering the regional production function of \( Oi \) so that increased output flows would result from the same volume of input flows. He also distinguished between four alternate approaches to the evaluation of regional impact: regional flow-of-funds impact, regional benefit and cost impact, regional output and employment impact (current account) and regional output and employment impact (current and capital account).

Biehl (1980) argued that ‘...the regional problem consists in attracting a sufficiently large part of world demand in order to fully utilise its production or- from a long term point of view- its Regional Development Potential (RDP)’ (52). The determinants of RDP and its relative competivitiy are its geographical location, natural resources endowment, degree of agglomeration, sectoral structure, public infrastructure

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equipment, labour force potential and fixed private capital stock. Of these, RDP-relevant
resources are those with a high degree of ‘publicness’ under the appropriate time
horizon i.e. which are characterised by immobility, indivisibility and non-substitutability
and these resources determine potential income or potential productivity per capita. Two
aspects of public sector activities relevant for RDP are ‘the short-term per period flow of
taxes and expenditures between regions and their effects on interregional income
distribution in a formal incidence sense, and the long-term cumulative capacity or
resource effects on determinants of RDP, especially on the stock of human capital,
public infrastructure, agglomeration, and sectoral structure’ (61-62). The investment
types of public goods are especially important because of their influence on the
productive capacity of a region and on regional productivity.

Looney and Frederiksen (1981) tested Hansen’s hypothesis for Phase 1- for the 32
regions of Mexico and for the year 1970- that Economic Overhead Capital (EOC) has its
greatest impact on incomes in the intermediate regions while Social Overhead Capital
(SOC) has its greatest impact on lagging regions (after an examination of several
economic indicators for each state indicated that Mexico was in Phase 1)73. Cluster
analysis based on seven variables was used to group the states into the three categories-
congested, intermediate and lagging. Using the last two groups, the impact of
infrastructure on regional income was tested by means of multiple regression analysis
where other variables were economically active population, capital in agriculture, and a
proxy for total private capital stock in each state. EOC and SOC were represented by
four and five measures respectively. The direction of causality between investment and
economic growth was also tested. The results confirmed Hansen’s hypothesis for phase
1.

Nijkamp (1986) argued that ‘infrastructure policy is a conditional policy for regional
development: it does not guarantee a favourable regional development, but it creates the
necessary conditions for an achievement of regional development objectives’ (2)74.
Infrastructure policy may have both a direct effect (via the impacts on the demand

73  Looney, Robert and Peter Frederiksen (1981): ‘The Regional Impact of Infrastructure Investment in
sector) and an indirect effect (via the change in development conditions). He used a quasi-production function, based on a Cobb-Douglas specification for the empirical analysis of 11 Dutch provinces for two time periods (1970-75 and 1976-80). The results indicated 'significant correlation between the average overall infrastructure endowment and average regional product' (13) and Nijkamp concluded that 'the extent to which infrastructure contributes to regional development varies over time and depends also on the spatial level of analysis and on the overall level of economic welfare' (15).

Costa, Ellson and Martin (1987) specified and estimated a translog production function explicitly containing a measure of public capital for the 48 contiguous states of the U.S. using cross-sectional data for 1972 to examine the association between regional output and public capital. This approach enabled the direct measurement of the interaction between public capital and other productive factors and to derive output and scale elasticities with respect to public capital, defined in the study as the capital outlays of state and local governments. The results showed that labour and public capital are complementary inputs, and that public capital exhibited diminishing returns. A complementary relationship was also found between public and private capital in two of the three cases tested which was however insignificant. The results supported Hansen's (1965) findings 'that the ratio of public to private capital is negatively related to the output elasticity of public capital. Thus, the notion that public investments will strongly assist the development of poor regions is open to question' (433).

Deno (1988) postulated that public capital enters the production process as an unpaid, fixed input and as such has a direct favourable effect on firms' variable costs and prices which may induce existing firms to expand their operation and entice new firms to enter the region. The resulting rise in labour demand leads to higher industrial sector wage bill, which through a multiplier process increases regional personal incomes. Such growth will increase the stock of private capital, providing a base for future regional growth. A different and longer-term effect may be the structural changes induced in the regional economies, as for example reorient the basic sector towards more profitable

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or/and higher technology industries or to make accessible new markets. Deno estimated a translog profit function (with symmetry imposed) and where three different types of public capital (road infrastructure, basic sanitation, and water supply) enter jointly as fixed inputs for 36 selected metro areas for the period 1970-78. He concluded that 'Public capital appears to play an important role in manufacturing firms’ output supply and input demand decisions' (409). The aggregate stock of public capital in the region has a larger effect on production decisions than any of the separate categories and also has the largest effect on all production decisions in declining regions suggesting that as a policy tool, public investment may be relatively more effective at promoting regional growth in such regions.

Aschauer (1989) argued that public non-military investment taken as a proxy for roads, mass transit, port facilities etc. had positive direct and indirect effects on private sector output and productivity growth- the former via allowing greater access to national and international markets and the latter by increasing returns to private capital. He applied a regression equation following from a neo-classical production function whereby private sector output was obtained by application of labour services to private and public capital stocks to data from the Group of Seven (G-7) countries over the period 1966 to 1985. He concluded that ‘the data provide strong support for the idea that public investment is a critical determinant of labour productivity growth' (20) and offered ‘evidence against the “reverse causation” hypothesis that low productivity growth tows in its wake low public capital expenditures' (24).

Hulten and Schwab (1991) distinguishing between two aspects of the infrastructure-growth link: (a) infrastructure as a direct input to production and (b) infrastructure as a source of externalities and focusing on the latter, applied a variant of the sources of growth model in which capital, labour and intermediate inputs were related to output via a production function for the period 1951-1986. They concluded that 'regional

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differences in growth are due entirely to regional differences in the growth of capital and labour' and 'that public capital is not a key determinant of productivity growth' (128). They did not, however, rule out possible links between public capital and the demand and supply of inputs.

Duffy-Deno and Eberts (1991) postulated three dimensions of the relationship between public infrastructure investment and regional income: 'public infrastructure as an input into the production process, public investment as a construction or “public works” activity, and the determination of the level of public infrastructure as a consumption good in the median household’s utility function' (330)79. Two equations were estimated simultaneously: one with per capita personal income as a function of public capital stock and public investment and the other with the level of public investment as a function of personal income using pooled data for 28 metropolitan areas from 1980 through 1984. The results revealed that public capital stock has positive and statistically significant effects on per capita personal income through two channels: actual construction of public capital stock and through public capital stock as an unpaid factor in the production process and a consumption good of households.

Garcia-Mila and McGuire (1992) estimated long-run statewide production functions utilising a cobb-douglas specification with five inputs: capital in structures, capital in equipment, labour and public capital in highways and education, on panel data from 48 contiguous U.S. states for the period 1969-198380. The estimated input elasticity coefficients indicated that 'both highways and education are productive inputs with the latter having a stronger impact on output' (239).

Section 1.5.B
Public Investment and Regional Growth: Studies on India81
In one of the earlier studies Gupta (1973) used regional concentration coefficients and four types of investment expenditures- state plans financed by state resources, state plans financed by central assistance, central plans on industry and power, and central

81 Literature focusing on disparities at the sectoral level are not reported here.
plans on agriculture, social services and transport to examine the effect on regional disparities of the first four Five Year Plans.\textsuperscript{82} He concluded that the Five-Year Plans helped to reduce regional income disparity over the period 1950-9-1965 while the 'redistributive potentiality in the Fourth Plan seems to have fallen' and also, that 'although the central government's role in redistribution has increased significantly, much of its favourable impact might be washed away by the pattern of the state's investment allocations'. Gupta, Ahluwalia and Singh (1983) constructed two indices- an 'efficiency sub-set' and a 'public sector sub-set'- for the years 1961, 1971 and 1978 and on their basis concluded that the role of the public sector in reducing inequalities in 'the development process over different regions in India has been achieved much better pre-1971' (44).\textsuperscript{83}

Mathur (1987) developed an analytical framework based on the economics of steady and non-steady growth states and used two approaches- 'sources of growth' and 'determinants of growth'- for explaining variations in growth performance at both national and regional levels for the period 1951-1981.\textsuperscript{84} Four sets of variables were identified and tested as determinants using correlation and regression analysis- the savings ratio, the rates of growth of certain basic inputs crucial for the growth of the technologically advanced segment, the initial availability ratios of selected inputs, and some institutional and environmental factors. Four types of key inputs- infrastructural facilities, basic industries like steel, power generation, equipment making and some crucial intermediate goods such as fertilisers were identified for the second and third set of determinants, though capital goods industries were not incorporated as regional determinants. While public capital was not explicitly considered as an explanatory variable the relevance of Mathur's work for this study lies in the fact that (a) the public sector was the sole (or dominant) producer of many of the identified key inputs and (b) in one of the important findings that 'for the majority of the inputs the explanatory power of growth of key inputs in accounting for differences in regional growth increases substantially when the initial availability ratios are incorporated' (193).


Prasad (1988) examining the causes of regional inequalities in India for the 14 major states and over the period 1969-70 to 1984-85 focused on four factors: Finance Commission devolutions, plan assistance by the Planning Commission, the investment by the non-departmental public sector undertakings and the central and centrally-sponsored schemes. All the four types of transfers were determined to be progressive after correlation analysis. Prasad then identified three variables- the states’s own plan outlay, expenditure on centrally sponsored projects, and investment in central government non-departmental undertakings- as the main constituents of public investment in states and assessed the impact of such public investment on the growth of states’ incomes using multiple regression analysis. While both plan outlays and investment in central government non-departmental undertakings showed a positive impact on the growth of domestic production of states only the former relationship was found statistically significant.

Elhance and Lakhmanan (1988) estimated two fully specified econometric models- one with overall infrastructure stock index and the second with separate indices for economic and social infrastructure aggregates- for India as a whole and for six states for the period 1950-51 to 1978-79. The considered economic infrastructures were roads, power capacity, railway length and telephones while the social infrastructures were higher secondary schools, technical institutions, hospital beds and registered medical practitioners. The production system was restricted to only the registered manufacturing sector. It was demonstrated that ‘the demand, own-price and cross-price elasticities of variable inputs are affected by the availability (or inadequacies) of infrastructure stocks as are the variable inputs’ demand elasticities vis-a-vis output changes’ and ‘larger output levels can be produced with less-than-proportional rise in infrastructure stocks especially economic infrastructure stocks’ (529).

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86 See also G.K. Chadha (1988) and Hiranmay Dhar (1989), both in *Economic and Political Weekly*, December 24-31 and March 4 respectively, for a critique of Prasad’s work.
Sarker (1994) examined the relationship between plan outlays and regional development for 15 major states (including Assam) over the period 1960-61 to 1986-87. He constructed a composite development index for the states using the combined component scores from the first and second principal components of factor analysis of fourteen development indicators and specified a simple regression model between the combined component scores and cumulative per capita plan outlays. He concluded from the results that there is a strong relationship between the development of states and the amount of per capita plan outlays allocation and that this relationship grew stronger over the years of the plan periods.

Ghosh and De (1998) in their study covering all states over the period 1971-72 to 1994-95 analysed the role of physical infrastructural facilities and planning in regional income determination with emphasis on level of income differentials rather than on growth. They constructed a Physical Infrastructure Development Index (PIDI) using principal component analysis and based on indicators for transport, power, irrigation and communication (telephones) and also used Per Capita Plan Outlays (PCPO) as explanatory variables of per capita NSDP in OLS regressions at two different points, 1971-72 and 1994-95. The results indicated a high level of significance of PIDI in determining PCNSDP with PIDI alone explaining more than 50 percent of income in both years and further ‘inclusion of both PIDI and PCPO as independent variables substantially improves the results’ (3046).

Rao, Shand and Kalirajan (1999) examining the determinants of interstate differences in growth rates for 14 major states over the period 1960-61 to 1994-95 regressed average annual growth rates of per capita SDP for six different time periods (1965-94, 1970-94, 1975-94, 1980-94, 1985-94, 1990-94) on five independent variables- the initial level of per capita SDP, human capital stock, share of state government expenditure in SDP, private industrial investment in the state, and adoption of technological change in the agricultural sector. The regression coefficient of the variable ‘share of state government expenditure in SDP’ had a positive sign but was not significant in any of the years. However, per capita investment as proxied by loans given by financial

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88 Sarker, P.C. (1994): *op cit*
89 Ghosh, Buddhadeb and Prabir De (1998): *op cit*
institutions were significantly influenced by per capita government expenditures. The study also concluded that investments in central enterprises have not strengthened inter-sectoral linkages in poorer regions of the country and 'neither has the spread of infrastructure facilities created by state government spending helped to improve productivity in less developed states' (775).

The review of literature in sections 1.2, 1.3, 1.4 and 1.5 reveals that the evidence, both theoretical and empirical, seem mixed and inconclusive in respect of all the relevant issues and dependent, as noted earlier, on factors like choice of regions, the reference time period, methodological differences and the data sets utilised. All aspects, therefore, need to be investigated in the specific context of this study.

Section 1.6
Objectives of the Study
There would be essentially four broad strands of analysis;
1. To determine the pattern of regional growth and whether regional disparities increased in India or if there was any convergence of regional incomes.
2. To determine the regional distribution of public investment and whether there was any association between the distribution of investment and regional incomes.
3. 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.
4. 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 1.7
Scope of the Study and Basic Methodology
The time period for the analysis was the period 1965-66 to 1994-95 and this was primarily determined by the fact that the input-output tables which would used to assess the impact of central public investment on regional growth had been constructed in reference to the year 1965.
The choice of states was also determined by the availability of comparable input-output tables, which was crucial for the analysis. This aspect is dealt with in greater detail in section 3.2, chapter 3.

**Methodology**

Detailed methodology (and the sources of data) for each objective is given in the introductory section of each of the chapters. The basic methodology followed for each of the objectives is outlined below:

**Regional Growth and disparities**: Regional growth was defined solely in terms of Net State Domestic Product and measured by simple average rate of growth (SARG), compound annual rates of growth (CARG) and Log-lin regressions. The movement of regional disparities was analysed with the help of three measures— the weighted coefficient of variation, σ convergence and the deflated average distances derived from the distance matrices for the different periods.

**Structure of the state economies**: ‘Key’, ‘Priority’, and ‘Deficit’ sectors were identified for each of the regional economies on the basis of their backward and forward linkages. Output and Value-added multipliers were also determined for each of the sectors. The size and complexity of the regional economic systems were assessed on the basis of the number and proportion of sectors in the ‘Intermediate’ and ‘Final’ categories for both ‘Manufacturing’ and ‘Primary’ divisions.

**Impact Analysis**: The impact of public investment on regional growth was analysed using two different techniques. This was necessitated by the fact that public investment was heterogeneous in its composition with its different components postulated as having varying impact on the regional economies. The differential impact of investment by the centre in different non-departmental undertakings (directly productive activities) in various regions was analysed by estimation of the output and value-added impact multipliers of the enterprise. These multipliers were determined by the insertion of input-vector of the enterprise into the regional input-output technical coefficient matrices using the Katz and Burford (1981) methodology. The input-coefficients of the public enterprise were first converted into ‘pure’ coefficients.
The other major component of public investment (both at the centre and state level) was investment in infrastructure. This category of public investment, too, could not be termed as homogeneous as it was composed of investment in physical, social and financial infrastructure. The hypotheses that there existed a relationship between public investment in infrastructure and the regional incomes and that the nature of this relationship was determined both by the nature of investment and the level of development of the different regions was sought to be tested by regression analysis with OLS equations estimated for three different points in time- 1970-71, 1980-81 and 1990-91.

For this analysis:
(a) a basic production function was defined for the regions for the three reference years.
(b) Indices for physical, social and financial infrastructure were constructed for each of the reference years using Principal Component Analysis.
(c) The states were grouped using Cluster Analysis based on nine socio-economic indicators of development in each of the reference years.

The differential impact of infrastructure was sought to be ascertained by using slope dummy variables for the infrastructure variables.

Section 1.8
Chapterisation Scheme
1. Introduction
2. Regional Growth and Disparities in India
3. Structural Analysis of the State Economies
4. Central Public Investment in States
5. Impact of Public Investment on Regional Growth
6. Role of Infrastructure in Regional Development
7. Summary of Findings and Conclusions