

# **GROWTH AND STRUCTURAL CHANGES IN THE MANUFACTURING INDUSTRIES OF KERALA: 1976-'87**

**(A COMPARATIVE STUDY *VIS-A-VIS* OTHER SOUTH INDIAN STATES)**

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I hereby affirm that the research for this dissertation titled "Growth and Structural Changes in the Manufacturing Industries of Kerala : 1976-1987 [A Comparative Study vis-a-vis other South Indian States]" being submitted to the Jawaharlal Nehru University for the award of the Degree of Master of Philosophy was carried out entirely by me at the Centre for Development Studies, Trivandrum.

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## Chapter 1

### INTRODUCTION

There is growing literature on industrial growth in India. The central concern, has been with the deceleration (stagnation) in the industrial growth since mid 60's and the revival thereafter. The debate is not confined to the underlying causes of deceleration/acceleration but extended to the timings of the stagnation and the revival, of industrial growth. Some economists claim the growth revival to have begun by the mid seventies, others consider the revival as a phenomenon of the eighties. The debate has indeed contributed to clarify some interesting side-lights on the analytic of planning and interventionist policies of the government on industrial development in the country. It is but intriguing to note that most of the debates and discussions are carried out in the national context; very few of them have attempted to examine the regional dimension of industrial growth in India.

This apparently is a serious short-coming of the burgeoning literature on the growth and structural changes in Indian industries. For, the quest for economic equality has ever been an eternal phenomenon. Needless to say, the aim of socialistic structure of society can not be achieved on the basis of growing inequalities. Even the welfare goals of a capitalistic society connote that economic inequalities should be reduced to the minimum. Here, the concept of economic equality should go beyond the individuals and deal with the space as well, because of the interrelatedness between the two.

In the case of Indian society, the development of productive forces and division of labour during the British period had paved the way for rise of capitalist production in which economic disparities between regions continued to increase and contributed to the acceleration of economic inequalities between individuals. In particular, the concentration of industrial fabrics and growth of modern sector tended to promote economic polarisation. Even after political independence and more than forty years of development planning, India has failed to achieve a reasonable regional balance on the industrial front. The Indian manufacturing sector is nothing but a collection of a few isolated geographical centers of manufacturing with wide differences between them in respect of historical evolution, industrial structure, labour organization, pattern of resource use, entrepreneurs etc. Given the inter-regional diversities, the case for taking the regional dimensions into account in the analysis of industrial growth is stronger in India. It is rather unfortunate that adequate attention is not being paid on the spatial aspect of industrial development with the result that the status of our understanding of the process of industrial development in different regions and the inter-regional differentiation of industrial growth in India is peripheral, to say the least.

That many regions in the country even today remain industrially backward whereas, a few others have received undue share in the benefits of the overall industrialisation in the country is now widely acknowledged. The Industrial Policy Resolution of 1991 admitted the fact that the earlier policies regulating industries to go to backward areas just didn't achieve

the success. A perusal of existing literature also suggests that our understanding of the process of industrial development in particular regions is awfully unsatisfactory for analytical as well as policy purposes. The present study is an attempt towards improving our understanding of the process of industrialisation, in particular state-regions, by focussing on the growth performance and structural changes in Kerala vis a vis other state-regions in south India.

The choice of Kerala as the focal point of study is guided by several considerations. Kerala has achieved a high level of development in terms of social indicators. Yet, the stagnation in the growth of commodity producing sectors has given rise to economic crisis potent enough to threaten the sustenance of the very achievements in social development. Analysis of the sectoral performance of the Kerala economy under the past Five year Plans would reveal that, the growth of the primary sector has been either stagnant or negative and that the annual average growth in the secondary sector has been quite tardy.<sup>1</sup> The services sector, however, has maintained a steady growth over the years comparable to the corresponding growth rate in the national economy. No serious attempts have been made were made to integrate agriculture with industry in order to maximize value addition. As a result, 'cultivation' is no more considered as a viable full time occupation especially by the younger generation belonging to marginal and small farming communities.

There was no well laid strategy to industrialize the State either. In fact, up to the Seventh Five Year Plan, industry as a

sector had not received Plan allocation in proportion to its potential to grow.<sup>2</sup> The existing plan schemes being too many in numbers, the scarce budgetary resources got thinly distributed without making impact on any category or segment. The functional areas covered under the Plan schemes related to strengthening of district industries centers, providing technical and financial assistance to industries, industrial cooperatives and those promoted by weaker sections and as self-employment venture, developing industrial infrastructure and providing loans and share capital to state public sector undertakings. An important element of the strategy initially was to set up state public sector undertakings for in order to compensate for the lack of private initiatives in setting up industries in the State. This has become a classic example of the inefficient use of resources in the pursuit of industrialisation. Investment by Central Government public sector undertakings has been yet another dimension of the strategy to industrialize in Kerala. Despite these policies and programmes, the composition of the state economy and the commodity production structure have more or less remained stagnant and there has not been any appreciable growth in the region's economy. Indeed, Kerala provides a classic case to study the economic impact of strategies on the growth and structural changes in the industrial sector in a state-region.

We do not claim that no serious studies on Kerala's industrial economy have ever been made. There have been stray attempts both by the government and by individual researchers to analyze the industrial performance of Kerala.<sup>3</sup> From the methodological

perspective, however, most of these have dealt with the region in isolation and not in an inter-regional framework.

A review of the theories that have been put forward to examine the anatomy of regions would tell us that an inter-regional approach, which seeks to explain the difference between the regions taking the region as a whole has some intrinsic advantage. This approach is conceived mainly with growth and change and depends heavily on economic concepts. The approach postulates that economic structure of the region is basically responsible for the variations in the level of development between regions. These theories, known as the regional multiplier theories, seek to explain changes in the economic structure stressing the inter-relationships among sectors within the regional economy. Further, regional growth may result from either endogenous or exogenous determinants or a combination of both. Thus, an inter-regional approach tells us a great deal about the links between regions and the national economy. What therefore we claim as departure from the earlier studies on Kerala is the attempt to understand the growth performance and structural changes in Kerala's industrial economy in somewhat an inter-regional perspective by looking at the trends vis-a-vis all India and other state-regions in south India.

With the foregoing discussion in the backdrop we may now specify the objectives of the present study. Before doing so, however, a critical review of selected literature focussing the method may be in order of analysis. The literature can be classified into those related to (1) structure, (2) growth, and (3) productivity.

## 1. Literature related to the structure:

The term structure is defined as an organized body or combination of mutually connected and dependent parts of elements in a system. In economic literature the term structure has different dimensions like market structure, product structure, organization structure, regional structure and so on. In the present context we are mainly concerned with the regional industrial structure.

One of the methods of analyzing structure is with the help of input-output table. Due to the absence of detailed input-output tables at the regional levels for different time periods, attempts at carrying out analysis in the Indian context on the 1-0 frame work have been rather limited<sup>4</sup>.

Another popular method of analysis of structural change is by employing the economic study concept of location quotient and specialization coefficient. There are fairly a good number of studies using location and specialization coefficients to analyze structure.

## 2. Literature related to growth

As we have already noted, though there are a large number of studies on the macro industrial growth, its regional dimension has not been given due attention. Nevertheless, there are a few studies which need to be noted.

The initial studies on the interregional variation in industrial growth have used, in the absence of detailed data on regional industrial output, different proxy variables for industrial growth. For example, Dhar et.al (1961) used Power Consumption as an indicator for industrial growth. By calculating and comparing the coefficients of variation they inferred that inter-state disparities in industrial output have declined between 1951 and 1961. Lahiri (1960) employed another indirect measure wherein he compared the percent population of the states with percent industrial employment for the years 1956 and 1965 to infer that inter-state disparities in levels of industrialisation have declined. A major problem with these studies apart from the proxies that have been employed is that both the studies are comparisons between two points of time and cannot hence be considered indicative of the movement of disparities over time.

Thirthankar Roy's (1984) study on "Inter-state variations in industrial growth in India" was primarily an attempt towards understanding the regional dimension of the industrial deceleration in India since mid 60s. More specifically the study was concerned with two issues. First, he looked into the inter-industry and interstate variations in the rates of growth. Then he examined into the factors that have contributed to inter-state differences in rates of growth changes from one period to another. In the course of his analysis, he found that neither agricultural growth nor structural factors adequately explain regional differentiation patterns, particularly during the period 1965-74. But within each industry, there were sharp inter-state differences in growth rates. The growth rates in states have moved

in different directions. The nature of these movements in the high growth states can be understood in terms of relative stability in certain product groups, notably chemicals.

Recently, Bishwanath Goldar and Vijayseth (1989) tried to study trends in industrial output in various states during the period 1960-61 to 1985-86. Growth rates in industrial output have been estimated for three sub-periods 1960-61 to 1965-66, 1965-66 to 1975-76 and 1975-76 to 1985-86.<sup>5</sup> Comparing the growth after the mid 60s, a sharp fall in the rate of industrial growth occurred in Orissa, West Bengal, Kerala and Rajasthan, whereas Andhra Pradesh and Maharashtra experienced only a marginal diminution in the rate of industrial growth. There was a recovery in the rate of industrial growth after the mid 70s. The states in which there was a sharp increase in the rate of industrial growth are Orissa, Bihar, West Bengal and Uttar Pradesh. It is interesting to note that in Kerala and Madhya Pradesh and to a lesser extent in Karnataka and Andhra Pradesh, the rate of industrial growth continued to decelerate beyond 1975-76. How can one account for the observed phenomena? Whether the observed pattern could be attributed to change in structure? or productivity differences? These studies keep a 'strategic silence, on this issue.

Attempts however have been made to examine the impact of structural change on output growth. Y.K. Alagh et.al (1983) made a study on this issue. The study reported a remarkable stability in the level of industrial diversification<sup>6</sup>. But growth rates were not associated with the increasing level of diversification. Perhaps the rate and pattern of output growth in the less



diversified regions was such that the structure of industrialization continued to be of a rudimentary nature.<sup>7</sup> The study examined a relation between structural change and output growth by relating changes in location quotients over time to the observed annual compound growth rates in employment. It needs to be noted at this juncture that the analysis was confined to the end points alone.

The problem of end point comparison was rectified by a later study by Awasthi et.al (1988) for the same period. In addition to employment this study has taken into account other indicators of industrial development like value added, fixed capital. Methodologically Awasthi's study made use of different indicators of structural change like Gini coefficient, Herfindhal index etc. rather than confining to location quotient and specialization coefficient. The study revealed that resource-oriented industrial base is the basic characteristic of most of the regional economics in India. exceptions apart. But when they compared that with the previous analysis, Awasthi et.al. found that most of the states have diversified their industrial base from traditional consumer goods sector to relatively modern sector.

But Maharashtra continues to dominate the industrial scene though without improving its share. At the same time West Bengal seems to emerge as a net loser in quiet a few significant industries. The gainers have been states like Gujarat, Tamil Nadu, Uttar Pradesh, Madhya Pradesh and Rajasthan which over time gained significant share of some of the important industries. Even though Maharashtra, West Bengal, Gujarat and Tamil Nadu continue to

dominate the first ten industry groups, the degree of dominance has tended to decline over time. States like Andhra Pradesh, Karnataka and Madhya Pradesh have shown improvement whereas Assam has lost its initial advantage in some of the important industry groups. Kerala has remained almost static with a somewhat unusual upward swing in 1969. Among the remaining states, while Rajasthan, Orissa, Punjab and Haryana seem to have broadened their base, the performance of Jammu and Kashmir has been anything but impressive. Thus it is clear that industrial structure of a country has been heavily concentrated in a few industries. These industries, in turn are concentrated in a few states.

Awasthi et.al. examined the relative extent of industrial diversification of the various regions by estimating the regions specialization coefficient. During the period of analysis (20 years), almost all the states have diversified their industrial structure, except Maharashtra where the tendency seems to be in opposite direction and Andhra Pradesh and Orissa which became more specialized in some industries and attained higher degree of diversification by 1978.

Awasthi's analysis, though more comprehensive, is not free from certain problems. For instance, no attempt has been made to develop an analytical framework to bring out the relation between structural change and output growth. This has led them to estimate the correlation coefficient between output growth and structural change. The problem is further compounded by the fact that the measure of structural change (location quotient and specialization

coefficient) are relative measures while the growth rate of the region is an absolute concept.

This problem has been taken care of by Udayasekhar (1983) in his study. Udayasekhar tried to measure structural change with the help of shift-share analysis. To explain the divergence in the industrial performance of different states, one of the important factors to be kept in mind is the product mix of industry in the state. Shift-share analysis is used to isolate this factor. Armstrong and Taylor (1980) defined it as a method of calculating the extent to which the difference between a region's growth and the nation's growth can be explained by the region's industry-mix.

To sum up the above discussion, studies generally show that there is increasing inter-regional variation in the level and rates of industrial growth across different regions. The different regions vary in terms of the industrial structure and there is a general consensus that the industrial structure has a significant influence on the region's industrial growth.

The above findings are based on the studies carried out during the period before 1978. (only exception is Goldar, 1985). The period since 1980 has recorded a revival in the rate of industrial growth in India. While its regional dimension has been captured in Goldar (1985), our understanding of the contribution of the structure towards this industrial revival remains rudimentary. Given the changes in government policies, therefore we need to examine, whether there were any discernible trends or atleast a tendency towards its structural change. Equally

important is to go behind the observed regional variation in industrial growth. Given a uniform macro industry policy framework, the regional differences could be attributed at least partly to the regional industrial policies.

### 3. Literature related to Productivity

Most of the early studies on productivity changes in Indian manufacturing sector were confined to the analysis of partial productivity of labour and capital. Later, researchers came with analysis of individual industry performance, inter-industrial and inter-regional comparisons of productivity change with the help of multifactor productivity analysis.

BalaKrishan (1958) analyzed labour productivity movements in twelve industry groups covered by C.M.I data for the base year in a regional frame work. The regional comparison was carried out in terms of spatial significance in production. The states of west Bengal and Maharashtra were taken together as one region and the rest of India as the other, on the ground that the former was far more industrialized in relation to the latter.

Mukherjee (1975) conducted a comparative study of the productivity trends in the large scale manufacturing sector of Bihar relative to the productivity trends at the all - India level but could find no systematic trend at the state level. The total factor productivity showed a declining trend both at the state and all - india levels, the rate of decline being marginally higher at the state level.

Radhakrishnan (1990), in his analysis of partial productivity growth revealed that, for the manufacturing sector as a whole, there was a general rising trend in labour productivity and a falling trend in capital productivity over the entire period of analysis 1960-61 to 1982 - 83. However, an inter-temporal analysis of the growth rates during the two sub-periods (pre 1970 and post 1970) showed significant deceleration in the growth rates of both labour and capital productivities during the second period. A comparison of productivity performance in the large scale manufacturing sectors of Kerala and all-India indicated that the long term trend growth rates of labour productivity for Kerala exceeded the observed growth rates of capital productivity. Interestingly, the results of the sub-period analysis point to a different conclusion. During the first period pre 1970, the growth rates of both labour and capital productivities were higher in Kerala and during the second sub-period (post 1970) the rates in the state were pronouncedly lower. This steep decline in the growth rates of both labour and capital productivities during the second sub-period is disheartening and is a sure indication of the malaise that has crept into the manufacturing sector in Kerala.

Comparison of total factor productivity growth in the manufacturing sector between Kerala and all - India showed a higher rate in Kerala over the entire period from 1960-61 to 1982-83. The analysis on the basis of sub-periods indicated that the manufacturing sector of Kerala experienced a high growth rate during 1960-1970. A higher rate of growth experienced by the manufacturing sector since 1970 appears to have been a phenomenon

peculiar only to the state of Kerala and at variance with the national trend.

Rajalekshmi (1981) made a comparative study of the productivity performance of the mineral and metal-based industries of Rajasthan and all-India. She observed that at the all-India level the productive efficiency declined over the period in industries like basic industrial chemicals, machinery except electrical and electrical machinery. This happened inspite of the increase in labour productivity and capital intensity. Among the other three industries selected for the study, non-metallic mineral products and metals except machinery exhibited an increase in the means productive efficiency. In the case of Rajasthan, the total factor productivity growth was substantially higher than that at the all-India level for all industry groups except electrical machinery. For electrical machinery the relative decline in total factor productivity was more in the case of Rajasthan. The study further observed an overall declining trend in total factor productivity in most of the mineral and metal based industries at the all-India level since the mid-sixties. However, such decline was discernible in the case of Rajasthan only towards the end of the sixties.

Sastry(1984) assessed the productivity trends in cotton textiles industries for Maharashtra, Tamil Nadu and Gujarat. The study disclosed that labour productivity increased both in Maharashtra and Tamil Nadu over the Period 1949-1970. However, the increase was much more rapid in Tamil Nadu than in Maharashtra. Capital Productivity declined both in Maharashtra

and Tamil Nadu, the decline being much larger in Maharashtra. All the three indices of total factor productivity showed a general uptrend, both in Maharashtra and in Tamil Nadu, indicating an increase in overall production efficiency.

#### Objectives of the study

From the foregoing review of Indian literature it is evident that the structural change along with productivity differential have cast their influence on the regional differentiation in industrial growth. This in turn has to be seen in the context of regional industrial policies that mould the behaviour of region-specific factors and the inter-regional linkages. The objective of the present study is to focus on the correlate of structural change and growth performance in a given region in a comparative static framework by making a comparative study of Kerala vis a vis other states in the south India. To be more specific, the study seeks to trace

- (1) the trends in the growth in industrial income in Kerala and compare its performance with other south Indian states;
- (2) the trends in the productivity changes in the industries in Kerala and compare with the patterns in other south Indian states
- (3) the trends in the changes in the economic base and structural diversification in Kerala vis-a-vis other south Indian states.

In the light of the empirical findings, the study seeks to establish the correlate between the structural change and growth performance and underlines its import on policies for regional industrial development.

### Notes and References

1. See for example, State Planning Board (1989), Subrahmanian, K.K. and Mohanan Pillai, P. (1986), Kannan, K.P. and Pushpangadan, K. (1988).
2. Task Force Report (1991).
3. To cite a few, Subrahmanian, K.K. and Mohanan Pillai, K. (1986); Oommen, M.A. (1979); Task Force Report (1991); Ramachandran, V. (1989), Radhakrishnan (1989).
4. S.P. Kashyap and S.S. Mehta (1973) tried to find answer to issues through I-O-system. (1) Repercussion effects of industrial sectors and to check whether these effects vary for regions at different levels of industrialisation (2) whether the regions differ in the process of formation of the industrial clusters i.e. inter-related sub-sectors of industries. They found that an industrially backward system is likely to have found repercussion effects because of lower linkages and greater linkages through its dependence on land and imports. Second, they were hypothesised like that industrially backward regions would tend to show a weak cluster formation due to absence of linkages. It could be followed by industrialisation advances by strong clusters and finally once again, weak clusters due to circularity of inter-industry transaction.
5. Subrahmanian, Alagh, Kashyap (1971).



## Chapter 2

### TRENDS IN INDUSTRIAL GROWTH

#### Introduction

We begin the analysis of the core of the study with an evaluation of the performance of manufacturing industries in Kerala vis-a-vis other south Indian states. The performance is seen in terms of the trends in the annual rates of growth of income generation (value-added) by the factory sector during the period 1976-1987. In order to present the evaluation in a wider perspective, the analysis is carried out against the backdrop of the trends in the inter-regional variations in the levels and growth of national domestic product. The main objectives are (1) to compare the growth performance of Kerala with other south Indian states during the study period and (2) to identify the major industrial branches that accounted for the growth performance in the respective states. It is also hoped that the analysis will throw light on the association, if exists, between the growth pattern at the national level and at the regional level in south India.

The chapter is organized in the following way. The first section gives a detailed account of the sources of data and methods of analysis. In the second section an attempt is made to present an overview of the inter-regional variations in the national income growth in India. Against this background, the third section analyses growth trends in the manufacturing industries in Kerala vis-a-vis other south Indian States.

## Section I

### Sources of data, Methodology and Measurement of variables

In the national accounting practices industrial sector is treated synonymous with the secondary sector, which consists of manufacturing (registered and unregistered), electricity, gas & water supply and construction. Analysis of the trends in the industrial growth in such a broadly defined sense is not feasible as the data pertaining to the performance indicators for the secondary sector are not available at sufficiently dis-aggregated level in order to make inter-industry and inter-state comparisons. Therefore, the general practice, as it is done in many earlier studies<sup>1</sup>, has been to confine the analysis to the factory sector data and treat it as the measure of performance for the aggregate manufacturing. The present study also adheres to the practices followed by earlier studies and limits the analysis to the factory sector, which in the popular parlance represents the organized manufacturing industry.

#### Data Source

The basic data for the factory sector are provided by the Annual Survey of Industries (ASI) published by the Central Statistical Organisation (CSO), Government of India. There are two main components in the data: census and sample. ASI census sector covers factories using power and employing 50 or more workers and not using power but employing 100 or more workers. Sample sector, which is also known as residual sector, covers units with employment of 10-50 workers using power or 20-100 not using

power. Since 1973, the CSO has been publishing census and factor sector data separately. The factory sector is nothing but a version of census and sample sectors added together.

The scope of ASI data is limited to the manufacturing industries registered under section 2 (m) of the Indian factories act, 1948. Even among this group establishments under the control of the defence ministry, oil storage and distribution units, restaurants and cafes and technical training institutes not engaged in the production of any tangible commodity exchange are excluded from the purview of ASI survey schedule. More significant than that is the total absence of data on the unregistered sector, which contributes more than one third part of the total value added by manufacturing in GDP. Needless to say, any study based on ASI data will have some inherent limitations as it leaves out of the scope a significant part of the manufacturing activity. At the same time, it must be noted that ASI factory sector data include some activities such as gas and water supply and repair service, which are more in the nature of services than manufacturing as such.

The present analysis has opted, as done in Ahluwalia's study, to exclude industries which come after the code 389 at 3-digit industrial classification scheme. To that extent therefore, the study can be regarded as strictly confined to manufacturing industries in the registered (organized) sector. Further, as there is lack of consistent time series data for some industry groups at the state level, we have clubbed together some industries and presented the analysis in terms of 18 industry-groups at 2-digit

presented the analysis in terms of 18 industry-groups at 2-digit classification scheme for inter-state comparison.

The study also faced yet another problem. The data for 1973, 1974 and 1975 are not available at disaggregated levels through ASI. Therefore the study perforce had to start the analysis from 1976 onwards only. Thus, the study period is from 1976-77 to 1987-88. The period chosen, however, can be justified on the ground that the decade prior to this was one marked by industrial stagnation in the country as a whole. There are now sufficient evidences to suggest that India's industrial economy came out of the prolonged period of stagnation and started showing signs of recovery in growth since the late seventies and witnessed acceleration in growth during the eighties. Thus, the study period (1976-77 to 1987-88) and particularly the eighties would be one of growth revival in India's industrial economy. How did Kerala perform vis a vis other states in south India during the above period of growth-buoyancy at the national level? This central question is sought to be examined by tracing the trends in the growth of value-added by the factory sector.

### Methodology

To analyse the trends overtime, we have estimated semi-logarithmic function of the form:

$$\ln Y = a + bt$$

The regression co-efficient 'b' yielded an estimate of the annual compound growth rates.

The analysis of movements in growth that uncover cyclical fluctuations with irregularity (if any) is extremely important either to choose the appropriate method of trend fitting for tracing the actual growth pattern or to provide a meaningful interpretation of the estimated growth which required qualifications for the "left out effect" of cyclicity in the analysis of trend fitting<sup>2</sup>. Here, we have used the equation  $y=a+bt$  for the value-added in Kerala's manufacturing sector. After calculating the residuals and later taking three year moving averages of the residuals we have identified two distinct growth phases:

first phase : 1976-77 to 1980-81

second phase: 1981-81 to 1987-88

To find out the growth rates for each of these phases (sub-periods), dummy variables were used for both intercept and slope. The fitted equation took the form:

$$\ln Y = a+a'D + bt+b'Dt$$

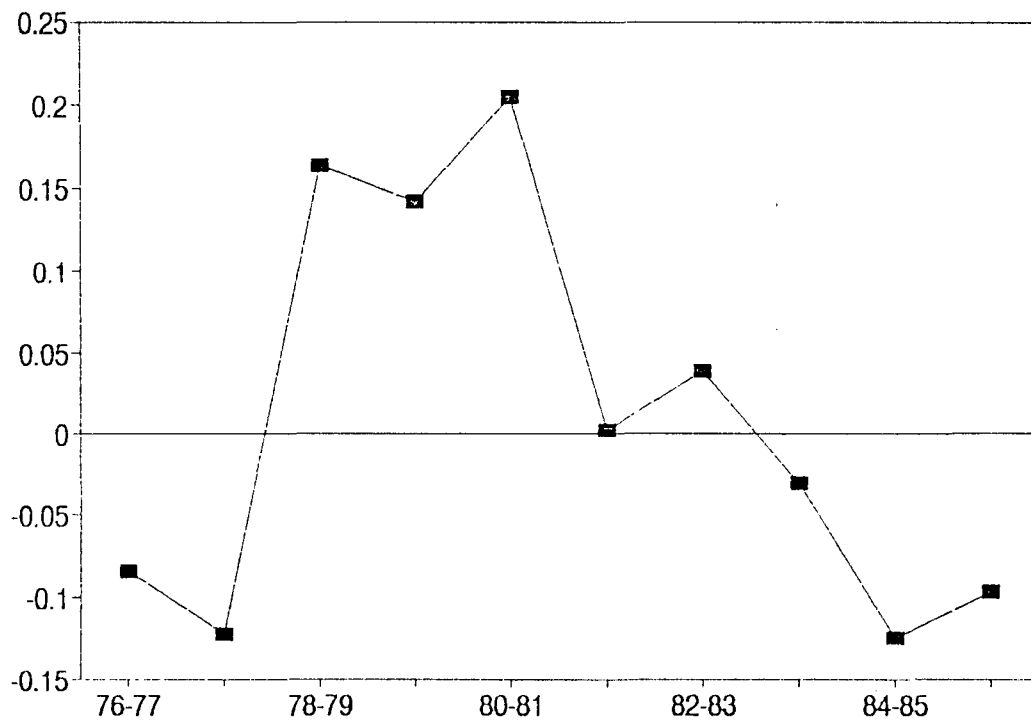
where D is dummy variable with value zero for the first sub-period and unity for the second period. In such a framework, the coefficient of time (t) yielded the compound growth rate for the first period, while the sum of this coefficients and that of the multiplicative dummy term yielded the compound growth rate for the second period. We could also use the model to check whether there was decline in the growth rate in the second period<sup>3</sup>.

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Fig 1 : Cyclicality in Value Added  
(Kerala)



### Measurement of Variables

In the assessment of performance we need to use appropriate output variable. The ASI data is prepared on the basis of empirical definitions, which often do not fully satisfy the conceptual requirements. We have, therefore, made some adjustments to the published data.

Output can be measured in terms of either value added or gross output. However, it has been argued that the use of gross output is not appropriate as it is sensitive to differences in the material intensities of different industries. Several studies have put forth arguments in favour of value-added. In the present study also value-added is used to represent the output. Here again, although net value added is more relevant than gross value added, the study has used the latter. For, the depreciation figures as reported in ASI would not reflect the actual capital consumption.

The gross value added figures are obtained by deducting the total value of input from the total value of gross output. This is cross checked by the sum of the reported net value added and depreciation. The gross value added and gross output at constant prices are obtained by deflating the current values by the official Wholesale Price Indices (WPI) for specific industry group with 1970-71 as the base<sup>4</sup>. Admittedly, the single deflation method as used by this study as well as most others has the limiting assumption that input and output prices are perfectly parallel<sup>5</sup>.

## Section 2

### Inter-state variations in growth: An overview

In this section we seek to answer the following three questions:

- (1) What has been the observed trend in the inter-state variation in the level and rate of growth of NDP ?
- (2) What has been the contribution of different sectors towards the observed variability ? and
- (3) Whether or not the observed trend in the variability among the south Indian states shows the same pattern at the all-India level ?.

The analysis is based on the variability in per capita net state domestic product of states during the period 1976-77 to 1987-88. The variability is seen in terms of the estimated coefficients of variations. This measure is supplemented with the weighted and unweighted coefficients of variation<sup>6</sup>.

The results of the above exercise is presented in table 2.1. It is evident that whatever be the measure of variation adopted, the broad trend is one of increasing inter-regional variations in the levels of per capita income. Though the magnitudes are of marginal order, yet the plotting of the coefficients on a graph (graph 2) suggested two phases: (1) an increasing phase of inter-regional differential covering the period 1976-77 to 1980-81 and (2) a declining phase thereafter.



Fig 2. Movement of variability in  
percapita NDP across different states

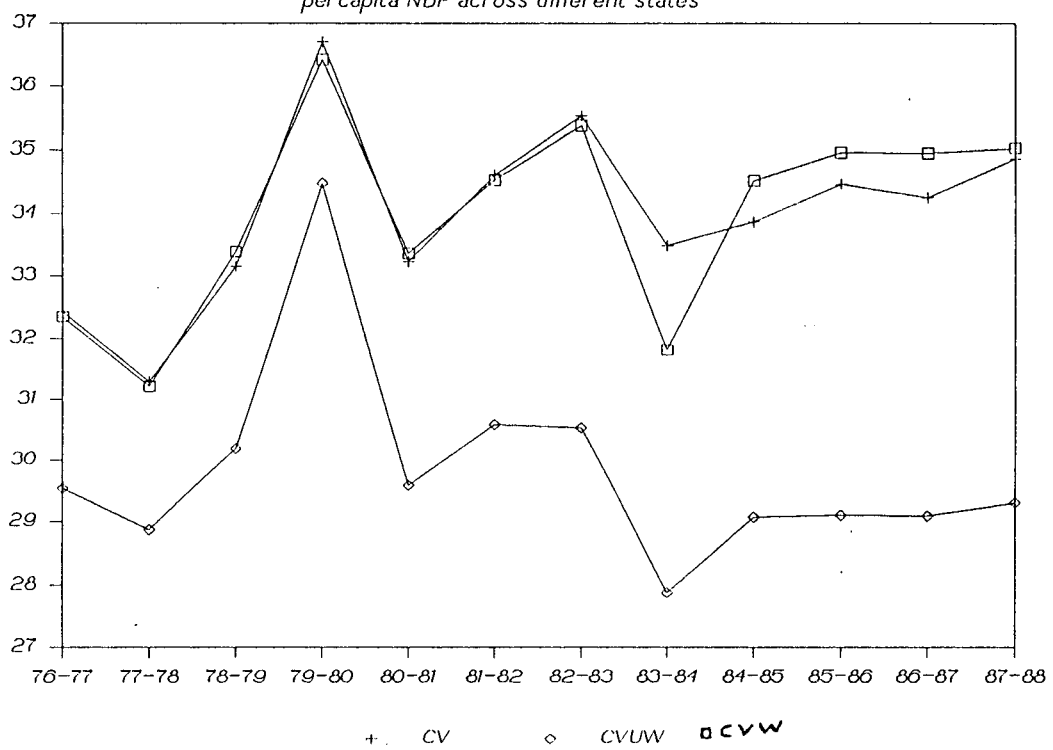


Table 2.1

Inter-State Coefficient of Variation in Per capita NDP  
(at 1970-71 Prices)

Year	C.V.	C.Vuw	C.Vw
1976-77	32.36	32.44	29.53
1977-78	31.22	31.30	28.87
1978-79	33.39	33.16	30.19
1979-80	36.42	36.70	34.49
1980-81	33.36	33.23	29.58
1981-82	34.54	34.61	30.59
1982-83	35.38	35.53	30.54
1983-84	31.82	33.49	27.88
1984-85	34.53	33.87	29.08
1985-86	34.97	34.48	29.11
1986-87	34.96	34.26	29.10
1987-88	35.04	34.87	29.31

Note: C.V. - Coefficient of variation  
 C.Vuw - Coefficient of variation (unweighted)  
 C.Vw - Coefficient of variation (weighted)  
 Source : Calculations based on CSO data.

Now it will be of interest to see whether there is any association between the observed inter-state variation in the levels of per capita NDP and the per capita output growth. Towards this end we have estimated the annual growth rate of per capita NDP. The result is presented in Table 2.2.

It is evident from the table that there is considerable year to year fluctuations in the growth rate. To iron out the fluctuations, we have calculated the three year moving averages and the result is plotted in a graph. (Graph 3). A close examination of the graph reveals different growth phases. Since 1976-77 growth rate begins to show a declining trend. In the next phase, 1981 onwards, growth rate records a revival.

Fig 3. Three year moving average of  
growth rate in per capita NDP (India)

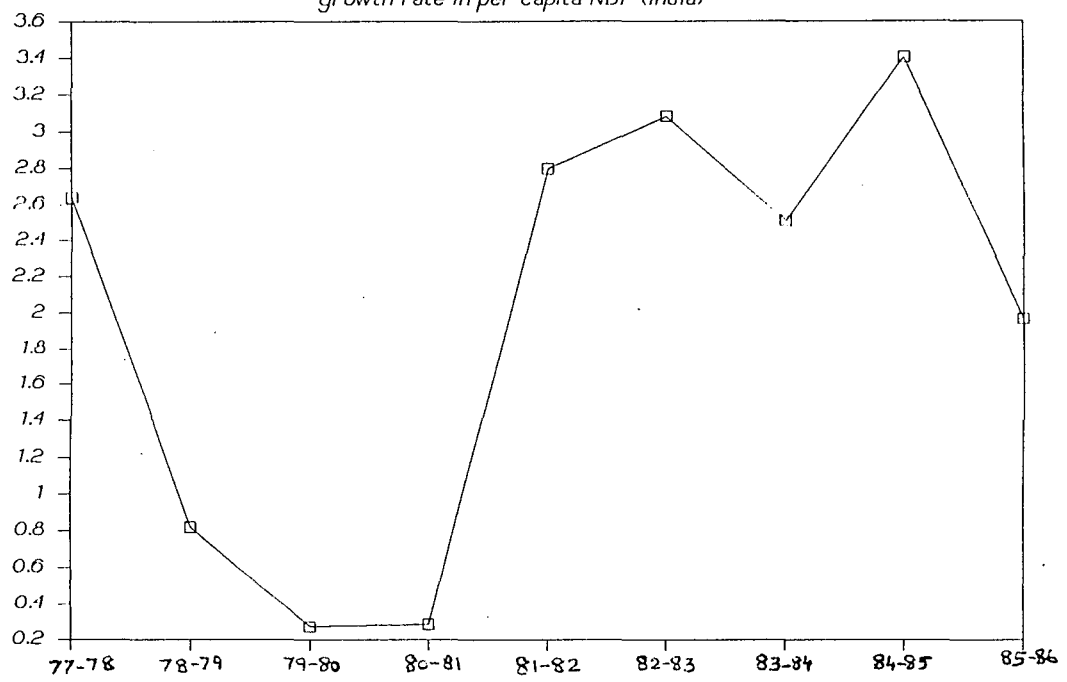


Table 2.2

Annual Growth rate of Per capita NDP

Year	Growth Rate
1976-77	-1.81
1977-78	6.60
1978-79	3.12
1979-80	-7.26
1980-81	4.96
1981-82	3.15
1982-83	.28
1983-84	5.81
1984-85	1.44
1985-86	2.97
1986-87	1.50

Source: Calculations based on CSO data.

Here, a notable point is the almost inverse association between growth rate of per capita NDP and inter-state variation in per-capita NDP. To be more specific, a period of declining growth rate is found associated with increasing inter-regional differences in the levels of per capita NDP. When the growth rate picked up, the variation declined as compared to the previous phase. On the whole, the increasing output growth at the national level appears to have a depressing effect on the inter-regional variation and vice-versa.

Now, let us examine whether or not the inter-regional variation in per capita income is accounted by specific sectors of the economy. To begin with, we examined the relative shares of different sectors in per capita NDP in table 2.3.

Table 2.3 shows that the share of per capita primary sector in NDP is declining. But the share of tertiary sector has notably increased and that of secondary sector remained almost stagnant.

Table 2.3

Share of different sectors in per capita NDP

Year	Primary	Secondary	Tertiary
1976-77	.433	.216	.340
1977-78	.446	.221	.332
1978-79	.434	.224	.340
1979-80	.397	.232	.370
1980-81	.416	.219	.364
1981-82	.410	.219	.369
1982-83	.385	.216	.397
1983-84	.397	.218	.284
1984-85	.379	.221	.399
1985-86	.365	.224	.409
1986-87	.356	.218	.425
1987-88	.367	.221	.437

Source: Calculations based on CSO data.

Now, coming to the contribution of each of these sectors to the overall inter-regional variation, we have estimated C.V, C.Vuw and C.Vw for the three sectors viz., agriculture, industry and services. (see table 2.4). The inter-state variation in the primary sector shows an increasing trend throughout the period under consideration. On the other hand, that of the secondary and tertiary sector shows broadly two phases: an increasing phase and a declining phase. In terms of level of variation, it is observed that the variation in primary sector and tertiary sector was at a lower level and moved almost similarly till 1982-83. Since 1982-83, there was a major divergence in the movement of the variation; the tertiary sector recorded a declining trend and primary sector an increasing trend.

Fig 4. : Movement of variability in SDP  
across different states

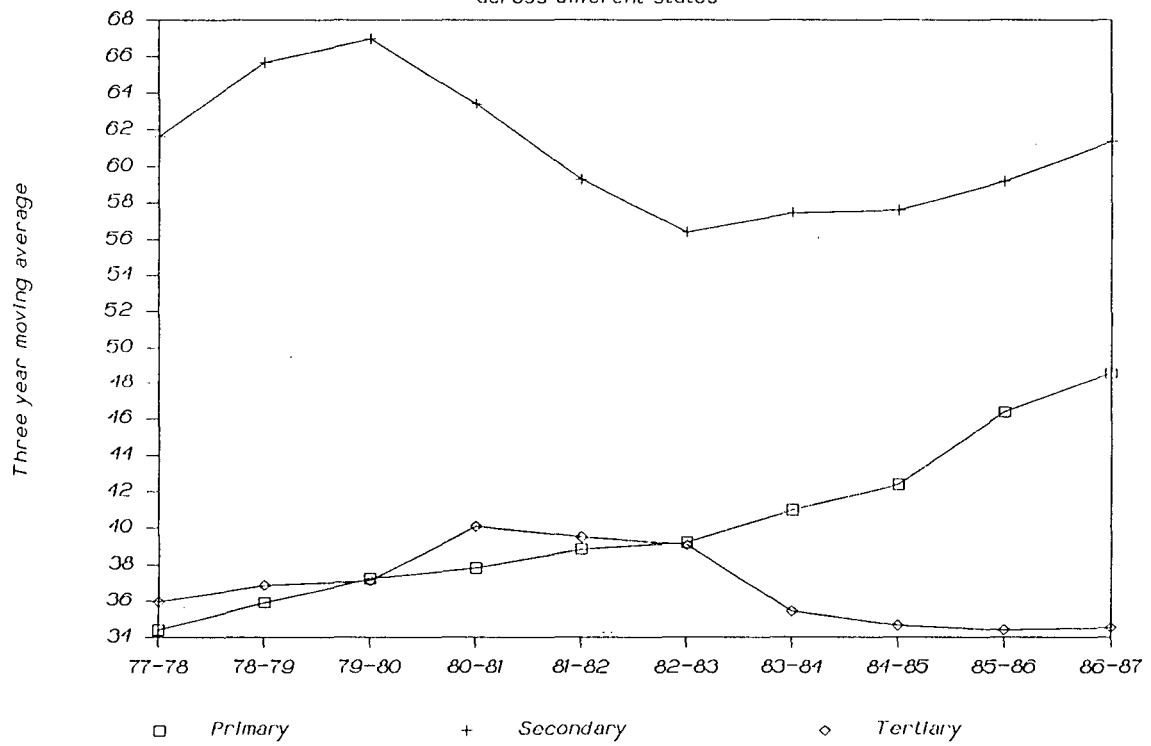


Fig 5 : Movement of Variability in SDP  
 across different states (Unweighted)

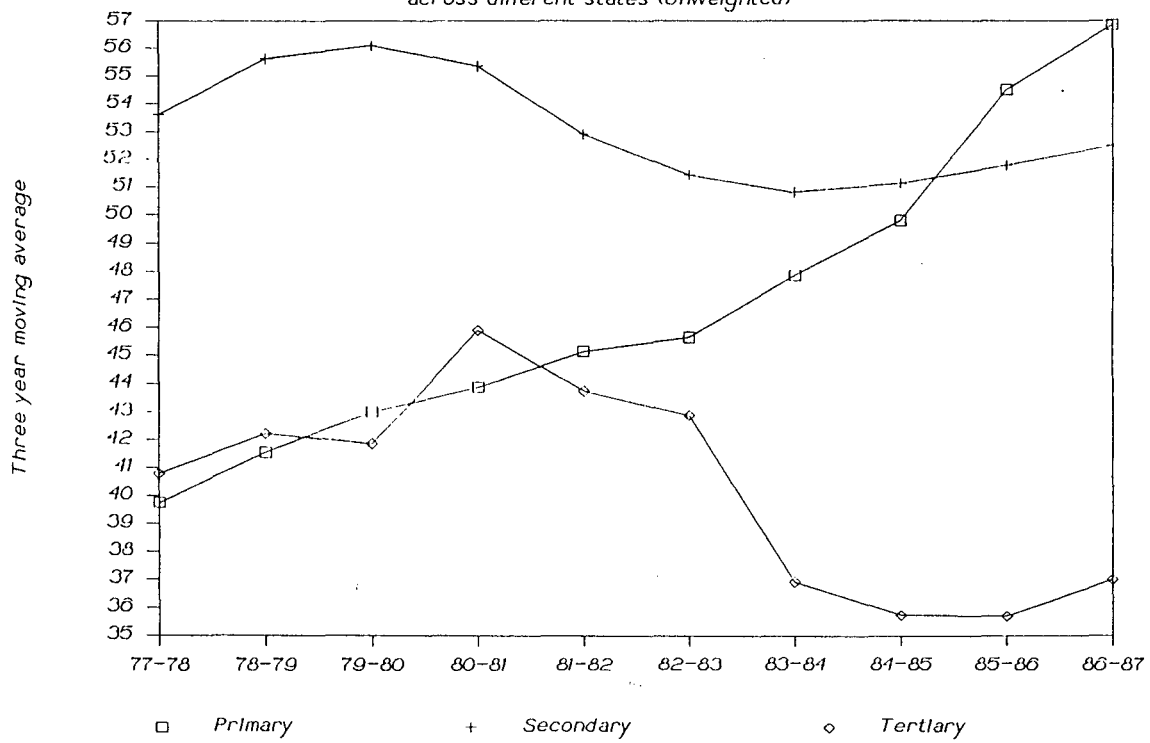


Fig 6 : Movement of Variability in SDP  
across different states (Weighted)

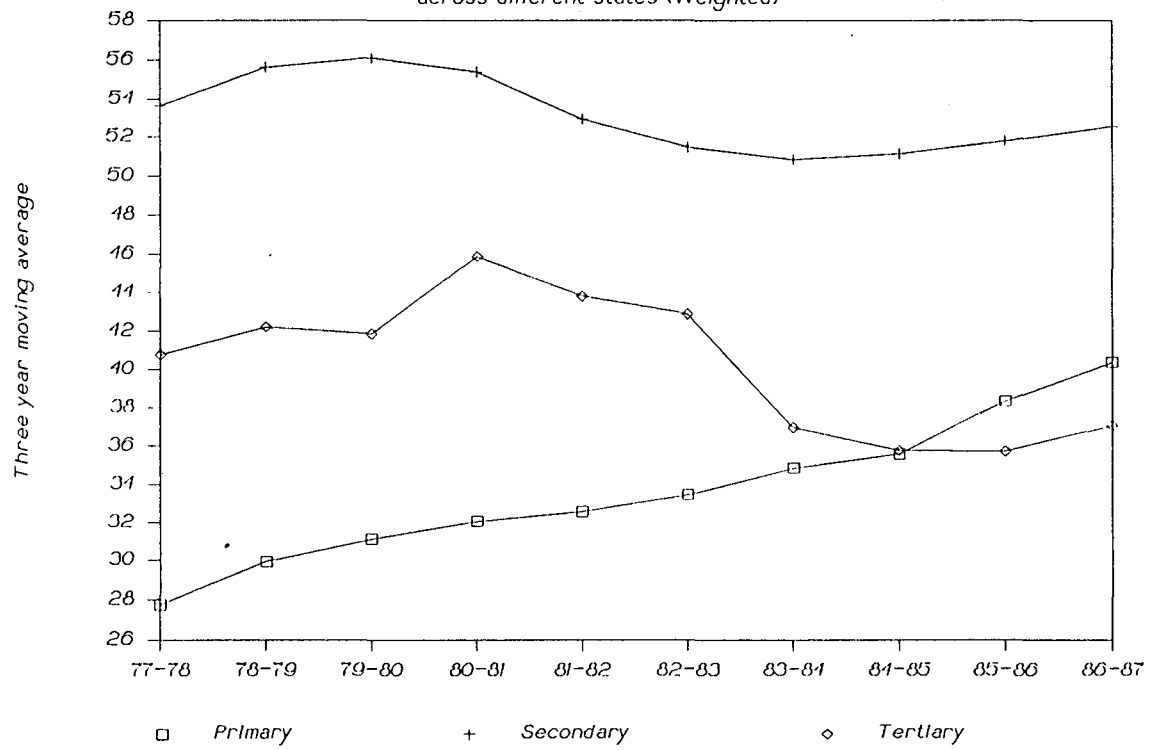




Table 2.4

Inter state variation in per capita NDP in agriculture,  
industry and tertiary sectors (Constant in 70 - 71 prices)  
(%)

Year	Agriculture			Industry			Tertiary		
	C.V	C.V.uw	C.Vw	C.V	C.V.uw	C.Vw	C.V	C.V.uw	C.Vw
1976-77	35.32	41.20	28.50	59.35	52.61	50.73	35.70	40.68	39.67
1977-78	32.06	37.16	26.04	61.60	53.69	51.90	35.51	40.68	39.47
1978-79	35.86	40.88	28.72	63.85	54.63	52.99	36.62	40.98	39.64
1979-80	39.74	46.60	35.03	71.63	58.57	58.31	38.55	45.01	44.35
1980-81	36.14	41.60	29.63	65.48	55.08	53.34	36.25	39.60	37.00
1981-82	37.65	43.55	31.46	53.07	52.46	50.75	45.48	53.06	57.84
1982-83	42.83	50.35	36.56	59.40	51.27	48.55	36.81	38.68	36.03
1983-84	37.22	43.10	32.26	56.75	50.62	47.28	35.03	36.93	35.19
1984-85	42.94	50.12	35.70	56.25	50.58	47.16	34.47	35.19	34.16
1985-86	47.00	56.20	38.78	59.83	52.22	48.97	34.49	35.16	34.26
1986-87	49.18	57.27	40.62	61.51	52.58	50.06	34.31	36.85	40.34
1987-88	49.38	57.11	41.72	62.71	52.82	50.86	34.82	39.10	41.12

Source: Calculations based on CSO data.

The level of variation in the industrial sector is found to be much higher than in the other two sectors. On the whole, it may be stated that industrial sector accounted for a major part of the inter-state variation in NDP. Hence, the factors behind the inter-state variation in the secondary sector may take us long way towards understanding the overall regional variation in NDP. This also is the rationale behind our analysis of inter-regional variations in industrial growth in south India. Indeed, an analysis of all the regions would be more rewarding, but time consuming. Hence, we have confined the scope of the study to the four states in south India viz., Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. Among the south Indian states the focus is placed on recording the growth experience of Kerala in comparison with other south Indian states.

As a prelude to the selection of south India, we have had a preliminary examination of the inter-regional variation in south India using the same methodology which we have adopted for all states; the results are presented in table 2.5. The result is found to be interesting. The regional variation in south India, similar to all-India, shows two phases; an increasing phase and a decreasing phase. What is more interesting is the synchronisation of these two phases both in south India and at all-India level. Nevertheless, it is to be noted that the level of variation in south India is lower than that at all-India. Against this broad perspective, that we would like to go into the growth trends in the manufacturing sector of Kerala vis-a-vis other south Indian states during the study period 1976-87.

Table 2.5

Inter state Coefficient of per capita variation  
in South India: Secondary Sector  
 (%)

Year	C.V	C.V.uw	C.Vw
1976-77	30.67	36.71	37.35
1977-78	32.52	38.71	38.64
1978-79	35.38	37.05	36.81
1979-80	34.52	34.90	35.44
1980-81	29.92	33.62	33.97
1981-82	28.41	32.87	32.77
1982-83	25.72	29.97	29.31
1983-84	28.64	30.65	30.84
1984-85	32.43	35.07	33.30
1985-86	32.20	33.09	30.91
1986-87	32.70	32.93	31.62
1987-88	32.72	33.10	32.12

Source: Calculations based on CSO data.

Fig 7 : Movement of percapita SDP  
In secondary sector

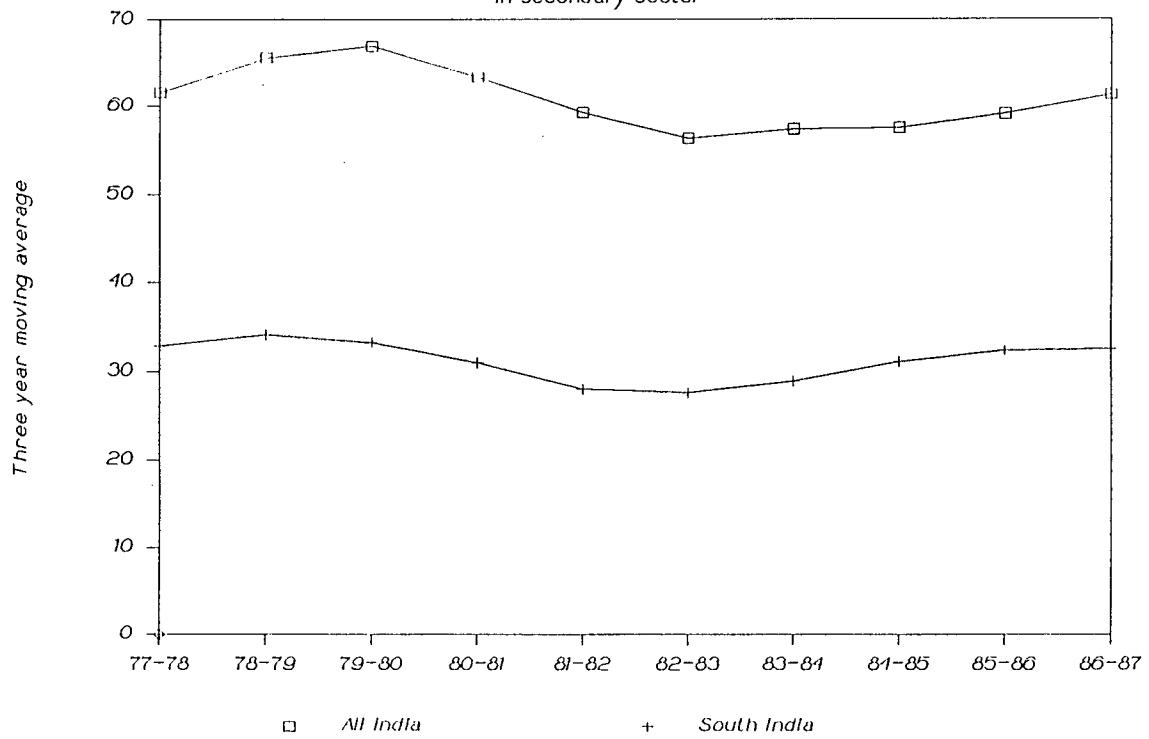
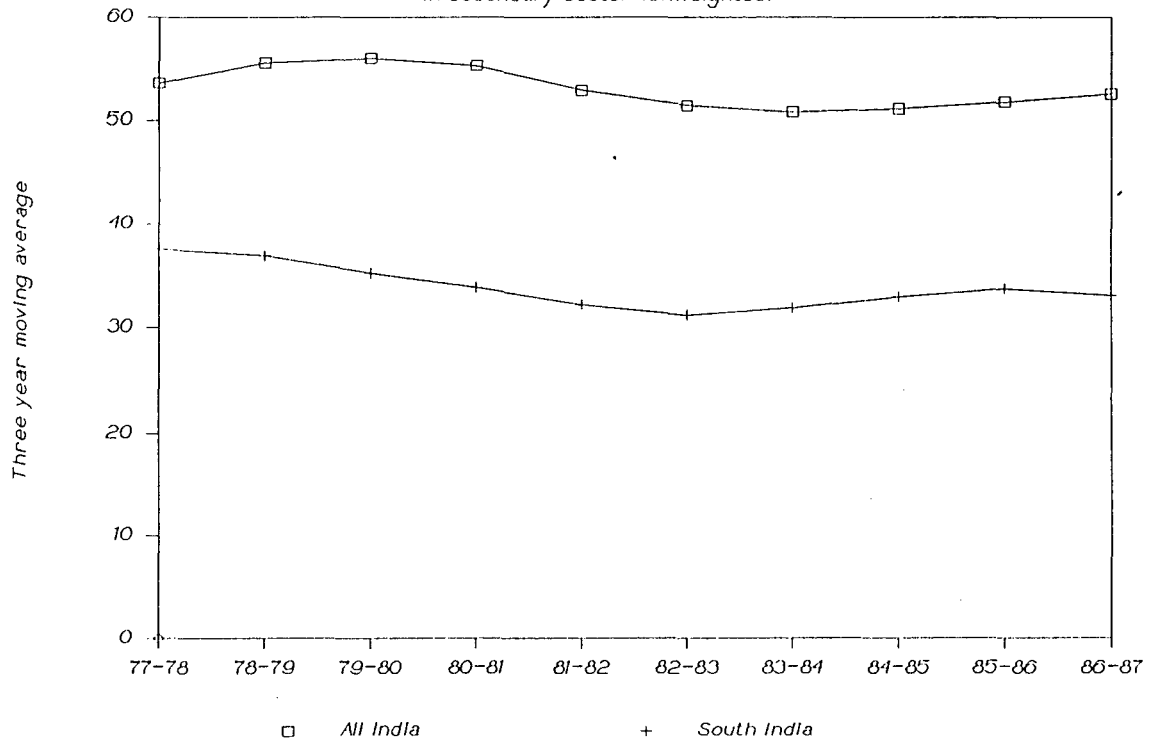
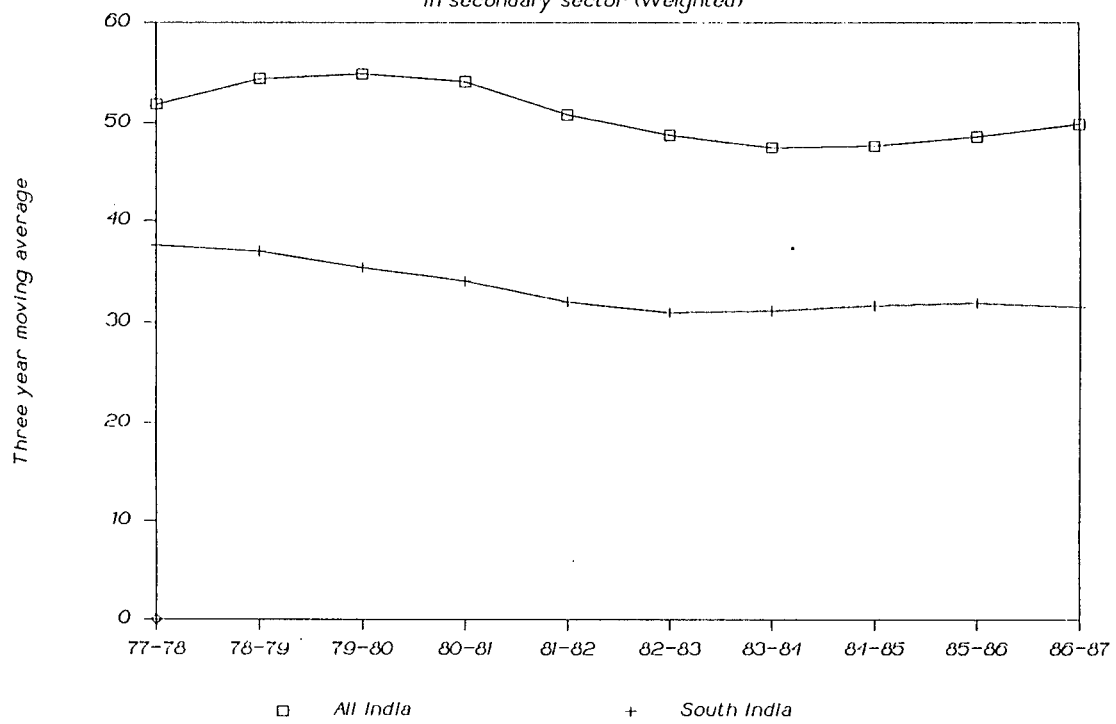


Fig 8 : Movement of percapita SDP  
In secondary sector (Unweighted)



*Fig 9 : Movement of percapita SDP  
In secondary sector (Weighted)*



### Section 3

#### Trends in Growth rates of Value added in Manufacture in Kerala and other southern States

As a prelude to the analysis of the growth performance during the study period it may be relevant to highlight the main strands of the inter regional differences in the levels of development in south India prior to the study period.

British South India in the late 19th and 20th Centuries, consisted of five major distinct political entities - Madras Presidency and the Princely states of Hyderabad, Mysore, Travancore and Cochin. There were four major industries of the household kind that need to be considered. These were the cotton handloom weaving industry (mainly in Madras and Hyderabad) the sericulture industry (in Mysore) and the cashew and coir industries in Travancore and Cochin. Of the four industries, the handloom industry (weaving cotton fabrics) was the only one whose dynamics were in a major way affected by the developments in the large scale mechanised sector in India<sup>7</sup>.

Even after independence it took more than nine years to re-organise the states in a more or less judicious way<sup>8</sup>. Telugu speaking areas of composite Madras state and Telungana region were joined to form Andhra Pradesh. The united Mysore state was renamed Karnataka in 1973. Travancore, Cochin and Malabar were united to form the Kerala state. Madras state changed its name to Tamil Nadu in 1969.

Drawing from an earlier study<sup>9</sup>, let us now look at the trend in employment and output prior to our study period.

Table 2.6  
Growth trends in Employment in the Organised manufacturing Sector of south Indian States

Compound growth rates			
States	60-65	65-69	69-75
Andhra Pradesh	8.8	4.8	4.4
Karnataka	8.8	2.9	4.9
Kerala	3.6	3.3	2.9
TamilNadu	11.1	4.6	2.1
All-India	6.5	1.0	3.5

Source: T. Roy (1984)

In 60-65, except in Kerala, all other south Indian states showed a higher compound growth rate of employment compared to all-India level. The growth rate of employment of all southern states except Kerala has declined notably in 65-69. Declining trend continues in 69-75 period for all southern states except in Karnataka. The interesting point is that the south Indian states miserably failed even to achieve their 60-65 growth rate in employment in later years.

Similarly, let us have a look at the growth rates of gross output at constant prices.

Table 2.7

Growth Trends in Output of the manufacturing Sector  
of south Indian States

Compound growth rates			
States	60-65	65-69	69-75
Andhra Pradesh	11.8	10.0	9.7
Karnataka	16.1	8.0	6.5
Kerala	8.4	15.6	9.9
TamilNadu	16.0	8.9	6.1
All-India	11.3	5.6	4.9

Source: T. Roy (1984)

In 60-65, Andhra Pradesh, Karnataka and Tamilnadu were reported in the high growth group. Kerala was in a moderate group. Later in 65-69, Andhra Pradesh, Karanataka and Tamilnadu were grouped into the moderate level. But Kerala improved its position and joined the group of high growth. The same trend continued in 69-75 also except that Kerala also lost its high level and came under the moderate group.

The Overall Trends during 1976-187

Now, turning to the study period 1976-87, we have estimated the overall growth in value added in the manufacturing sector of Kerala, other south Indian states and all India. The results obtained are reported in table 2.8. It is evident that the growth pattern of Kerala and other south Indian states in general have shown a trend almost diametrically opposite to that of the all



India manufacturing sector. During the entire period of analysis (1976-87) Kerala and other south Indian states recorded a relatively higher growth rate than all India.

Table 2.8  
Growth rates of Value-added in Manufacturing Sector  
at Constant (1970-71) Prices (%)

Value added	1976-77 1986-87	1976-77 1981-82	1981-82 1987-88
(1)	(2)	(3)	(4)
All India	5.58(*)	4.65(*)	7.77(*)
Kerala	6.86(*)	8.82(**)	4.32(*)
Karnataka	6.2(**)	4.34	5.84(*)
Andhra Pradesh	8.99(**)	5.86(*)	4.15
Tamil Nadu	6.22(*)	7.4(**)	4.44

Note: \* - 5 % level of Significance.  
 \*\* - 10 % level of Significance.

Source : Calculations based on ASI

As we move to the sub periods also the above conclusion holds. To elaborate, during the first period (1976-81) the growth rate observed by South Indian States in general was higher than all-India. The trend however was different as we move to the Second Period; Here, a significant increase in the rate of growth of manufacturing value-added was registered by the all-India manufacturing sector whereas, all the south Indian States marked a decline in their growth of value-added. What is more important to note is that the rate of decline of value-added recorded during the second period was highest in the case of Kerala. To be more specific, growth rate recorded during the second period of Kerala

was only one half of the first period. An exception to the observed trend may also be noted. The state of Karnataka recorded an increase in the growth rate during the second period (though not as large as the decline recorded in other states).

#### Growth Trends by broad Industry Groups

The above conclusion, however, is based on the analysis of the entire manufacturing sector. To have a better picture, one should analyze how different industry groups in the manufacturing sector have behaved during this period. It is to this question that we turn now.

##### a) Agro based Industries

The group agro based industries includes the following industries: a) manufacture of food products, b) manufacture of beverages tobacco and tobacco products, c) manufacture of cotton textiles, d) manufacture of wool, silk and synthetic fibre textiles, e) manufacture of jute hemp and mesta textiles and f) manufacture of textile products. Our analysis of the growth trends of this industry group revealed that the broad pattern of growth of this group remained the same as that of the manufacturing sector. To elaborate, during 1976-87, the recorded growth rate of the agro based industries in South Indian states was lower than that of the all India. (see table 2.9) The observed trend in this industry group was different from the overall manufacturing sector during the sub periods. In tune with the overall manufacturing sector, the agro industry group at the all India level recorded an

Table 2.9

Growth Trends in the Agro based Industries

States	1976-87	1981-86	1981-87
Kerala	3.44 **	-0.91	4.84*
Karnataka	8.21 *	5.72*	14.86*
Andhra Pradesh	4.99**	1.26	4.88**
Tamil Nadu	4.21 *	3.90 **	7.84*
All India	3.01 *	2.80*	4.03

Source : Calculations based on ASI

\* 5% level of significance

\*\* 10% level of significance

increase during the second period. The agro industry group in south India in contrast to the overall manufacturing sector, registered a significant increase in their growth rate. Thus the pattern of growth in the agro industry group in the south India and the all India remained the same during the sub periods. Notwithstanding this broad similarity, it is worth noting that the rate of increase of the south India states was much higher than that of all India (see Table 2.9)

b) Forest Based Industries

This group includes the following industries; a) manufacture of wood and wood products, b) manufacture of paper and paper products and c) manufacture of leather and fur products. Our analysis of the growth trends of this group between the overall period there is considerable similarity in the growth trends in this group with the overall manufacturing sector in Kerala and other south Indian states and that of the all India manufacturing sector. Similar to the overall manufacturing sector, the growth

during 1976-87 in the south Indian states was higher than the all India level (see table 2.10). The growth trends in the sub periods have shown a different pattern in that, while Kerala and Karnataka, along with all India, have shown an increase in the growth rate during the second period as compared to the first period, Andhra Pradesh and Tamil Nadu have shown a decline in their growth rate (see table 2.10)

Table 2.10

Growth Trends in the Forest based Industries

States	1976-87	1981-86	1981-87
Kerala	3.00 **	2.52**	4.49 *
Karnataka	3.89**	-9.61	9.85*
Andhra Pradesh	7.84 *	12.13*	0.67
Tamil Nadu	6.88*	7.31*	5.55**
All India	2.52 *	0.89	7.44**

Source : Calculations based on ASI

\* 5% level of significance

\*\* 10% level of significance

c) Rubber, Petroleum and Chemical based Industries

This is the single largest group in the manufacturing sector of Kerala. As one would expect, the growth trends in Kerala in this industry group were similar to the overall manufacturing sector.

Table 2.11

Growth Trends in the Rubber, Petroleum and Chemical based Industries

States	1976-87	1976-81	1981-87
Kerala	7.31**	-0.59	-0.34
Karnataka	9.42*	17.65*	9.27
Andhra Pradesh	6.47*	9.26 **	1.17**
Tamil Nadu	5.88*	17.16*	1.64
All India	6.38*	2.11*	8.27*

Source : Calculations based on ASI

\* 5% level of significance

\*\* 10% level of significance

In contrast to the trend observed for the overall manufacturing sector, this group of industries at the all India level recorded a higher growth rate than Kerala and other south Indian states during 1976-87 (see table 2.11). As we move to the sub periods there appears to be a difference in the growth trends in Kerala with that of other south Indian states. To elaborate, while in all the other south Indian states there was a significant decline in the growth rate during the second period as compared to the first period the growth rate in Kerala during the second period remained almost at the same level as that of the first period.

d) Iron and steel & Metal Based Industries

Our analysis of the growth in this group of industries revealed that this group exhibited a different pattern from that of the overall manufacturing sector. Despite the considerable increase in growth during the eighties in the overall manufacturing sector, this sector at the all India level remained almost stagnant (see table 2.12) While it remained stagnant (with a marginal increase in the growth rate) at the all India level, there was a significant decline in the growth rate during the eighties in all the south Indian states including Kerala. Such a differential trend was observed during the entire period of analysis as well. The growth rates recorded by Tamil Nadu and Kerala were lower than all India.

Table 2.12

Growth Trends in the Iron and Steel  
and Metal based Industries

States	1976-87	1981-86	1981-87
Kerala	-3.47 **	-2.92	-0.34
Karnataka	4.75	-0.93**	0.02
Andhra Pradesh	4.73 *	2.82	0.89
Tamil Nadu	0.78	10.85	-2.97
All India	1.16 **	2.19	2.42 **

Source : Calculations based on ASI

\* 5% level of significance

\*\* 10% level of significance

e) Manufacture of Machinery and transport Equipments

This group of industries is considered as a major component of the engineering industries. Analysis of the growth rates in this group of industries revealed that the recorded growth pattern in this group was similar to that of the overall manufacturing sector - that is during the entire period of analysis the growth rate at the all India level was lower than Kerala and other South Indian states. Even when we move to the sub periods the observed similarity with the overall manufacturing sector holds. To be more

Table 2.13

Growth Trends in the Manufacture of Machinery  
and Transport Equipments

States	1976-87	1981-86	1981-87
Kerala	10.61 *	19.08	-0.40
Karnataka	6.55 *	2.28**	10.27*
Andhra Pradesh	8.56 *	9.07	1.52*
Tamil Nadu	5.75 *	-0.74	5.67*
All India	6.59 *	4.77 *	5.24

Source : Calculations based on ASI

\* 5% level of significance

\*\* 10% level of significance

specific, during the second period while there was a significant decline in the growth rate in all the south Indian states except Karnataka, the growth rate at the all India level increased.

On the whole, our analysis of the growth in the subperiods has shown that at the all India level while there was an increase in the growth rate in the second period as compared to the first period, Kerala and other south Indian states in general recorded a decline in growth. Growth trends in the broad industry group have shown that the observed trends were similar to that of the overall manufacturing sector. But the behaviour of the agro based and the forest based industries during the second period was different from the overall manufacturing sector. To throw more light into the observed growth trends we may now proceed to analyse the growth trends at a more disaggregated level.

#### Growth Trends : a disaggregated Analysis

With a view to examining further, the role of different industries in the manufacturing sector we have calculated the growth rate at the two digit level. This analysis, we hope would throw more light into the question as to what extent Kerala's growth pattern differs from the other states. The growth rate of different industries at the two digit level during the period under consideration is given in the appendix 2.I.

In Kerala, Beverages, Tobacco and Tobacco products(13.48%), Rubber, Plastic, Petroleum and Coal(11.7%), Machinery, Machine tool and parts(12.71%) and other Manufacturing products showed

high growth rate during the period 1976-87. Manufacture of food products(2.5%), Cotton textiles(5.04%), Paper and paper products, Printing and publishing and allied industries(3.6%), Chemicals and Chemical products(8.8%), and transport equipments(7.77%) also showed positive and significant growth rates. But the Wool, Silk and Synthetic fibre textiles gave a negative growth rate (-11.5%). Like the earlier analysis this could also be done on two time periods.

Compared to 1976-87, in 1976-81 a large number of industries showed high growth rates. Manufacture of food products (14.09%), Beverages, Tobacco and Tobacco products(29.61%), Cotton textiles(12.69%), Rubber, Plastic, Petroleum and Coal(19.40%), Nonmetallic Mineral(10.7%), Transport equipment(25.13%) and other Manufacturing industries(31.4%) showed high growth rates. Metal products and machinery, Machine tools and parts are gave growth rates of 5.27 percent and 7.83 percent. But the former is not significant at a desired level. The analysis of 1981-87 shows that many of these industries have recorded a significant decline in the growth rates. Beverages, Tobacco and Tobacco products and Cotton textiles declined significantly by 18.63 percent and 6.29 percent respectively. Similarly non-metallic Mineral industry and other Manufacturing products have also declined significantly to -1.65 percent and -6.92 percent growth rates.

Compared to Kerala, few industries showed high growth rates in Karnataka. Leather, Leather and fur products (29.1%), Rubber, Plastic, Petroleum and Coal(14.1%), Non-metallic mineral(11.3%) and other Manufacturing Products(11.06%) showed relatively high



growth rates. Even among this group, manufacture of food products(6.2%), Beverages, Tobacco and Tobacco Products(5.2%), Wood and Wood products, furniture and fixtures(3.2%), Chemical and Chemical Products(5.5%), Electrical Machinery(5.7%), Transport equipment(2.9%) are gave a growth performance between 3 and 6 percent. Textile Products(6.5%), Metal Products(7.11%) and Machinery, Machine tools and parts(8.72%) have also shown a similar trend. Basic metals and alloys gave a negative performance during the period of analysis.

Like Kerala, during the two sub periods Karnataka has shown a varying performance. In 1976-81, Leather, Leather and fur products(26.09%), Rubber, Plastic, Petroleum and Coal(19.74%) and Chemicals and Chemical Products(10.85%) showed high growth rates. Electrical machinery showed a negative growth rate. Non-metallic Mineral industry, Metal Products industry and Machinery, Machine tools and parts have shown higher growth rates. But they are not significant at the desired level. In 1981-87, the growth rate of Cotton-textile industry has drastically declined to reach -2.16 percent. Similar pattern was seen in the case of Wool, Silk and Synthetic fibre textiles also. But Wood and Wood products, furniture and fixtures and Electrical machinery have increased their growth rates significantly in the second period.

In Andhra Pradesh, Manufacture of food products(10.9%), Cotton textiles(9.3%), Wood and Wood products, furniture and fixtures(10.7%), Rubber, Plastic, Petroleum and Coal(9.9%) and Electrical Machinery(10.5%) industries have shown the highest growth rates. Jute, hemp and mestha textiles(4.3%), Paper and

Paper products, Printing and Publishing and allied industries (6.9%), Non-metallic minerals(7.5%), Other manufacturing products(7.1%) and Metal products(5.7%) have shown moderately high growth rates. Wool, Silk and Synthetic fibre textiles industries whosed a negative growth rate.

In 1976-81, manufacture of food products(14.3%), Jute, Hemp and Mestha textiles(11.68%), Paper and Paper products, Printing and Publishing and allied industries(18.27%), Rubber, Plastic, Petroleum and Coal industries(12.64%), and Basic metals and alloys(15.25%) have shown the highest growth rates. Textile Products(wearing apparel other than footwear) and Metal products, Machinery , Machine tools and parts industry have recorded growth rates which are not significant at the desired level. During the second period of analysis, industries like Cotton textiles(3.62%) Rubber, Plastic, Petroleum and Coal(6.14%) have registered a come down in their growth rates. Non-metallic mineral industry has come down notably to a negative growth rate.

In Tamil Nadu, industries like Beverages, Tobacco and Tobacco products(10.9%), Textile Products (wearing apparel other than footwear)(11.3%) Chemicals and Chemical products(14.4%) and other manufacturing products(11.9%) have recorded highest growth rates. During the first period, Chemicals and Chemical products have showed a high growth rate of 33 percent. Metal products also shown a high growth rate of 13.46 percent. Electrical machinery showed a growth rate of 7.01 percent. These three industries have registered a drastic decline in the growth rate during the next period. Chemicals and Chemical products and Metal products have

declined to -2.95 percent and -6.73 percent respectively. Electrical machinery has declined to 5.43 percent. At the same time, industries like Cotton textiles, Textile products(wearing apparel other than footwear) and Paper and Paper products, Printing and Publishing and allied industries have increased their growth rates significantly.

At the all-India level, Electrical machinery(8.1%), Rubber, Plastic, Petroleum and Coal(7.9%) and Other manufacturing products(11.21%) have registered the highest growth rates. Along with this, Beverage, Tobacco and Tobacco products(4.3%), Textile products(wearing apparel other than footwear)(3.6%), Paper and Paper products, Printing and Publishing and allied industries(2.3%), Leather, Leather and fur products(5.2%), Chemicals and Chemical products(6.1%) and Non-metallic mineral products(6.2%) appeared in the middle level category. Metal products(3.1%), Machinery, Machine tools and parts(3.5%) and Transport equipment(5.4%) also showed significant growth rates though at a lower level.

During the first period, Non-metallic mineral industries(12.16%) and Electrical machinery(11.42%) and other manufacturing industries showed positive and significant growth rate. The growth rate of non-metallic mineral industries and Electrical machinery declined in the second period. But basic metals and alloys and other manufacturing industries registered increased growth rates in the second period. Industries like Beverages, Tobacco and Tobacco products(3.58%), Cotton textiles(1.45%), Wool, Silk and Synthetic fibre textiles(3.98%),

Paper and Paper products, Printing and Publishing and allied industries(4.63%), Leather and Leather and fur products(4.18%) and Rubber, Plastic, Petroleum and Coal(18.34%) industries have shown significant growth rates during the second period.

### Concluding Observations

On the whole, it is seen that in terms of the growth rate in value added in the manufacturing industries during 1976-87, notwithstanding marginal differences, the trend observed in Kerala was almost similar to that of other south Indian states in general. Whenever the all India manufacturing sector was more dynamic in terms of growth the recorded growth rate in the south Indian states were lower than all India. More importantly during the eighties when there was a growth buoyancy at the all India level the southern states recorded a decline in their growth rate. Such a trend was more striking in the case of Kerala. Our analysis of the growth in the sub periods has shown that at the all India level while there was an increase in the growth rate in the second period (1981-87) as compared to the first period(1976-81) Kerala and other south Indian states in general recorded a decline in growth. Growth trends in the broad industry group have shown that in most of the broad industry groups the observed trend was similar to that of the overall manufacturing industries. But the behaviour of the agro based and the forest based industries during the second period was different from the overall manufacturing industries. To throw more light into the observed growth trends we have analysed the growth trends at a more disaggregated level. This

analysis also confirmed the above findings. Having examined the trend in value added growth let us now proceed to analyse the trend in productivity. That is what is attempted in the forthcoming.

### Notes and references

- 1 See for example, Ahluwalia I.J.(1985) and Awasthi D.N. (1991)
- 2 Anandraj (1992).
- 3 Ahluwalia I.J (1991), Pushpangadan K (1990)
4. The price indices used relate to the all-India level as the information is not available for the states to the required level.
- 5 The double deflation method although superior could not be used due to difficulties in getting suitable price deflators for the heterogeneous group of material inputs.
- 6 Nair K R G (1981)
7. Under the British rule, India found herself ruled by two systems of government existing side by side-indirect and direct rule. Under the indirect rule, although the Govt of India held ultimate responsibility for the princely states, they were ruled internally by Indian princes, who were more or less autonomous. On the other hand the system of government in British India was direct, since officials of the Government of India were responsible for making and carrying out all major and minor policies.
8. The state reorganization act was passed by the Parliament in 1956. It involved not only the establishment of new states and alterations in state boundaries but also the abolition of the three categories of the states and the classification of certain areas as union territories.
9. Roy T (1984).

## Appendix 2.I

## Growth Rates of Two Digit Industry Groups of Kerala and Other Southern States

	KERALA			KARNATAKA			ANDHRA PRADESH			TAMIL NADU			ALL-INDIA		
	1976-87	1976-81	1981-87	1976-87	1976-81	1981-87	1976-87	1976-81	1981-87	1976-87	1976-81	1981-87	1976-87	1976-81	1981-87
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
20-21	2.5*	14.09**	0.37	6.2*	-3.34	5.51	10.9*	14.31**	0.28	0.37	6.7*	-0.48	4.6	-6.26	-04.02
22	13.42*	29.61*	18.63**	5.2*	-3.36	13.07	0.03	-06.22	5.73**	18.63**	10.9*	0.49	4.3*	-2.69	3.58*
23	5.04*	12.69*	6.29**	2.6	7.98*	-2.16	9.3*	14.91*	3.62	6.29**	-3.3*	0.93	0.38	3.35	1.45*
24	-11.5**	-0.41	-38.29	6.2*	8.99**	5.51*	-8.3**	-12.81	1.00	-38.29	-0.6	7.01	6.4	-0.92	3.98**
25	...	...	...	...	...	...	4.3*	11.68**	5.14*	...	1.8	13.44	-1.5	5.44	2.20
26	1.2	-2.63	-6.98	6.5*	2.46	5.74	3.6	12.56	7.76	-06.98	11.3*	6.72	3.6*	0.51	0.56
27	-2.2	-0.78	-18.07	3.2*	-6.60**	14.17*	10.7*	-4.92	13.88**	-18.07	2.7	1.58	1.0	2.34	2.16
28	3.6*	6.37	28.03	3.3	-7.54	9.92	6.9*	18.27*	9.67**	28.03	2.7	-05.09	2.3**	-4.51	4.63**
29	...	...	...	29.1*	26.09**	8.79	5.1	-14.86	19.36	...	5.4*	2.86	5.2*	-2.84	4.18*
30	11.79*	19.40*	0.42	14.1*	19.74*	17.07	9.9*	12.64**	6.14**	0.42	7.2**	-05.53	7.9*	-3.43	18.34*
31	8.20*	8.35	-5.02	5.5*	10.85**	2.71	3.7	2.38	-6.49	-05.02	14.4*	33.0*	6.1**	-11.96	5.13
32	2.3**	10.70*	-1.65*	11.13*	10.79	13.28**	7.5*	2.08*	-9.30	-01.65*	2.6**	4.84	6.2*	12.16*	3.92*
33	-2.4	-9.13	25.55	-16.6**	-6.19	23.74	3.8	15.25**	8.79	25.55	-01.3	5.89	0.84	-11.72**	0.51
34	8.90*	5.27	24.01	7.11*	9.08	11.67	-5.7**	4.79	4.74	24.01	4.2*	13.46*	3.1*	-1.70	4.82
35	12.71*	7.83*	14.34**	8.72*	7.64	4.52	-1.6	16.12	-13.54	14.34**	6.7*	0.58	3.5*	-8.60	3.23
36	10.4*	17.23	28.07	5.7**	-16.12*	4.02*	10.5*	11.99	0.50	28.07	6.9*	7.01*	8.1*	11.42*	4.76*
37	7.77*	25.13*	-4.11*	2.9*	2.22	3.15	03.4	-10.39	-06.27	-04.11*	3.6*	2.24	5.4*	0.28	11.95
38	12.10*	31.4*	-6.72*	11.06*	4.83	-4.62	7.1*	-07.83	23.19	-06.72*	11.9*	2.15	11.21*	9.66*	11.13

Note: \* - 5 percent significance.

\*\* - 10 percent significance.

Denote: 1 - Agro-based industries.  
 2 - Forest and animal based industries  
 3 - Rubber, Petroleum, Chemicals group  
 4 - Iron and Steel & Metal based industries  
 5 - Manufacture of Machinery & Transport equipment

## Chapter 3

### TRENDS IN PRODUCTIVITY

#### Introduction

Productivity has now assumed significance in the growth analysis. A direct positive relationship between productivity change and rate of growth of output is generally postulated and empirically established in the burgeoning literature on economic growth<sup>1</sup>. It is however instructive to note that the classical economists had conceived the idea in the eighteenth and nineteenth centuries in the form of law of diminishing returns. In the 19th century, Frederick W. Taylor advanced the thesis in his 'Taskstudy' that "Human work can be made infinitely more productive not by 'working harder' but by working smarter"<sup>2</sup>. Later on however the 'Convenience Economics'<sup>3</sup> which has two major divisions-Micro and Macro - did not give due importance to the concept until the fifties. In Macro Economics the Keynesian theorem took productivity for granted: The aggregate demand situation was given more prominence though Keynes was aware of the importance of productivity. He did not consider it necessary to integrate it with the theoretical apparatus developed by him. On the other hand, Micro Economics is concerned with allocative or market efficiency under 'Perfectly Perfect Competition', but within individual decision units like firms there are no markets. While we have both the concepts and the data, we don't have, so far, a Micro Economic model that embraces productivity and capital formation<sup>4</sup>.

With the spurt of concern and interest in economic growth since the fifties, however, productivity analysis began to receive



considerable focus in growth analysis. The concept of productivity is seen in terms of either partial factor productivity or total factor productivity. Some of the later studies have shown that one-third to one-half of output growth could be attributed to total factor productivity change.<sup>5</sup> It is therefore logical for the present study on the growth performance of Kerala vis-a-vis other south Indian states to attempt a comparative analysis of changes in productivity, both partial and total in the industrial sector during the study period. We first deal with the concept and measurement problems associated with productivity so that the empirical results of the analysis can be read with the required caution.

#### The measurement of the concept

During the last fifty years or so 'Productivity measurement' has emerged as a distinct and separate branch of study in the discipline. Broadly, we can classify the measures on productivity as (1) Partial and (2) Total.

Partial Productivity is a concept derived in terms of a single input, other things assumed to remain constant. This can be measured either as average or marginal <sup>6</sup>. Most commonly used partial productivity measures are labour productivity and capital productivity.

Labour productivity is defined as the ratio of output to the corresponding input labour, labour being measured in terms of number of workers or manhours<sup>7</sup>. This does reveal only the

accounting relation between output and input<sup>8</sup>. While, interpreting productivity ratios one must take cognizance of the physical changes in output in contiguity with the direction in which such changes take place<sup>9</sup>. Other wise this ratio could become a misleading indicator.

Capital productivity, in semblance to labour productivity is output per unit of capital. This reflects not only the use efficiency of capital but also the level of embodied technology in use. In fact, it has been argued that it is impossible to construct an index of the quantity of capital as capital is essentially a value concept that is affected by changes in the relative factor prices, the interest and wage rates<sup>10</sup>.

Growth in partial productivity is able to measure only the savings achieved in particular cost elements as a result of changes in productive efficiency and/ or interfactor substitution<sup>11</sup>. Total factor productivity growth captures the effects of factor substitutability along with the contribution of its own input. To that extent, partial factor productivity growth might mislead in understanding the productivity growth performance. An appropriate measure to analyse changes in output at different levels of economic activity, corresponding to the changes in the total input is the total factor productivity<sup>12</sup>. Estimates of the concept are designed to provide an indication of the changes in over all efficiency with which resources are utilised in the production process<sup>13</sup>. Total factor productivity can be fathomed as the proportion of growth in real output that can't be accounted for changes in specifiably identifiable inputs<sup>14</sup>. This is the reason

why the concept has been termed as 'measures of our ignorance'<sup>15</sup> and 'the residual'<sup>16</sup>.

Even though, total factor productivity has emerged as an alternative to overcome the limitations of partial productivity analysis, this is also subject to severe objections. In the analysis of total factor productivity, the total output is the outcome of the play of a weighted composition of all inputs used in the production process so that one can differentiate the contribution of labour (wages), capital (profit) and the residual representing technology. The measurement of total factor productivity is based on the neo-classical theory of production function which rests on certain restrictive assumptions about the behaviour of production units and properties of input and output variables. Errors in estimating the parameters of production function or errors in measuring variables can bias the estimates of total factor productivity purely due to erroneous measurement of inputs and output<sup>17</sup>.

Another objection against the concept is that it is based on extreme supply side considerations. Infact, in a developing country like India, the overall productive efficiency is influenced by several other factors such as demand constraints, market imperfections, institutional inadequacies etc.

#### Approaches to the measurement of Total factor Productivity

The analytical frame work of total factor productivity is based on the concept of production function which is defined as

the technical relationship between quantity of output and quantities of inputs<sup>18</sup>. A shift in the production function is regarded as an index of technical change. Following Solow's logic<sup>19</sup>, most of the studies use the terms 'total factor productivity growth' and 'technical changes' synonymously<sup>20</sup>.

Various measures of TFPG have been developed during the 1970's and 80's by scholars like Kendrick (1961), Domar (1961), Solow (1957), and Christensen, Jorgenson and Lau (1971, 1973). Let us now examine each of these measures of TFPG.

#### Kendrick measure

Kendrick defines TFPG as, "the ratio of a change in output to a weighted sum of changes in all inputs, weights being instant factor prices". It assumes implicitly homogeneous production function and marginal income distribution. For a homogeneous production function with two inputs, such as capital (k) and labour (L), the Kendrick measure is defined as

$$DA = \frac{(Y_1/Y_0)}{S_{L0}(L_1/L_0) + (1-S_{L0})(K_1/K_0)} - 1$$

where  $S_{L0} = (W_0L_0/Y_0)$

and  $1-S_{L0} = S_{K0}$

The subscript '1' stands for the current period and the subscript '0' refers to the base period. The notations such as DA, Y, L, K, W and r used in the equation are TFPG, real output, labour, Capital, average wage rate and average rate of return to capital

respectively. The constant weights imply that there is no disembodied technical change. However, Nadri(1970) demonstrated that production function underlying the Kendrick measure of TFPG could be characterised as constant elasticity of substitution production function provided that the weights are permitted to change over time.

### The Domar Index

In this geometric index of total factor productivity, the rate of change of total factor productivity is given by the difference between the rate of change of output and constant weighted sum of inputs growth rates such as capital and labour.

$$\frac{\Delta A}{A} = \frac{\Delta V}{V} - \left[ \alpha \frac{\Delta L}{L} + \beta \frac{\Delta K}{K} \right]$$

The Domar index also assumes fixed weights like the Kendrick index. For a short period, the difference between the two is small if the rates of growth of labour and capital are not much different. However, the Domar index is preferred to the Kendrick index for long term comparisons<sup>21</sup>.

### The Solow index

Solow (1957) interprets TFPG as "the rate of shift in production function" under the assumption of Hick's neutrality of technical change, it is called as disembodied technical change, a short hand expression for any kind of shift in the production function. However, Solow admitted in his paper (1960) that the time

shift in the production function was a confession of ignorance rather than a claim of knowledge under the restrictive assumption of constant returns to scale, unitary elasticity of substitution, and Hick's neutrality of technical change. Solow's measure of TFPG is derived as follows.

Production function takes the form

$$V_t = A(t) f(L_t, K_t) \quad \text{-- (1)}$$

Where V, L, K and A represent the value-added, labour, capital and measurement of the accumulated effects of shifts in the production function over time. By differentiating the equation (1) totally with respect to time, we get

$$dV = A \left[ \frac{\delta f \cdot dL}{\delta L \cdot dt} + \frac{\delta f \cdot dk}{\delta k \cdot dt} \right] + f(L, K) \frac{dA}{dt} \quad \text{--- (2)}$$

dividing equation (2) by  $V = A(t) f(L, K)$  and denoting the time derivatives by stars,

$$\frac{V^*}{V} = \frac{A^*}{A} + A \frac{\delta f \cdot L^*}{\delta L \cdot V} + A \frac{\delta f \cdot K^*}{\delta k \cdot V} \quad \text{--- (3)}$$

The marginal productivity conditions for labour and capital imply

$$\frac{\delta V \cdot L}{\delta L \cdot V} = S_L \quad \text{and} \quad \frac{\delta V \cdot K}{\delta K \cdot V} = S_K \quad \text{where}$$

$S_L$  and  $S_K$  are shares of labour and capital. Substituting the results in equation (3) we obtain

$$\frac{V^*}{V} = \frac{A^*}{A} + S_L \frac{L^*}{L} + S_K \frac{K^*}{K} \quad \text{--- (4)}$$

denoting  $\frac{V^*}{V}$  (the Proportionate growth of V) by  $\bar{V}$ ,  $A^*/A$  as  $\bar{A}$ ,

$\frac{L^*}{L}$  by  $\bar{L}$  and  $\frac{K^*}{K}$  by  $\bar{K}$ , we may write

Equation (4) as

$$\bar{V} = \bar{A} + S_L \bar{L} + S_K \bar{K} \quad \text{or} \quad \bar{A} = \bar{V} - (S_L \bar{L} + S_K \bar{K}) \quad \text{---(5)}$$

This equation tells us that the rate of growth of total productivity is equal to the difference between the rate of growth of value added and the weighted sum of the rates of growth of labour and Capital, the weights being the respective shares.

Translog measure:

Christensen, Jorgenson and Lau (1971,1973) developed a measure of TFPG by specifying explicitly Translog production function. The translog functional form provides a second order approximation to an arbitrary twice continuously-differentiable production function and also accommodates elasticity of substitution varying from zero to infinity. Infact, this is a discrete approximation to the continuous changes in divisia quantity index of TFP. Let us specify the translog production function for a case of two inputs.

$$\begin{aligned} \ln Y = & \alpha_0 + \beta_K \ln(K) + \beta_L \ln(L) + \beta_T T \\ & + 1/2 \beta_{K.K} (\ln(k))^2 + \beta_{KL} (\ln(k) \ln(L)) \\ & + 1/2 \beta_{L.L} (\ln(L))^2 + \beta_{KT} (\ln(k))T \\ & + 1/2 \beta_{T.T} T^2 + \beta_{L.T} (\ln(L))T \quad \text{---(7)} \end{aligned}$$

Where  $\ln(Y)$ ,  $\ln(K)$ ,  $\ln(L)$  refer to natural logarithms of output, capital and labour respectively. 'T' denotes time trend as a proxy for technical change.

By imposing assumptions of constant returns to scale, perfect competitive equilibrium, Hick's neutrality of technical change, the total differentiation of the Equation (7) with respect to time, after rearranging the terms, yields

$$AT = (\ln Y_t - \ln Y_{t-1}) - S_L (\ln L_t - \ln L_{t-1}) - S_K (\ln K_t - \ln K_{t-1}) \quad \text{-----} (8)$$

$$\text{Where } A_t = (\ln A_t + \ln A_{t-1})/2$$

$$S_L = (S_{L_t} + S_{L_{t-1}})/2$$

$$S_K = (S_K + S_{K_{t-1}})/2$$

The Expression in Equation (8) is the average rate of technical change for the period, t-1 to t. The TFPG is the difference between the growth of output and the weighted sum of the growth of inputs, the weights being the corresponding average value shares of the current year and that of the preceding year.

Dividing the equation (8) by the term  $(\ln Y_t - \ln Y_{t-1})$ , sources of growth of output can be computed.

Contribution of labour to output growth is

$$\{ S_L (\ln L_T - \ln L_{T-1}) \} / \{ \ln Y_T - \ln Y_{T-1} \}$$

Contribution of capital to output growth is

$$\{ S_K (\ln K_T - \ln K_{T-1}) \} / \{ \ln Y_T - \ln Y_{T-1} \}$$



### Comparison of Alternative Indices of Total Factor Productivity

A comparison of alternative indices of total factor productivity shows that the behavioural restrictions of the underlying production relations such as constant returns to scale, perfect competition and marginal productivity conditions are the same for all the indices. However, significant differences can be noticed in the case of Elasticity of substitution. While Domar and Solow indices assume unitary elasticity of substitution, it is constant in the case of Kendrick index. Translog index on the other hand, permits elasticity of substitution to vary. Yet another fundamental difference is with regard to the nature of weights assigned to the factor inputs in the process of their aggregation.

While Kendrick and Domar indices make use of the base period value shares, the Solow index operates on the current period value shares of the respective factor inputs. In the case of the Translog index, the average of current and previous period value-shares is employed. Compared to other indices, the Translog index has several theoretical and empirical advantages as it is based on a more flexible form of production function. Further, the translog index enables to decompose the total factor productivity growth into technical change, scale effects and other components.

## Empirical Results

### Partial Productivity Measures:

We begin the productivity analyses with partial productivity measures. Labour Productivity is measured as the ratio of gross value-added at constant prices to the total number of persons employed. Similarly, capital productivity is worked out as the ratio of gross-value added to the value of fixed capital, both reckoned at constant prices.

### Trends in labour Productivity

The estimated results of labour productivity growth rate in the manufacturing industries of south Indian states and at all-India level are given in table 3.1. Among the south Indian States, Kerala has shown highest labour productivity growth of 6.9 per cent during 1976-87. This is much greater than the all-India labour productivity. In terms of labour productivity, Kerala is followed by Karnataka and Andhra Pradesh recording, a growth rate higher than that at the all-India level.

The finding that a definite improvement in labour productivity was taking place overtime is in conformity with the results of studies conducted earlier dealing with the period prior to our analysis. Goldar (1987) reported the labour productivity ratios for the large-scale manufacturing industries (census sector) over the period 1960-1979. It was observed that labour productivity

in India's manufacturing sector registered an annual average growth of 3.26% per annum during the twenty years.

Table 3.1

Labour Productivity Growth

	1976-81	1981-87	1976-87
Kerala	0.50	7.60**	6.91*
Karnataka	0.65*	10.42*	5.66*
Andhra Pradesh	-0.11**	2.00*	4.29*
TamilNadu	0.33*	4.03*	2.75*
All-India	-1.18**	5.89	3.90*

Note :

\* denotes 5% level of significance

\*\*denotes 10% level of significance

Source: calculation based on ASI data

The estimates of labour productivity growth for two sub-periods for all-India and other Southern states show that, in Kerala the recorded growth rate during the second period (81-87) was higher than the first period (1976-81). Similar trend was observed in other states as well. The observed trend in labour productivity that we have seen is in consonance with the result obtained by the Task Force<sup>22</sup> on Kerala's industries.

Another study<sup>23</sup> which divided the period 1960-80 in to two sub periods - 1960-70 and 1970-79 showed that Kerala has shown a similar picture. Kerala experienced a higher growth rate of 9.19 percent during the first period and a decline (1.93 percent) in the second period. Our finding in line with the TaskForce report has found that this decline was offset by the performance of 1980.

We can take 1981-87 growth rate of Kerala labour productivity (76%) in Kerala as a sure indication of, an improvement in the labour relationships in the economy.

### Trends in Capital Productivity

Having examined the trend in labour productivity, let us now proceed to analyse the result of the other component of partial productivity viz., capital productivity. Table 3.2 reports the results of capital productivity estimates.

It is evident from table 3.2 that during 1976-87 the trend in capital productivity was similar to that of labour productivity; that is, the recorded growth rate in Kerala was the highest with the south Indian states in general recording a higher growth rate than the all India level. However, as we move to the sub periods, the growth of capital productivity showed a different pattern from labour productivity. While, the labour productivity growth was lower during the first period in Kerala, capital productivity

Table 3.2

#### Capital Productivity Growth

	1976-81	1981-87	1976-87
Kerala	7.55*	4.56*	6.54*
Karnataka	9.18	7.49**	5.36*
Andhra			
Pradesh	5.19*	-5.16	2.04*
TamilNadu	11.21	1.80*	2.18*
All-India	6.60*	3.20*	4.02*

Note :

\*5% level of significance

\*\*10% level of significance

Source : calculation based on ASI data

growth was found to be high during this period. A similar trend was observed in the other regions as well. The trend observed at the all India level was also same.

### Trends in Total Factor Productivity

The partial productivity analysis may not enable us to understand about the factor use efficiency and technological dynamism in the manufacturing sector. For this purpose, we should examine growth in total factor productivity by using translog measure. The estimated results of growth in total factor productivity is given in table 3.3.

Table 3.3  
Total factor Productivity Growth

	1976-81	1981-87	1976-87
Kerala	7.97**	4.67*	7.11**
Karnataka	5.37*	5.85*	6.52*
Andhra Pradesh	1.86*	-1.44	2.73*
TamilNadu	5.84*	1.19*	2.99*
All-India	3.83*	4.05*	3.95*

Note :

\*5% level of significance

\*\*10%level of significance

Source : calculation based on ASI data

It is evident from table 3.3 that the during the period 1976-87 growth in the TFP in Kerala was similar to that of labour productivity and capital productivity; that is, Kerala recorded the highest growth with the south Indian states in general recording a higher growth rate than the all India level. But the growth observed in the TFP during the sub periods is different from

both labour and capital productivity. To elaborate, in Kerala, the rate of growth in total factor productivity declined in the second period as compared to the first period. On the other hand, at the all-India level, there was an improvement in the total factor productivity growth as we move from first period to second period. Thus, here again the growth pattern of Kerala is different from the trend observed at the all-India level. At this juncture it is pertinent to raise the question why the manufacturing sector in Kerala remained technologically stagnant when the manufacturing sector at the all India level was technologically more dynamic and vibrant in growth. An answer to this question is attempted later in the study.

Meanwhile, let us examine the performance of other states in total factor productivity performance. It is observed that the pattern of productivity growth in Tamil Nadu and Andhra Pradesh was more or less in tune with that of Kerala. Total factor productivity growth observed in Andhra Pradesh was considerably lower than the other states. On the other hand, Karnataka showed a pattern similar to that of all-India.

To sum up, our attempt so far has been to highlight the overall trends in partial productivity growth and total factor productivity growth in Kerala vis-a-vis other south Indian states in the context of productivity trends in the manufacturing sector in India. The analysis has revealed the following; (a) During the entire period of analysis, Kerala recorded a higher growth rate in terms of all indices of productivity as compared to other south Indian states and all India; (b) labour productivity growth in

Kerala vis-a-vis other South Indian states showed an improvement during the second period as compared to the first period. This was found to hold good at the all-India level as well. (c) Capital productivity growth on the other hand registered a decline in growth rate during the second period in Kerala, other south Indian states and all-India. (d) While the trend in partial productivity growth remained the same across different regions during the period of analysis, total factor productivity growth showed a different pattern. To be more specific, while total factor productivity growth recorded a decline in Kerala as well as other south Indian states except Karnataka, it has increased at the all-India level and Karnataka. On the whole, notwithstanding certain similarities in terms of the growth in partial productivity indices, there was a distinct difference in factor use efficiency and technological dynamism as shown by TFPG in South Indian states including Kerala viz-a-vis all-India. The above result raises the question as to what has been the relative contribution of these factors to the growth in value-added. We now turn to find our answer to this question.

#### Sources of Growth-A decomposition analysis

The contribution of different factors like labour, capital and TFP (or technology) to the growth in value-added could be understood in an additive decomposition frame work. The result of the exercise is shown in table 3.4.

Table 3.4

Contribution of labour capital and TFP to growth in value added

	1976-81			1981-87			1976-87		
	Labour	Capi- tal	TFP	La- bour	capi- tal	TFP	La- bour	Capi- tal	TFP
Kerala	2.95	49.84	47.21	66.50	57.75	-24.25	42.88	50.40	5.72
Karnataka	5.68	90.60	3.72	83.59	67.85	-51.45	40.72	43.57	-15.71
Andhra Pradesh	-25.55	146.21	-20.66	-92.42	190.28	2.14	76.02	39.38	15.40
TamilNadu	2.49	107.26	-9.75	149.31	46.98	-96.29	39.64	41.55	18.81
All-Indi	-12.80	85.82	26.98	71.09	40.45	-11.54	48.92	51.39	-0.31

Source : calculation based on ASI data

From table 3.4, it is evident that during 1976-87 the relative contribution of TFP to value-added growth is lower as compared to labour and capital in all the regions and All-India. Despite this broad similarity, a close examination reveals a differential trend in the South-Indian states as compared to all-India. The contribution of TFP to growth in value added in the all-India Manufacturing sector was negative and that of Kerala and other South Indian states was significantly higher than zero. However, Karnataka remained an exception to the South-Indian states (see table 3.4). Further, it may be noted that relative contribution of labour and capital remained almost same in all the regions.

Having examined the contribution of different factors during the entire period of analysis, let us now proceed to analyse the contribution of these in the sub-periods. To begin with let us



take the first period (1976-81). During this period, contribution of labour is found to be negligible in Kerala, Karnataka and TamilNadu and negative in Andhra Pradesh and all-India. (see table 3.4) Similar to labour, the contribution of TFPG is also found to be relatively on the lower scale. Hence, the major contributory factor towards the value-added growth in all the regions is found to be capital. In this context, it may be noted that Kerala showed a distinct pattern as compared to other regions - while the contribution of TFPG was negligible in all the regions, its contribution in Kerala is found to be as much as that of capital.

During the second period, contribution of TFPG is found to be negative in all the regions except Andhra Pradesh. Viewed in this sense it is evident that the low level of factor use efficiency and technological dynamism that remained during the first period continued in the second period also. More importantly, Kerala, a region wherein the contribution of TFP was significant during the first period, also showed a negative contribution. The observed lower contribution of TFPG during the second period, however was off set to a great extent by an increase in the contribution of labour. Hence it may be concluded that the slow growth in value-added during the second period (which was found to be lower than the first period) was presumably due to the lack of technological dynamism and not accounted by labour and capital.

### Productivity Growth : By broad industry groups

So far our analysis was confined primarily to the trends in labour, capital and productivity growth in the entire manufacturing sector. Now let us proceed to analyse the growth trend in these variables registered by broad industry groups. For the sake of continuity we have followed the same industrial grouping used in the earlier chapter. Let us begin with agro-based Industries.

#### Agro-based Industries:

The result of estimated growth rates in labour productivity, capital productivity and total factor productivity in agro-based Industries of Kerala, other south Indian States and all-India are given in the table 3.5. A perusal of table 3.5 reveals that during 1976-87 the overall trend in labour productivity growth, capital productivity growth and TFPG in the agro-based industries was similar to that of the overall manufacturing sector. That is, in terms of these three indices of productivity, the south Indian states recorded a higher growth than all-India during the three periods under consideration. It may also be noted that unlike the total manufacturing sector, the growth in the productivity indices of agro-based Industries of Kerala was not the highest.

Table 3.5

Productivity trends of Agro-based industries of South  
Indian regions and All India

	1976-81	1981-87	1976-87
Kerala			
LPG	-1.00**	10.93**	6.53*
CPG	2.43	11.00*	8.83*
TFPG	1.63*	12.55**	7.58*
Karnataka			
LPG	3.70*	19.36**	10.73**
CPG	18.73	8.79**	8.92*
TFPG	7.30*	13.45	10.66**
Andhra Pradesh			
LPG	-3.10**	8.25*	4.40*
CPG	2.81*	0.82*	1.39**
TFPG	-2.49**	6.11*	2.20*
Tamil Nadu			
LPG	-0.90**	7.71*	2.95*
CPG	8.37**	8.59**	4.18*
TFPG	-1.06**	8.64*	4.23*
All India			
LPG	0.20	6.57*	4.02*
CPG	8.31**	2.38**	2.95*
TFPG	2.23*	4.47*	3.45*

Note :

\*5% level of significance

\*\*10% level of significance

Source : calculations based on ASI data

In terms of labour productivity growth, it is observed that similar to Kerala there was a considerable increase in its growth during the second period in other regions of south-Indian and all-India. While capital productivity in the agro based industries declined in other regions and All-India, Kerala recorded a distinct pattern wherein there was a significant increase in the growth

rate in the second period. The trend in total factor productivity growth recorded a considerable increase in all the regions including Kerala.

With a view to obtaining a detailed picture of the behaviour of different individual industries, we have estimated the growth of productivity indices at two-digit levels of desegregation. The results of the exercise are given in the appendix 3.I.

In terms of labour productivity, out of six industries only three industries have shown a similar trend of the agro-based industry group during 1976-87. They are, a) manufacture of food products, b) manufacture of beverages, tobacco and tobacco products and c) manufacture of cotton textile industries. But food products industries have shown an increasing trend of labour productivity like agro-based group in general during the second period. In Karnataka all the industries in the agro based group have shown similar labour productivity. Like Kerala the same three industries have shown increasing trend of labour productivity growth in agro-based industries of Karnataka. In Andhra Pradesh except beverages and tobacco industries all other industries in the agro-based group have shown same trend of that group in all India.

Except Jute, hemp and mesta textile industries all others have shown the increasing trend of agro-based industries in Tamil Nadu during the second period. Food products industry, beverages and tobacco industries and wool, silk, synthetic fibre industries have shown increasing trend of labour productivity during the second period. In Tamil Nadu food products industries, cotton,

textiles industries, wool, silk and synthetic fibre industries have shown the same declining trend of agro-based industries in the state.

All the industries in the agro-based group of Kerala have shown similar capital productivity growth trend during the entire period of analysis. Manufacture of food products and manufacture of cotton textiles have shown the same pattern of increasing capital productivity growth during the second period. Except manufacture of wool, silk and synthetic fibre textiles, all other industries in the agro-based group of Karnataka have shown the general trend of this group during the period 1976-87. Except cotton textile industries all others have shown the same trend in the second sub-period. In Andhra Pradesh except cotton textiles industry and jute, hemp and mesta textile industries all others have shown the same trend of agro-based group. Manufacture of food products industry is the only one in the state which showed an increasing trend in the labour productivity during the second period. Only cotton textiles and jute, hemp and mesta textiles have shown the same pattern of agro-based group in the Tamil Nadu. Except food products industries and textile products industries all others have shown increasing trend of capital productivity during the second period.

As far as total factor productivity growth is concerned, all the industries in agro-based group of Kerala and Karnataka have shown an increasing growth rate as compared to all India. Food products industries and cotton textile industries of Kerala and cotton textile industries of Karnataka have shown an increasing

trend during the second period. Beverages, tobacco industries, wool, silk and synthetic fibre textile industries and other textile products industries of Andhra Pradesh have shown an over-all trend which is similar to the agro-based group of Andhra Pradesh. But only food products industries have shown an increasing trend during the second period. Only cotton textile industries and jute, hemp and mesta textile industries have shown an over-all declining trend which is similar to the agro-based group of Tamil Nadu. Beverages, tobacco industries, cotton textiles industries, wool, silk and synthetic fibre textiles industries have shown an increasing trend of total factor productivity growth during the second period.

#### Forest and animal based Industries:

A perusal of table 3.6 revealed that during 1976-87 the pattern of growth in labour productivity and total factor productivity in this industry group was similar to that of the entire manufacturing sector of Kerala. Capital productivity has shown a different pattern. Karnataka has also shown the same trend in the whole period analysis compared to overall trends in manufacturing sector. Andhra Pradesh and Tamil Nadu have followed a different pattern in the forest and animal based industries.

Except Andhra Pradesh, all regions including all India have shown an increasing trend in the labour productivity of forest and animal based industries in the second period compared to the first. Except Tamil Nadu, all regions have shown a declining trend in the capital productivity during the second period which is similar to the over-all trend of capital productivity in the manufacturing sector.

Table 3.6

Productivity trends of forest and animal based Industries of South Indian regions and All India

	1976-81	1981-87	1976-87
Kerala			
LPG	0.30*	10.39**	4.14*
CPG	-0.65	24.07**	-1.94
TFPG	-0.99**	15.22	7.85*
Karnataka			
LPG	-10.7**	9.43**	3.69*
CPG	-21.43**	20.92	-2.06*
TFPG	-9.91**	14.69*	3.51**
Andhra Pradesh			
LPG	3.5*	-1.57	2.32*
CPG	-15.47*	13.1*	1.29*
TFPG	-0.56**	5.53**	2.76*
Tamil Nadu			
LPG	1.10*	2.11**	4.77*-----
CPG	10.62*	-6.97	2.22**
TFPG	6.45*	-5.39**	-0.01
All India			
LPG	-2.60**	7.75*	1.07**
CPG	2.18*	9.83*	0.49
TFPG	-7.43**	10.03**	2.1**

Note :

\*5% level of significance

\*\*10%level of significance

Source : calculation based on ASI data

During the entire period of analysis, labour productivity growth trends of all the industries in this group of Kerala and Karnataka have followed the over-all trend of the group in their state. Except leather, leather and fur products industries all the industries in this group have shown an increasing pattern of labour productivity during the second period in Karnataka. Manufacture of wood and wood products, furniture and fixtures,

manufacture of paper and paper products, printing and publishing and allied industries have followed the same trend of forest and animal based group industries in Andhra Pradesh. Only the paper and printing industry has shown a declining trend as of forest and animal based industries during the second period. Except wood and wood products, furniture and fixtures industries no other industry has shown the declining trend of over-all labour productivity of this group in Tamil Nadu compared to all India. Along with this industry leather, leather and fur products industries has also shown an increasing trend of labour productivity during the second period.

As far as capital productivity is concerned only paper and paper products, printing and publishing and allied industries has followed the declining trend of capital productivity during the whole period in Kerala and Karnataka. Paper and printing Industries in Kerala and wood industries and paper and printing industries in Karnataka have followed the increasing overall trend during the second period of this group in these states have followed the increasing capital productivity trends during the second period in Andhra Pradesh and paper and printing industries have followed the declining tendency of capital productivity growth during the second period in Tamil Nadu.

All the industries in Kerala have followed the over-all total productivity trend of this group in Kerala. Manufacture of wood and wood products, furniture and fixtures industries has followed the increasing trend of total factor productivity growth during the whole period. Paper and printing industry in Kerala and wood



industry in Karnataka have shown the increasing trend of total factor productivity during the second period. Not a single industry in Andhra Pradesh has shown a similar over-all Total factor productivity of the state. All the industries in forest and animal based group have increased the trend of total factor productivity growth during the second period. Paper and printing industries and leather and fur products industries have followed the over-all declining trend of total factor productivity of this group in Tamil Nadu. Only the paper and printing industry has shown the declining trend of total factor productivity growth during the second period in Tamil Nadu.

#### Rubber, Petroleum, Chemical Groups

Kerala and Karnataka registered the same over-all trend of increasing labour productivity in the manufacturing sector for this group. All the south Indian states recorded the same trend which was seen in the capital productivity of manufacturing sector for the whole period.

During the two sub periods Kerala, Andhra Pradesh and all India gave the same trend which was visible in the labour productivity trends of manufacturing industries in rubber, petroleum and chemical group industries. All the regions including all India have shown the same declining trend of capital productivity during the two sub periods in these groups of industries also. Kerala, Andhra Pradesh and all India showed the same declining total factor productivity growth trends during the second period compared to the first period here also.

Table 3.7

Productivity trends of Rubber, Petroleum and Chemical Industries of South Indian regions and All India

	1976-81	1981-87	1976-87
<b>Kerala</b>			
LPG	-7.9*	-0.82	4.74*
CPG	4.16*	-8.19	5.39*
TFPG	9.99**	-3.7*	2.53*
<b>Karnataka</b>			
LPG	10.3*	6.74*	5.38*
CPG	24.33**	3.54	7.08
TFPG	19.38	3.42	10.68*
<b>Andhra Pradesh</b>			
LPG	-3.7**	-2.96**	0.66**
CPG	12.15	-10.49**	0.42
TFPG	8.64*	-5.08*	1.16**
<b>Tamil Nadu</b>			
LPG	11.10**	-0.75	2.14*
CPG	27.63**	-8.16	2.03**
TFPG	14.55	-5.02**	3.87*
<b>All India</b>			
LPG	-4.50*	4.3	2.93*
CPG	6.02*	1.63	4.6*
TFPG	6.87**	2.97*	4.74*

Note :

\*5% level of significance

\*\*10% level of significance

Source : calculations based on ASI data

Chemical and chemical products industries in Kerala has shown an over-all similar trend of this group. The same industry has also shown increasing labour productivity during the second sub-period. All the industries in this group of Karnataka has shown similar broad tendencies. Except chemical and chemical products industries all others have shown an increasing tendency in this group.

Except non-metals, mineral products all other industries in Andhra Pradesh have shown an over all similar performance. Along with this industry, chemical and chemical products industry has also shown an increasing trend of labour productivity during the second period. Only non-metallic mineral products industry has shown a similar trend of labour productivity growth in relation to all India during the over-all period in Tamil Nadu. All the industries in this group of the State have performed negatively in labour productivity growth during the second period.

Not a single industry in this group of Kerala has shown similar over-all tendency. All the industries have shown a declining trend of capital productivity growth during the second period. In Karnataka only chemical and chemical products industry have shown similar trend of this group in the state. Except rubber, plastic, petroleum and coal products all other industries in Karnataka have shown a declining trend during the second period. All the industries in Andhra Pradesh have followed similar over-all and sub-period trends among all industries in this group. Except non-metallic mineral products all others have shown the similar trend of this broad group in Tamil Nadu during the over-all period. But all industries have shown the similar declining sub period trend.

All the industries of Kerala have gave the same declining trend of this broad group at over-all and sub period level. Except rubber, plastic, petroleum and coal products in Karnataka, chemical and chemical products in Andhra Pradesh and non-metallic mineral products in Tamil Nadu all others have shown similar trends of this

broad group in their states during over-all and sub period level.

### Iron and Steel and Metal based Industries

Except Tamil Nadu all other regions followed the same trend in the labour productivity growth of manufacturing industries. Compared to All India, Karnataka, Andhra Pradesh and Tamil Nadu followed the same trend of capital productivity growth of manufacturing industries during the whole period, here also. Karnataka and Andhra Pradesh have shown the same trend of capital productivity of manufacturing industries during the whole period, in this group also.

During the second period labour productivity growth has shown an increasing tendency in manufacturing industries as a whole and the same trend holds good in the iron, steel and metal based industries also. Except Andhra Pradesh all other industries have shown the same trend of declining capital productivity growth of manufacturing industries, here also. Kerala, Andhra Pradesh and all India gave the same trend which they showed in the two periods of total factor productivity growth of manufacturing industries here also.

Table 3.8

Productivity trends of iron and steel and metal based industries of South Indian regions and All India

	1976-81	1981-87	1976-87
Kerala			
LPG	-3.7*	0.29**	-3.67 **
CPG	5.47*	-20.01	-8.97
TFPG	7.14**	-9.57*	-1.97*
Karnataka			
LPG	-5.6*	1.32**	-6.61**
CPG	20.56*	5.91	4.58*
TFPG	3.42*	2.1*	3.02*
Andhra Pradesh			
LPG	-16.62**	-6.79	-2.66*
CPG	-16.62*	-7.32**	-1.72**
TFPG	2.92**	-12.06**	-5.25
Tamil Nadu			
LPG	3.2*	3.0**	0.07
CPG	7.73*	5.49	0.55**
TFPG	-6.42	7.78*	1.33**
All India			
LPG	-1.90*	4.0*	-0.65
CPG	6.81*	4.33*	1.79*
TFPG	-3.98*	5.07*	0.96

Note :

\*5% level of significance

\*\*10% level of significance

Source : calculation based on AST data

Basic metals and alloys industries have shown the same declining tendency of this group during the over-all period. Manufacture of metal products and parts except machinery and transport equipment have shown an increasing labour productivity growth trend which is similar to the broad-trend of this group in Kerala. All the industries in Karnataka have shown a declining tendency at over-all level and increasing tendency of labour

productivity growth during the sub-period level. Except basic metals and alloys all other industries in Andhra Pradesh have shown similar trend of this group in the state. During the second period all the industries have shown an increasing trend in the state. Not a single industry in Tamil Nadu has shown a similar trend of labour productivity growth during the whole period. Manufacture of metal products used parts except machinery and transport equipment has shown a declining trend in the labour productivity growth during the second period.

Except the manufacture of metal products and parts, and machinery and transport equipment, all others have shown similar broad based trend during the whole period in Kerala and Karnataka. All the industries of Andhra Pradesh and Tamil Nadu have an over-all declining trend of capital productivity growth during the whole period. Kerala and Karnataka have shown an increasing capital productivity growth trend during the second period in the manufacture of metal products and parts except machinery and transport equipment industries and Tamil Nadu and Andhra Pradesh have shown a declining trend of capital productivity growth during the second period in basic metals and alloys industries.

As far as total factor productivity growth is concerned, all the industries in Kerala and Andhra Pradesh have shown similar declining trend during the whole period. But not a single industry in Karnataka and Tamil Nadu has shown the same broad tendency during the over-all period. Except Tamil Nadu, in all other regions total factor productivity growth of basic metals and alloys industries has declined during the second sub period. Except Tamil

Nadu and Andhra Pradesh, total factor productivity growth trend of the manufacture of metal products and parts except machinery and transport equipment has shown an increasing trend during the second sub-period.

### Manufacture of Machinery and Transport Equipment

Kerala is the only region which has shown the same over-all trend of labour, capital and total factor productivity growth compared to all India, in this group also.

Karnataka, Tamil Nadu and all India followed the same trend of labour productivity growth during the two periods of manufacturing industries here also. Except Tamil Nadu, all other regions have the same trend of capital productivity growth of manufacturing industries in this group. Except Tamil Nadu and all India all other regions followed the same trend of manufacturing industries, in the manufacture of machinery and transport equipment industries.

Except manufacture of electrical machinery industry, all other industries have shown the same trend of labour productivity growth in Kerala. Except the manufacture of machinery, machine tools and parts all others have shown the same trend of labour productivity growth during the entire period in Karnataka.

Table 3.9

Productivity trends of manufacture of machinery and transport equipments of South Indian regions and All India

	1976-81	1981-87	1976-87
Kerala			
LPG	11.50**	8.14**	7.69
CPG	26.84*	24.25*	21.89*
TFPG	15.6*	10.54**	18.29*
Karnataka			
LPG	-1.00	5.0	3.85*
CPG	2.08**	-2.04	2.51*
TFPG	2.68*	3.41**	2.82*
Andhra Pradesh			
LPG	3.3*	-6.39	3.27*
CPG	17.38**	-8.06	8.18*
TFPG	2.12*	-6.41*	6.15*
Tamil Nadu			
LPG	-8.2**	3.57*	1.58**
CPG	1.49*	3.42	1.57*
TFPG	1.78**	2.41	2.12*
All India			
LPG	-1.80*	2.75*	4.59*
CPG	5.11*	2.59	6.31*
TFPG	7.12	1.89	4.28**

Note :

\*5% level of significance

\*\*10% level of significance

Source : calculation based on ASI data

Manufacture of transport equipment and parts and other manufacturing industries have also shown the same over-all trend of labour productivity growth in Andhra Pradesh. Except other manufacturing industries all other industries have shown similar trend of labour productivity growth in Tamil Nadu. Except manufacture of machinery, machine tools and parts and except electrical machinery all other industries have shown a declining



trend of labour productivity growth during the second sub-period. Except other manufacturing industries, all others have shown an increasing tendency during the second sub-period in Karnataka and a declining tendency during the second sub-period in Andhra Pradesh. All the industries have shown an increasing tendency during the second sub-period in Tamil Nadu which is similar to labour productivity growth trend of this group in Tamil Nadu.

Except machinery and machine tools industries in Kerala, manufacture of transport equipment and parts in Karnataka and other manufacturing industries in Tamil Nadu, all other industries have shown a trend which is similar to the over-all capital productivity growth trends of this group in these states. Capital productivity growth trends and total factor productivity growth trends are similar to labour productivity-growth trends in this group. This is a unique unison of labour, capital and total factor productivity growth trends during the over-all period.

Except machinery and machine tools industries, all other industries in Kerala have followed the broad declining trend during the second sub period. Along with this industry, manufacture of transport equipment and parts have shown the similar broad pattern of this group in Karnataka during the second period. Except other manufacturing industries in Andhra Pradesh and manufacture of transport equipment and parts in Tamil Nadu all others have shown the similar trend of this group in these two states. Except electrical machinery apparatus all other industries have shown the same trend of declining capital productivity during the second sub period. Except manufacture of transport equipments and parts, all

other industries has shown the same trend of declining capital productivity growth in Karnataka during the second subperiod. Only this industry has shown the declining trend of capital productivity growth during the second sub-period in Andhra Pradesh. None of the industries have shown an increasing trend in this group. Only the electrical machinery industries have shown the same trend of this group during the second subperiod in Kerala. Similarly manufacture of transport equipments and parts in Karnataka and other manufacturing industries in Tamil Nadu have also shown the increasing trend of this group during the second sub-period. Manufacture of transport equipments and parts and other manufacturing industries have shown the same trend of declining total factor productivity growth trends during the second sub period.

#### Concluding Observations

Our attempt so far has been to highlight the trends in partial productivity growth and total factor productivity growth in the manufacturing sector of Kerala vis-a-vis other south Indian states in the context of productivity trends at the all India level. The analysis has revealed the following; (a) During the entire period of analysis, Kerala recorded a higher growth rate in terms of all indices of productivity as compared to south Indian states and all India; (b) labour productivity growth in Kerala vis-a-vis other south Indian states showed an improvement during the second period as compared to the first period. This was found to hold good at the all-India level as well. (c) Capital productivity growth on the other hand registered a decline in the growth rate during the

second period in Kerala, other south Indian states and all-India.

(d) While the trend in partial productivity growth remained the same across different regions during the period of analysis, total factor productivity growth showed a different pattern. To be more specific, while total factor productivity growth recorded a decline in Kerala as well as other south Indian states, (except Karnataka), it has increased at the all-India level and Karnataka. On the whole, notwithstanding certain similarities in terms of the growth in partial productivity indices, there was a distinct difference in factor use efficiency and technological dynamism as shown by TFPG in Kerala and other south Indian states vis-a-vis all-India. Our analysis of the trend in partial and total factor productivity by broad industry groups and at two digit level of aggregation also confirmed the above finding. On the whole, it is evident from the analysis made so far that the pattern of growth that was observed in terms of value added growth is almost the same as that of productivity. Viewed thus, the productivity growth is nothing but a mirror image of value added growth. Having analysed the growth performance, let us now proceed to examine the industrial structure of these regions and analyse whether there is any relationship between the observed growth performance and the industrial structure of the regions. This exercise is carried out in the next chapter.

## Notes and References

- 1 Verdoon (1949), Kaldor (1967)
- 2 Drucker, Peter F. "Toward the Next Economics" in the crisis in Economic Theory, ED by Bell Daniel and Kristol Irving Published by Basic books, Newyork (1981).
- 3 In the 400 year history of Economic doctrines beginning with cameralists and mercantilists in the first half of the 17th century, Economics has gone through four 'Scientific revolutions'-
  - (i) Cameralists and mercantilists
  - (ii) Physiocrats
  - (iii) Classical including neo-classical and marxian and
  - (iv) Keynesian including post-Keynesian Economics.
- 4 Drucker, Peter F. (1981).
- 5 Denison (1967, 1974), Griliches and Jorgenson (1967), Christensen and Jorgenson (1973), Ezaki and Jorgenson and Nishimiteo (1981).
- 6 The average productivity ratio is output/unit of input. The reciprocal of this gives input requirement per unit of output. The marginal productivity pre-supposes the existence of well-defined production function. If the specified production function is homogeneous, the marginal productivity ratio is expressed as a constant production of average proportion ratio.
- 7 The problem of measurement of output and input are discussed in detail in earlier chapters.
- 8 Kendrick (1956)
- 9 Stigler (1961)
- 10 Robinson (1955) Kaldor (1962)
- 11 Henry (1950)
- 12 While total factor productivity is a static concept which explains the level of productivity, growth is dynamic in nature and measures changes in productivity overtime.
- 13 The concept of total factor productivity was first introduced by Timbergen (1942) when he attempted an international comparison of productivity growth. Stigler (1947) developed the concept independently and suggested that measure of real total factor input could be obtained weighting inputs by their marginal products. Griliches (1960) and Denison (1962). Extended the Principle of weighting inputs by their marginal products to components of labour input. Griliches and Jorgenson (1966, 1967) applied the same principle to components of capital.

- 14 Sudit and Finger (1981)
- 15 Abramovitz (1956)
- 16 Domar (1962)
- 17 Jorgenson and Griliches (1964)
- 18 C.Radhakrishnan (1989)
- 19 Solow (1957) has conceptualized the shifts in production function or technical change as total factor productivity growth.
- 20 It is useful to make a distinction between the two concepts. Technical change implies advancement in knowledge relating to the art of production which may result in productivity improvement. But improvement in productivity can also result from other factors as well, such as, improvements in quality of inputs, better capacity utilisation, economics of scale etc. in addition to technical change. Thus total factor productivity growth is a much more broader concept than technical change. Goldar (1987).
- 21 Krishna (1975)
- 22 "Report of the Taskforce for review of implementation of plan schemes under Industries sector"- State planning Board, Thiruvananthapuram, 1991.
- 23 C. Radhakrishnan (1991)

## Appendix 3.I

## Trends in labour productivity growth of 2-digit manufacturing industries in south India

Industrial Classification	Kerala			Karnataka			Andhra Pradesh			Tamil Nadu			All-India		
	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87
20-21	8.49 *	-15.98 **	-16.80	9.48 *	14.38	-2.68	7.72 *	12.26	-0.69	6.54 *	8.70 **	-8.47	7.67 *	10.02 *	-15.17
22	8.21 *	15.07	19.55 *	6.29 *	18.35 *	-4.90	1.82	6.79 *	-14.12 **	9.70 *	9.06 *	-9.16	2.99 **	4.95	-5.66 *
23	3.00 **	6.83 **	12.88 *	15.31 *	26.18 *	10.13 **	6.64 *	8.00	17.80 *	1.17	7.19	2.53 *	2.78 *	5.26	6.69 *
24	-1.59	-7.99	4.68	2.48 **	6.04 **	13.22	2.64	-0.46	-5.68	0.87	8.85	2.80	2.04 *	7.15 **	2.29 **
25	0.00	0.00	0.00	0.00	0.00	0.00	3.02 *	2.59 **	8.05	1.95	-5.82	-2.88	1.17	3.64	5.60
26	-0.28	-4.61	2.20	2.59 *	4.46 **	-4.00	2.09	-7.68	15.63	2.65 *	6.20 *	-3.31 **	1.25 **	-0.97	-4.17
27	1.65 *	-4.28	-4.92	6.69 *	14.95 *	1.01 **	7.26 *	13.38 *	-16.72 *	0.03	3.62	-0.90	1.42	6.31 *	-4.54 **
28	3.75 **	18.91	2.23 *	2.36 *	8.71 *	-15.04	2.04 *	-2.52 *	6.21 *	4.55 *	1.15	9.32	0.93	8.53 *	-1.59
29	0.00	0.00	0.00	10.60 **	3.58	16.81	-2.97	7.75 **	-22.02	3.52	3.37	-13.30	1.60	4.29 *	-7.18
30	3.80 *	1.77 *	3.92	8.07 *	9.52	5.17	-4.48 *	-22.96 **	15.72 *	6.53 **	6.51 **	-16.19	4.39	15.65 *	-11.66
31	4.55	-0.50 **	-26.92 *	6.44 *	8.02 **	13.21 **	-1.15	1.08 *	-12.78	3.88 *	-3.47 *	10.80 **	2.35 **	-5.09	-2.60
32	-2.12 **	-2.64	3.71	3.60 *	6.22	4.40	5.12 **	4.80 *	-11.94 *	-2.40	-1.64 *	34.78 **	2.55 *	0.19	-3.69 **
33	-8.36 *	-9.83	-3.85 *	-11.16 *	-3.42	-7.42	-3.49 *	-10.45	-15.36	-2.27	4.52 *	-0.08	-1.98	-5.26	-3.33
34	5.90 **	14.87	7.88	2.97 *	4.64 **	2.76	1.23	3.97 **	-18.64 *	3.82 *	-0.13 **	9.34 *	3.17 **	19.39	1.99
35	11.41 *	13.18 **	1.52	5.02 *	7.10	6.50	4.18	-9.35 *	9.02	2.30	6.13 **	-10.00	4.07 **	-1.51	-1.29 *
36	-0.92	-1.51	11.60	3.57 **	4.68 **	-5.15	5.66 **	-4.47	0.82	3.93 *	4.96	2.14	5.42 *	4.68 **	1.54 **
37	4.48 *	7.04	8.65 **	1.45 **	0.90	-2.05 **	-8.14 *	-5.55	1.03 *	-0.99	-1.72 *	-10.37 *	2.90 *	3.33 *	-5.99 *
38	18.15 *	16.73 *	20.69 *	5.46 *	-1.04	4.09	5.13	20.48 *	-8.88	11.61 *	21.35 **	-4.71	9.51 *	7.86	0.96

Note : \* 5 % significance, \*\* 10 % significance

Source : Calculation based on ASI data

\* For de-coding industrial classification used in the present study see National Industrial classification as reported in the annual survey of industry volumes and reproduced in Annexure to this study.

Appendix 3.II

Trends in capital productivity growth of 2-digit manufacturing industries in south India

Indu- stri- es	Kerala			Karnataka			Andhra Pradesh			Tamil Nadu			All-India		
	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87
20+21	9.70 *	2.90	2.35 *	10.76 *	4.98	10.50	5.63 **	7.11	2.6	13.45 *	7.89 **	8.01	8.30 *	3.57	-4.50
22	10.21 *	0.41	21.73 **	5.83	-2.39 **	23.78 **	0.44	-4.86	-4.5	4.90	1.90	-14.01 **	1.26	-10.78	7.31
23	7.53 *	18.8 *	5.80 **	14.76 *	26.60	25.41 *	4.5	7.52	26.28 *	-0.28	10.22	3.55	2.27 *	5.45	13.65 **
24	3.39	-7.90	8.49	-24.94 *	-10.22	13.32	-16 **	-56.59 **	15.39	4.47 **	5.46 *	3.21 *	-1.31	6.58 **	5.69 *
25	0.00	0.00	0.00	0.00	0.00	0.00	6.79 **	-1.79	24.19 **	-0.02	-2.76	-28.25 **	3.66 *	2.70	16.35
26	8.10 *	-0.36	9.36 **	2.93	-13.9 *	16.11 **	-9.59 *	-30.5 **	13.64 *	6.64 *	1.31	7.98 **	-0.27	-10.35	-0.03
27	3.53 *	-2.52 *	5.75	15.17 *	27.93 *	10.73	6.72	36.53 *	-30.38 **	8.43	29.74	13.65	3.47	5.01 **	4.88 **
28	-2.6	32.88	2.90	-3.57	20.08 *	-24.76 **	1.47	12.68 **	-13.04	2.21 *	-11.86	19.81	-0.14	10.79	2.74
29	0.00	0.00	0.00	6.17 *	-14.56 **	27.62 **	6.96	4.53 *	-51.06 *	5.22 *	6.47 *	-8.08 **	5.67 **	8.67 *	-4.07
30	-4.10	-1.95	5.50	1.90	-8.37	-12.86	-21.17 **	-26.75 **	-2.6	-1.29	2.22	11.63	5.46 **	8.57	18.55
31	14.30 *	-9.48	-5.20 **	17.29 *	-3.95	39.75 *	22.05 *	37.38	5.89	6.43 **	-12.44 *	25.47 *	7.29 *	5.52	4.46 **
32	-5.80	-29.87 *	15.03	-2.62	2.33	13.75	-9.53 *	-23.44	1.97	-1.56	-10.70 *	46.13 *	-5.49 *	-17.01	5.01
33	-14.55 *	-36.71 *	9.28	2.58 *	2.12 *	21.31 *	-0.48	-4.75	-14.37 **	-0.06	6.44	3.00	1.15	2.92 *	6.05 *
34	10.72 *	30.76 **	-3.48	1.11	7.04	6.86	-9.29 *	-20.77	-12.69	0.36 **	-1.88 **	23.25 *	4.23 *	6.14	10.72
35	18.73 *	14.03	31.04 *	2.27	-1.11 *	20.70 *	14.84 *	1.18	21.3 **	3.71 *	5.33	5.91	6.61 *	6.08 **	13.50 *
36	3.05 **	3.51	17.16	1.33	-10.76	-2.78 **	13.19 *	-1.92	17.78	1.04	0.45 **	14.63 **	6.87 *	-2.53	15.17 *
37	27.65 *	28.36 *	24.91 *	5.00	-4.96	-3.20 **	-8.5 *	-16.15 *	11.46	-1.32	1.72 **	-8.90 **	4.31 **	4.72	-8.64
38	27.01 *	11.93	45.66	6.50 *	5.05 *	-3.53	0.19	-16.85 **	26.27	9.01 *	-8.00	38.47 **	8.72 *	1.32	9.41

Note : \* 5 % significance, \*\* 10 % significance

Source : Calculation based on ASI data

## Appendix 3.III

## Trends in total factor productivity growth of 2-digit manufacturing industries in south India

Indu stri es	Kerala			Karnataka			Andhra Pradesh			Tamil Nadu			All-India		
	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87	76-87	76-81	81-87
20+21	6.49 *	8.82 *	3.69 *	8.53 *	10.49 *	6.17 *	6.49 **	11.68	0.26 *	9.85 *	10.54 *	9.03 *	5.70 *	7.90 *	3.20 *
22	9.51 *	11.49 *	7.14 *	3.49 *	-2.97 **	11.24	-3.19 **	2.26 **	-9.74 *	2.52 *	2.69 *	2.31 *	0.70	-2.93	1.98 **
23	4.99 *	6.54 *	3.14 *	18.94	27.26	8.96 **	9.39 *	10.03 *	8.62 **	1.81 *	8.42 *	-6.12 *	4.13 *	3.74 **	4.61 *
24	1.07 *	-4.02 **	7.18 *	2.08 **	5.76	-2.35	-11.01 *	-30.30	12.13 **	8.13 *	7.18 *	9.27 *	0.08 *	6.72 **	-7.89 *
25							7.97 *	2.31 **	8.16 *	0.31 **	-8.22	10.53 *	2.18 **	0.54	4.15 *
26	5.19 *	1.02 *	10.18 **	2.02	-2.42	7.35 *	-5.74 *	-9.30 *	-1.46 **	3.74 *	3.92 *	3.53 *	-1.51	-5.48 *	3.26
27	4.10 *	1.74 **	6.92 *	12.67 **	17.39	7.01	7.50 **	24.79	-13.25 *	3.41 *	6.97 *	-0.86 **	2.50 *	3.61	1.18 **
28	9.54 *	19.68	-2.63	1.63 **	13.95	-13.16	2.63 *	3.98 **	1.08 **	1.26 *	-10.18 *	14.98 **	1.95 *	10.53 **	-8.34
29				1.78 **	0.07	3.82	8.84 *	13.58	-35.75	0.62 *	6.44 **	-6.36 **	2.83 *	9.46 **	-5.12
30	2.16 *	-0.95 *	5.89 *	4.95 *	5.54	4.23 *	-13.27 *	-39.62	18.35 **	1.41 **	4.37 *	-2.14 *	6.19 *	8.77 *	3.09 *
31	2.20 *	-1.54 **	6.67 *	17.60	5.16 *	32.53	15.55 *	25.94	3.08 **	4.89 **	-7.63	19.93	6.22 *	2.28 *	10.95 *
32	-2.12 *	-9.67 *	6.95	4.46	16.60 **	7.82 **	-5.25	-5.76	-4.63	4.90 *	-7.80	20.14	-1.21 *	-12.70	12.58 **
33	-5.79	-21.39 **	12.93	-2.40	-5.10	0.84	-2.40 *	-10.13 *	6.87	-0.54	8.13	-10.95	-0.16	-3.45	3.78
34	10.34	18.99	-0.04 *	8.77 *	9.51	7.88 **	-11.20 **	-16.46	-4.89 *	3.34 *	-0.95 *	8.50 *	3.61 **	18.33	-14.07
35	13.60 *	15.88 **	10.87 **	2.33 *	2.70	1.90 **	8.80	-3.87	24.00	4.23 *	4.11 *	4.37 *	5.06	-0.23 **	11.41
36	0.11	-5.08 **	6.35 *	2.52 **	-5.23 *	11.96	9.69	-6.34 **	28.85	1.89 *	-0.19 *	4.37 **	6.00 **	-0.27	13.52 *
37	12.05 **	3.53 **	22.27 **	2.46	0.44 **	4.89	-2.57 **	0.54	-6.30	-1.19	-0.05	-2.56 **	1.38 **	3.56 *	-1.23
38	37.55 **	33.90 **	35.95 **	1.32 **	6.13	-4.44	-0.47	0.77	-1.87	8.94 *	-6.27 **	27.19	5.95 *	1.72	11.03 **

Note : \* 5 % significance, \*\* 10 % significance

Source : Calculation based on ASI data



## Chapter 4

### CHANGES IN INDUSTRIAL STRUCTURE

#### Introduction

In this chapter we analyze the changes that have occurred in the industrial structure of Kerala and other southern states over the study period. The term, "industrial structure", indeed, has different dimensions; in the context of the present analysis what is meant is the regional industrial structure. The relevance of analyzing the structure in the present study needs no emphasis. For, structural change is associated with economic growth in the context of a modern economy. Clearly, the patterns of industrial growth and productivity observed in Kerala vis-a-vis other southern States should be seen in conjunction with the pattern of structural changes that have taken place in the respective regions during the study period.

Broadly, structural change may be defined as "a change in the relative weights of significant components of the aggregative indicators of the economy, such as national product and expenditure, exports and imports, and population and the labour force"<sup>1</sup>. Structural shifts take place as the economy passes through various stages of economic growth, from the traditional society to the stage of high mass consumption. In a traditional society, there exists a limited production function, and as the transformation takes place, new industries come up, new technology spreads and newer production possibilities open up. As the the economy moves towards maturity with older industries

levelling off', there will be a shift from coal, iron and heavy engineering to machine tools, chemicals, electrical and so on<sup>2</sup>.

The internal structure of manufacturing undergoes changes along with the structural changes marked by the rise in the share of the secondary sector and in particular, that of manufacturing<sup>3</sup>. Food, clothing and wood products give way to chemicals, metal products and modern manufacturing which provide the necessary momentum to the growth of the secondary sector. Empirical studies of the developed capitalist countries have shown a historically definite pattern of the diversification of production structure from primary processing to the manufacturing of consumer durable and then to the manufacturing of capital goods or from light industries to heavy industrialization.

The difference, seen in the internal structure of the secondary sector and in particular, manufacturing sector is a reflection of the difference in certain important aspects with regard to the process of industrialization. Also regions within a country tend to specialize in specific industries based on local raw materials, skills and other region-specific factors, which in turn give a specific character to the growth process and to the structural change in individual state regions. It is the regional industrial structure in the above sense that the present study is dealing with.

Obviously, the measurement of changes in the regional industrial structure is instructive in itself. But it is a difficult task. Indeed, there are the economic-base study

concepts and techniques like location quotients and specialization coefficients, which will give a qualitative idea of the regional industrial structure<sup>4</sup>. A change in these coefficients will also give an indication of the extent of the structural change<sup>5</sup>. Being summary measures, however, these coefficients tend to overlook the complexities involved in the process of structural change. Hence, for a better understanding of the process of structural change, it may be also advisable to analyze movements in the shares of different industries in the manufacturing output of the given regions.

In the present study we first analyze changes in the share of different industrial branches in the total industrial income over time in Kerala and other south Indian states. This will provide a detailed picture of the changes that have taken place in the industrial mix of the regions during the study period. We have supplemented this with an analysis of changes in location quotients and specialization coefficients. Finally, we make an attempt to enquire if there is any correlation between growth performance and structural change and also make an assessment of the relative importance of structural regional factors on the growth performance by using the technique of shift share analysis. These exercises, we hope, will give a better understanding of the regional industrial structure and the changes that have occurred therein, and the relation of these with the broad patterns of growth and productivity during the study period.

### Data source and period of study

For the purpose of analyzing structural change in the industrial sector we have taken into account only the value-added figures of the industries under consideration. It is possible to do the same analysis by considering other variables like employment, output, capital, investment, etc. As studies<sup>6</sup> have shown that correlations between these variables are positive and significant, the result may not be significantly different if we use any of the above variables. The choice of value-added in the present study is further guided by the consideration of data availability and analytical convenience.

The structural change could be analyzed in a time series framework or in a comparative static framework by tracing changes across some points in time. Given the fact, however, that structural change need not necessarily take place in the short run, we have considered the comparative pictures of the structure as on two years - 1976 and 1987 - and focussed on the major changes observed in the structure as between these points.

The major source of data is the Annual Survey of Industries (ASI) published by the Central Statistical Organization. The details and limitations of these data have been explained at length in earlier chapter. The caution needed while drawing conclusions from the study naturally would need no emphasis.

### An analysis of changes in the industrial-mix 1976-87

As already explained, the industrial structure of any economy changes with the changes in the level of economic development and an almost uniform pattern of structural change has been observed in the process of industrialization<sup>7</sup>. It has been argued that in the earlier stages of industrial development, traditional industries claim a relatively higher share of total employment, output or capital. Later, these industries tend to give way to the non-traditional sectors such as capital goods and intermediate goods as the process of industrial development accelerates. In order to chart out the directions of such changes in the mix of different industries in the total industrial output/income (which is what is meant by changes in the industrial structure) we have in the study worked out the percentage shares of different industrial branches at 3-digit level classification in the total value-added (income) generated by the manufacturing sector at all-India and other south Indian states.

Although the study relates to the period 1976-1987, a brief review of the structural characteristics prior to that period may provide a useful perspective. The table given below shows the product structure of southern States in 1960.

Table 4.1

Industrial Structure of southern States in 1960: Percentage share of product-groups in Gross output.

(%)

State Product Groups	Andra Pradesh	Karnataka	Kerala	Tamil Nadu	All-India
Food Products	30	18	31	12	20
Sugar	9	6	-	3	5
Tea	-	-	12	3	4
Beverages	-	-	-	-	-
Tobacco	28	9	-	1	3
Products					
Cotton	8	21	8	43	20
Textiles					
Wool, Silk	-	2	-	-	1
Etc.					
Jute	4	-	-	-	5
Textiles					
Textile	-	-	12	-	1
Products					
Wood	-	-	3	-	1
Products					
Paper	-	-	2	3	4
Products					
Leather	-	-	-	4	1
Products					
Rubber	-	-	3	1	2
Products					
Products					
of Petro					
Chemicals	1	4	19	6	8
Minerals	6	3	4	2	4
Cement	5	-	-	-	2
Metals &	-	7	-	4	9
alloy					
Ferrous	-	7	-	2	8
Metal	-	-	1	2	2
Products					
Non					
Electrical	1	6	1	3	3
Mechineries					
Electrical	1	10	5	2	3
Machineries					
Transport	5	5	1	11	8
Equipment					
Others	17	13	12	7	4
All					
Industries	100	100	100	100	100

Source: T. Roy (1984).

In 1960, food products and cotton textiles together constituted 40 percent in gross output of India. Food products and tobacco products contributed 58 percent of gross output of Andhra Pradesh. The same two products contributed 39 percent of Karnataka's gross output. Food products and chemicals consisted 50 percent of Kerala's gross output. Cotton textiles alone constituted 43 percent of Tamil Nadu's gross output.

In 1960, Karnataka and Tamil Nadu had favourable industrial structures as far as the relative importance of high growth industries were concerned. In both states machinery explained a higher proportion of output than in the case of All-India. The relative importance of food products was below the national level and that of cotton textiles above it. In Tamil Nadu, shares of cotton textiles was far above the national level of 20 percent.

The Andhra Pradesh had relatively less diversified structure. Here the shares of chemicals and machinery were substantially below the national level. The proportion accounted by food products, tobacco products and cotton textiles together was much above the national proportion.

The table shows a different industrial structure of Kerala. Textile products shows a greater importance. Food products also had an above the national proportion. Similarly chemicals also had a greater importance. Coir products and cash crops gave strong contribution to the earlier broader groups. In that sense Kerala had a peculiar structure.

We now move on to trace the changes in the industrial structure between 1976 and 1986 by working out the percentage distribution of different industries in total values added by manufacture in different south Indian states and all India. The results are reported in appendix table 4.I to 4.V For the detailed analysis, however, we have considered only those industries, which accounted for more than the average share in the aggregate manufacturing output. These industries are then sub-grouped into:

- 1 agro-based industries
- 2 forest and animal based industries
- 3 rubber, petroleum, chemicals group industries
- 4 iron and steel and metal based industries
- 5 manufacture of machinery and transport equipment.

The result of the above exercise for all-india and the southern states are given in the table 4.2. In this table only those industries with more than the average share in the total output are presented, and are called the 'dominant' groups in the region's industrial mix.

At all-India level, the dominant industries constituted around fifty percent of total value-added by the manufacturing industries in 1976. The major share (25%) of this was accounted by the subgroup agro based industries. By 1987, there was a marked change in the industrial mix at the all-india level. The noteworthy feature was the decline in the share of the dominant



industries by nearly ten percentage points and more significantly by the decline of agro-based industries.

Table 4.2  
Dominant shares in the manufacturing sector (%)

Groups -->	1	2	3	4	5	Total
Kerala (1976)	26.37	2.07	31.53	5.88	8.42	74.27
(1987)	21.97	8.72	41.79	5.18	12.23	89.89
Karnataka (1976)	14.09	5.63	4.79	13.02	31.55	69.08
(1987)	9.76	5.14	6.9	-	40.06	61.86
Andhra (1976)	33	2.94	12.63	2.38	19.89	68.25
Pradesh (1987)	18.74	6.03	22.71	2.29	29.31	79.08
TamilNadu (1976)	18.31	5.28	6.32	2.62	25.4	57.93
(1987)	23.25	5.63	6.15	-	13.58	48.61
All-India (1976)	24.78	-	8.35	8.92	7.61	49.66
(1987)	13.3	-	14.43	4.35	8.61	40.09

Note:

- 1 Agro based industries
- 2 Forest and animal based industries
- 3 Rubber, Petroleum, chemical based industries
- 4 Metal based industries
- 5 Manufacture of machinery and transport

The details of change at the disaggregated level are traced in appendix table 4.V. It is interesting to observe that fall in aggregate share of agro-based group is mainly accounted by the decline of the such traditional industries as tea processing, jute and mesta spinning, and cotton spinning. The inference that can be drawn at the all-india level, is perhaps the emergence and spread of industrial growth across various industrial branches by a process of diversification of the industrial structure. How far the changes in the industrial mix occurred during the study period in the southern states are in conformity with the all-india

pattern? Is there any significant difference in pattern among the southern states? And in particular, how does the changes that occurred in Kerala compares with the pattern in other southern states and at all-india level. These are the important questions which we deal with in the discussion that follows.

In Kerala the dominant industries, as seen in table 4.2, account for almost 75 per cent of the total manufacturing output in 1976. The distribution across different industrial sub groups, however, is not uniform with more than 50 percent share of income being concentrated in two sub-groups viz., (1). agro-based industries (26%) and (2) rubber, petroleum and chemical group industries(32%). Did the picture change after 10 years in 1987? It is seen that the dominant industries have increased in number and together constituted about 90 per cent of the total industrial income. More significantly, the shares of agro-based and rubber & chemical based industries together continue to enjoy the bulk of it. In fact, the share of chemical industries has increased ten fold and the shares of other industrial sub-groups either declined or remained more or less same in the degree of importance. Particular mention may be made of the low and more or less stagnant shares of sub-groups IV and V (which can be called in general as the engineering groups of industries) in the industrial output in Kerala. The overall picture emerging from the analysis is an industrial mix marked by concentration of traditional and resource-based processing industries continuing in Kerala.

To get a more descriptive account about Kerala a closer look at the appendix table 4.I is instructive. As stated earlier, the shares of agro-based and chemical-based industries put together has recorded considerable increase over the period. The increase, is primarily accounted by the chemical sub group and in particularly rubber products : The share of rubber products in 1976 was 7.9 percentage but it increased to 14.35 percentage in 1987. The other significant change has the increased importance of drugs and medicines, manufacture of basic and industrial, organic and inorganic chemicals and gases, manufacture of inedible oils, manufacture of glass and glass products and manufacture of cement, lime and plaster. In the agro-based sub-group the trend was one of decline importance of the traditional branches: the share of tea processing has come down from 8.77 percent to 4.51 percent and the share of cashew processing industry has also fallen down from 10.44 percentage to 3.51 percentage between 1976 and 1986. The declining importance of these traditional industries is noteworthy though these still account for a substantial share in the total manufacturing output in Kerala.

What is disturbing is that the share of engineering industries represented by sub groups 4 and 5 and in the total output continued to remain marginal. In group 4 there is only one industrial branch at 3-digit level (aluminum manufacturing) which occupied above average share (dominant) both in 1976 and 1986 and its share has remained more or less the same over time. In the sub-group 5, three branches at

3-digit classification (manufacture of machine tools and parts, ship building and repairing, manufacture of electrical industrial machinery and parts) enjoyed more than average share in 1976 and out of these the importance of shipbuilding and repairing declined, the shares of other two remained more or less the same and only two more branches viz. manufacture of insulated wires and cables, and manufacture of electronic components joined the sub-group by 1987. In fact, the notable feature was only that machine-tool industry has shown an increase in share from 2.41 percentage in 1976 to 3.21 percentage in 1987. As we move from 1976 to 1987 it was observed that the changes have not been powerful enough to make any significant change in the overall structure of the manufacturing sector in Kerala. The region's industrial mix continued to remain concentrated and dominated by agro-based, forest based and chemical based industries. The above findings tend to substantiate the argument that the overall industrial base of the State is still characterized by concentration rather than diversification<sup>8</sup>.

Having examined the basic structure of manufacturing sector in Kerala and the changes there in, let us now examine the structural changes that took place in other south Indian States during the study period. The primary objective here is to discern the broad similarities and dissimilarities that lie between Kerala and other south Indian states in the process of structural transformation.

In Tamilnadu dominant industries (industries with more than average share in manufacturing output) accounted for around 58% of the manufacturing output in 1976 (see table 4.2). The major sub-groups in the structure were agro-based (18.%) and manufacture of machinery and transport equipments (25%). The other three sub-groups put together accounted for only 14 percentage points in 1976. Clearly by 1976 the industrial mix in Tamil Nadu was much less concentrated than that of Kerala. The tendency towards structural diversification continued to remain operative in Tamil Nadu with the result that the share of dominant industries declined by 10 percentage points in 1987 to reach 48 percent 48 % as compared to 58 in 1976. However, the degree of diversification was below the all-India average. The process in Tamil Nadu, stands in contrast with the increasing concentration in Kerala. The diversification in Tamil Nadu has been tended to be marked by the growth of agro-processing industries and a relative decline in the share of engineering industries represented by sub-groups 4 and 5.

To get a disaggregated picture of Tamilnadu the appendix table 4.II show that there was a marked increase in the cotton spinning industries. Other industries which gain importance in the sub group were sugar industry, manufacture of bakery products and manufacture of all types of textile garments including wearing apparel. The notable decline has occurred in industries like tea processing, manufacture of chewing tobacco, printing, dyeing and canning and preservation of fruits and vegetables. As stated earlier, the

shares of agrobased industries has recorded considerable increase over the period.

In the engineering group industries, manufacture of boilers and steam generating plants, manufacture of railway wagons, coaches and parts, manufacture of motor vehicles and parts together accounted for a share of 22.8 percentage in 1976. However, these three have significantly declined in their shares to 13.51 percentage in 1987. It is obvious that these changes have significantly contributed to the decline of the aggregate share of engineering industries in the State. Industries in the other groups have played a passive role in the transformation of industrial structure in Tamil Nadu. Nevertheless, as compared to Kerala the striking feature of Tamil Nadu is the relative importance of engineering industries and the process of a more diversified industrial structure over time.

Coming to Karnataka it could be observed (table 4.2) that the dominant industries accounted for more than 69 percent of the manufacturing output in 1976. The major sub-groups were manufacture of machinery and transport equipments (31.55%), agro based (14.11%), and basic metals (13.02%). The dominance of machinery & transport was evident from the fact that the share of agro-based and iron and steel and metal based put together constituted less than the total share of manufacture of machinery and transport. Here also, the degree of diversification was below the All-india average. Clearly, the similarity of Karnataka with Tamil Nadu

and the dissimilarity of both with Kerala in structural features can be traced mainly in terms of the relative position of engineering industries. Over time, the share of the dominant industries in the total manufacturing output has come down (62 percent in 1987 as compared to 69 in 1976) as in Tamil Nadu indicating there by a progressive tendency toward industrial diversification. Unlike Tamil Nadu, however, the process of diversification in Karnataka was set in motion through an improvement in the relative significance of engineering rather than that of agro-processing industries as between 1976 and 1986. To elaborate, it is discernable from appendix table 4.III that the significant feature of structural change in Karnataka was a more than 10% increase in the sub-group V (manufacture of machinery and transport equipment) mainly due to the rise in the share of (a) radio and television industry (b) manufacture of electrical machinery and parts and (c) manufacture of clocks. The share of these three industries put together increased from 20.3 percent in 1976 to 27.4 percent in 1987. At the same time within the sub-group V, the manufacture of machine tools and manufacture of motor vehicles and parts together have declined in their shares from 11.3 percent in 1976 to 8.5 percent in 1987. Thus, there is a qualitative dimension to the industrial diversification in Karnataka: it is the development of modern industries like electrical and electronics that contributed towards industrial diversification.

As could be expected, the process of diversification was also marked by the relative decline of the traditional industries like cotton spinning, sugar and cigarette industries. The share of three industries together came down from 14 percent in 1976 to around 10 percent in 1987 with the major blunt being on the cotton spinning industry.

Overall, the industrial structure in Karnataka unlike that of Tamil Nadu is still a concentrated one but much less in degree than that of Kerala. In both Tamil Nadu and Karnataka the share of engineering industries occupies a substantial proportion unlike in Kerala. The process of diversification that has set into motion in Karnataka is qualitatively of some difference with the increasing importance of such modern industries like the electrical and electronics.

It seems, Andhra Pradesh developed more on the lines of Karnataka and Kerala than that of Tamil Nadu in structural transformation. As can be seen from table 4.2, dominant industries accounted for 68 percent of the manufacturing output in 1976. The major industry groups were agro-based (33%), manufacture of machinery and transport equipments (19.89%) and products in the rubber, petroleum and chemical group (12.63%). As in Kerala the share of dominant industries increased (by 10 percentage points to reach 79 percent in 1987) and thereby reflected a situation of increasing concentration. Unlike Kerala but like Karnataka, however, the share of sub-group V (engineering) was substantial and



witnessed a significant increase between 1976 and 1986 in the process of structural transformation in Andhra Pradesh.

To get into some details the composition of output mix, is described in appendix table 4.IV. Like Kerala and Karnataka the share of agro-based industries has come down from 33 percent in 1976 to 19 percent in 1987. Similarly, the share of rubber, petroleum and chemical products and manufacture of machinery and transport have increased from 13 percent and 20 percent in 1976 to 23 percent and 30 per cent respectively in 1987.

Manufacture of electrical machinery and apparatus and industrial machinery for other than food and textile industries have increased their shares in the total manufacturing output. These two industries have increased their shares over 5.54 percent; the share of manufacture of insulated wires and cables have risen their share from 1.38 percent in 1976 to 5.43 percent in 1987. The share of manufacture of cement, lime and plaster have increased their share from 2.76 percent in 1976 to 6.26 percent in 1987. Manufacture of drugs and medicines have also increased their share by 0.74 percent in 1987.

The share in manufacture of pulp, paper and paperboard has increased to 3.69 percent in 1987. Manufacture of beedi, cotton industry, grain mill products, sugar industry, jute and mesta spinning and weaving have together increased their shares from 15.29 percent in 1976 to 18.74 percent in 1987.

At the same time operations connected with manufacturing of raw leaf tobacco and cigarette industry have declined heavily. These two industries together constituted a share 17.61 percent in 1976 and declined to join the less average industry group in 1987. Thus the decline in the share of the agro-based industries was a feature of structural change in Andhra Pradesh.

On the whole our analysis of change in Industrial mix in terms of dominant industries tend to suggest that in Kerala and Andhra Pradesh there appears to be a trend towards increasing concentration whereas in Tamil Nadu and Karnataka the trend, is towards diversification in the industrial mix. Nevertheless, the degrees of diversification has been below the national average in all the southern states. Hence it may be concluded that despite marginal inter-state differences in the character, industrial structure in all the southern states still remained more concentrated than diversified as compared to the national level though among themselves Tamil Nadu has achieved the highest degree diversification and Kerala the lowest. The states of Karnataka and to some extent Andhra Pradesh recorded a moderate diversification in their industrial structure.

Our discussion so far has been primarily concerned with only those industries which occupied more than average share in total output (i.e., 'dominant' industries). To the extent that we have not taken into account those industries with less than average share, the analysis may be objected to be a

partial one. With a view to taking into account this problem, we have calculated the share of industry sub groups in the total manufacturing value-added. The result of this exercise is given in the table 4.3.

Table 4.3

Shares of different groups in the manufacturing sector

Groups -->		1	2	3	4	5
Kerala	(76)	35.09	8.04	36.12	8.5	12.25
	(87)	23.33	10.47	45.26	6.6	14.34
Karnataka	(76)	24.06	9.27	9.07	16.84	40.76
	(87)	18.67	9.21	16.58	6.05	49.49
Andhra Pradesh	(76)	42.08	4.86	20.73	3.35	28.98
	(87)	19.09	7.84	28.99	7.92	35.28
Tamil Nadu	(76)	29.4	9.14	20.28	6.39	34.79
	(87)	35.01	11.65	24.14	4.54	24.66
All-India	(76)	33.63	6.17	21.34	13.64	25.22
	(87)	29.05	4.37	27.90	9.18	29.05

Note:

- 1 Agro based industries
- 2 Forest and animal based industries
- 3 Rubber, Petroleum, chemical based industries
- 4 Metal based industries
- 5 Manufacture of machinery and transport

A perusal of table confirms our earlier findings. It may be concluded that regional industrial mix of Kerala and Andhra Pradesh is still concentrated in a few blocks of agro-based and chemical industries. Instructively, the process of diversification in Andhra Pradesh is picking up fast with rapidly declining share of agro-based and increasing share of engineering industries. In Kerala the trend is a very slow process with the result the overall industrial structure remained still highly concentrated as compared to other south Indian states as well as all-India. The industrial mix of

Tamil Nadu and Karnataka appeared less concentrated than the other two south Indian states. Interestingly, the industrial mix of Kerala remained marked by a lower share of engineering industries (sub-group 5) and a higher proportion of traditional agro-based and chemical based industries as compared to other south Indian states. The continued existence of the concentrated character of Industrial mix in Kerala perhaps constituted the striking feature emerging from the comparative analysis.

#### Industrial Base

Thus far our analysis has taken into account only absolute share of particular industries in particular regions. In a multi-regional economy like India, such absolute measures need not necessarily be meaningful for comparative analysis. For getting a precise understanding of the structure and changes therein one needs to supplement the above analysis with a measure of structural changes in the regions in relation to the national aggregate.

#### Location quotient - The concept and measurement

In the analysis of a region in relation to that of the nation as a whole, the industrial base of a region can be identified by using economic base study concepts like location quotient and specialization coefficient. Location quotient would provide the basis for a qualitative judgement

about the structural base of the regions industrial economy.

The location quotient is a measure of relative regional concentration of given industry compared to total national magnitudes such as value-added.

$$\text{(Location Quotient (L.Q))} = (V_{ij}/V_j/V_i/V_N)$$

Where V=value added, i=ith industry

J = jth region and N = Nation

So  $V_{ij}$  = Value added of ith industry in jth region

$V_j$  = the total Value added in the jth region

$V_i$  = Value added of ith industry in all the regions

N = the total value added of all industries in all the regions.

The value of  $L.Q.<1$  implies less than proportionate share of ith industry is in the jth region, and.  $L.Q.>1$  means more than proportionate share of ith industry in the jth region. The industries with high location quotients constitute the industrial base of the region.

In a multiregional economy a region would tend to specialize in those industries for which it has a raw material base and comparative cost advantage or scale and locational economics for which there is a strong demand base<sup>9</sup>. Given sets or blocks of interrelated industries from previous knowledge, it is possible by using locational quotient analysis to identify one or more sets of interrelated industries in which the region specialises. Industries for which the locational quotient is greater than

one may be taken as constituting an interrelated set or block of industries and one or more such sets or blocks of industries located in a region may be defined as 'industrial base' of the region<sup>10</sup>. This simple method of identification of the industrial base is useful for a qualitative understanding of the structure of the regional industrial economy and also for interregional comparisons.

Table 4.4 shows industrial base of Kerala and other southern states in 1976 and 1987 as identified by the blocks of industries for which locational quotient is assumed to one greater than unity. The industries have been classified into sectors and against each industry the relevant locational quotients have been indicated. The qualitative picture emerging from the table is that of relatively independent blocks or sets of industries comprising the industrial base of Kerala and other South Indian states.

Table 4.4  
Location quotients of south Indian states

Agro based		Forest and animal based		Rubber, Petroleum chemical		Iron & Steel metal based		Manufacture of machinery & transport	
1976 C (S)	1987 C (S)	1976 C (S)	1987 C (S)	1976 C (S)	1987 C (S)	1976 C (S)	1987 C (S)	1976 C (S)	1987 C (S)
<b>Kerala</b>									
235(24.57)	203(08.28)	271(8.88)	271(11.83)	302(7.67)	302(9.29)	335(6.50)	339(32.97)	370(2.65)	357(02.93)
203(16.78)	211(05.06)	284(2.39)	276(04.34)	300(3.09)	300(6.51)	341(1.07)	335(07.91)	361(1.81)	367(10.95)
220(01.24)	212(04.36)	273(2.06)	270(03.34)	320(4.70)	301(4.02)	345(1.01)	344(01.08)	380(1.75)	361(03.51)
212(04.29)	219(02.19)	274(2.10)	273(01.70)	314(2.17)	314(4.22)		341(01.01)	357(2.80)	362(02.37)
219(02.16)	201(01.42)	285(1.53)	274(01.29)	310(4.12)	315(3.06)			362(1.02)	370(05.04)
268(34.18)	220(05.92)	276(4.80)	284(05.78)		310(2.98)			360(1.02)	379(03.97)
239(01.43)	226(04.67)	270(6.40)	288(04.48)		319(1.10)			376(1.81)	389(10.19)
217(03.45)	235(27.54)		286(03.35)		320(5.64)			369(8.72)	380(02.80)
264(06.81)	261(22.75)		285(02.81)		329(2.16)				
265(02.80)	268(04.87)		289(01.22)						
	260(01.67)								
<b>Tamil Nadu</b>									
260(1.53)	205(4.50)	293(1.09)	275(2.12)	317(4.36)	302(02.73)	341(1.52)	344(1.30)	352(5.85)	352(4.30)
230(3.43)	213(1.61)	290(1.37)	276(1.37)	323(2.70)	317(05.93)		343(1.12)	379(1.20)	351(1.73)
231(1.48)	203(1.53)	275(1.17)	283(2.49)	318(1.37)	318(02.60)			380(1.38)	350(1.69)
264(1.03)	208(1.26)	289(2.34)	289(1.69)	319(1.69)	319(02.50)			372(3.42)	353(1.60)
213(3.09)	209(1.21)	276(1.81)	284(1.29)	302(2.80)	316(01.07)			351(1.72)	358(1.33)
209(1.55)	206(1.16)	284(1.95)	290(6.45)	324(1.54)	323(03.27)			350(1.86)	380(2.11)
216(1.22)	201(1.08)	280(1.67)	293(5.05)	328(1.28)	326(02.39)			358(1.52)	362(1.23)
212(1.04)	216(1.04)	281(2.02)	291(2.96)	316(1.29)	324(01.21)			362(1.11)	379(4.26)
228(3.18)	220(1.09)	285(1.14)	287(1.52)	329(1.20)	328(01.19)			374(2.24)	378(2.30)
230(1.07)	265(1.27)	279(2.00)	280(1.19)	311(1.60)	320(01.07)			367(3.24)	372(1.74)
219(1.37)	236(2.78)	299(2.74)		305(6.75)	327(25.76)			375(1.81)	374(1.04)
204(1.22)	231(2.20)			300(1.88)				376(1.35)	383(1.05)
242(1.21)	235(1.99)			303(1.39)					
	246(1.89)								
	260(3.65)								
	264(2.15)								
	266(1.81)								
	262(1.69)								
	268(1.27)								
<b>Karnataka</b>									
227(01.44)	213(4.35)	276(2.69)	270(3.57)	324(2.48)	315(1.30)	335(7.45)	335(6.41)	382(12.10)	357(3.73)
213(12.39)	215(3.39)	280(3.26)	273(2.77)	323(1.75)	326(1.04)	345(1.04)	333(2.99)	364(09.18)	351(3.30)
230(01.35)	203(2.38)	271(2.24)	276(2.58)	329(1.73)	324(2.30)	349(1.82)	345(3.27)	383(01.47)	352(1.36)
229(03.10)	202(2.33)	279(2.16)	271(1.44)		323(1.01)	343(1.01)	349(2.44)	367(01.80)	356(1.16)
203(02.02)	209(1.50)	285(1.28)	279(1.10)		320(1.41)	332(1.05)	343(1.39)	357(06.88)	366(6.52)
202(08.83)	206(1.28)	272(1.17)	281(2.08)		329(1.27)	330(1.16)	341(1.06)	351(01.39)	367(4.06)
228(02.08)	219(1.19)		280(2.03)					360(01.80)	360(2.79)
209(04.29)	205(1.02)		289(1.95)					362(01.55)	362(2.44)
264(01.43)	225(4.54)		284(1.47)					381(02.43)	365(1.71)
206(01.64)	229(3.29)		292(6.49)					372(01.13)	363(1.61)
269(01.68)	222(3.29)							374(01.31)	379(8.81)
211(02.20)	220(2.50)							369(01.29)	382(9.60)
204(01.17)	228(1.69)							375(02.38)	383(4.18)
223(01.17)	230(3.65)								381(1.34)

Contd...

Table 4.4 (Contd)

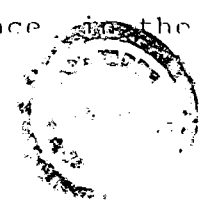
Agro based		Forest and animal based		Rubber, Petroleum chemical		Iron & Steel metal based		Manufacture of machinery & transport	
1976 C (S)	1987 C (S)	1976 C (S)	1987 C (S)	1976 C (S)	1987 C (S)	1976 C (S)	1987 C (S)	1976 C (S)	1987 C (S)
	234(2.12)								389(1.09)
	235(2.73)								
	240(1.69)								
	266(6.24)								
	268(5.56)								
	264(1.48)								
	267(1.24)								
	269(1.05)								
<b>Andhra Pradesh</b>									
225(14.10)	209(04.42)	289(1.18)	276(1.78)	326(3.44)	301(18.89)	353(1.06)	332(9.97)	370(04.21)	354(03.53)
226(06.52)	204(04.31)	280(1.66)	270(1.67)	315(4.51)	326(05.10)	357(2.84)	344(1.24)	361(01.75)	355(02.55)
235(01.22)	219(03.56)	279(3.47)	279(1.15)	324(2.59)	303(01.54)		340(1.30)	354(02.23)	359(01.77)
229(13.42)	215(01.39)	288(1.12)	281(2.61)	329(1.81)	328(03.80)		336(9.81)	360(02.14)	367(30.68)
209(03.41)	201(01.84)		280(2.45)	303(3.25)	318(06.09)		341(1.21)	355(03.24)	362(02.44)
204(03.36)	207(01.75)		284(2.08)	313(1.14)	324(02.97)		345(1.04)	362(02.12)	365(29.33)
219(01.57)	206(01.48)		292(3.69)	319(1.93)	315(03.63)			380(01.29)	379(01.16)
227(06.11)	210(01.47)		290(1.57)	311(1.66)	329(02.08)			379(20.77)	380(01.18)
220(02.98)	203(01.40)		273(1.56)		313(01.09)			389(02.55)	361(09.10)
230(02.20)	208(01.15)		289(2.57)		320(01.39)			366(11.89)	360(02.80)
201(03.93)	235(07.23)		236(1.40)						362(01.98)
251(01.30)	234(01.45)								363(01.85)
206(01.78)	240(02.25)								370(05.47)
210(01.61)	251(01.69)								372(01.05)
202(02.71)	202(01.11)								382(01.15)
205(01.29)	205(01.04)								
217(01.13)	225(11.45)								
213(10.40)	226(09.52)								
250(01.95)	223(07.09)								
221(01.97)	229(06.28)								
	224(05.41)								
	227(03.48)								
	220(02.93)								
	233(39.78)								
	230(02.52)								
	236(01.40)								
	244(01.34)								
	267(01.83)								



In 1976, 33 industries in Kerala, 50 industries in Tamil nadu, 42 industries in Karnataka and 44 industries in Andhra Pradesh constituted the industrial base of these states. This has increased to 42 in Kerala, 54 in Tamil nadu, 59 in Karnataka and 69 in Andhra Pradesh in 1987. Here it may be noted that the result in terms of the location quotient that we have obtained is broadly in tune with our analysis in terms of shares in the manufacturing output.

771-4369  
In Kerala, Forest and animal based group and rubber, petroleum, chemical group have shown a clear advantage in terms of its numbers. In Tamil nadu this type of an advantage is visible only in agro-based group. In Karnataka agro-based, forest and animal based and rubber, petroleum, chemicals group have shown an increasing dominance. In Andhra Pradesh agro based forest and animal based and iron and steel and metal based have shown an advantage.

Distilling, rectifying and blending of spirits, canning, preserving and processing of fish, weaving and finishing of cotton textiles in handlooms other than Khadi, manufacture of wooden furniture and fixtures, printing and publishing of newspaper, manufacture of dry and wet batteries are the industries which are enjoying higher locational quotients all over Southern states. In 1987 three among this group showed dominant share in Kerala's manufacturing industries. But manufacture of dry and wet batteries, manufacture of wooden furniture and fixtures and canning, preserving and processing of fish are showing only marginal presence in the industrial



sector. What is more important to be noted at this juncture is a significant discordance between the performance of these industries in the southern states other than Kerala. That is, the industries which form the industrial base of region say kerala is not necessarily the one that forms the industrial base in another region. More insight into this issue could be drawn by an exhaustive analyses on the performance of similar industries in neighboring state.

#### Industrial diversification:

The relative extent of industrial diversification of the various regions can be examined by estimating the region's coefficient of specialization. This measures the extent to which a given region's industrial economy has diversified pattern.

$$\text{Specialization Coefficient (SQ)} = \pm \sum_{j=1}^n [V_{ij}/V_j - V_i/V_N]$$

The limits of specialization coefficient are zero and unity. If the given region has a proportionate mix of industries identical with the national system, the value of specialization coefficient will be zero and vice versa.

Given the values of the specialization coefficient of each region, it is possible for analytical purpose to group the regions broadly by their levels of diversification. Regions with  $0 < SQ < 0.25$  can be grouped as diversified regions.  $0.25 < SQ < 0.50$  as middle level diversification and  $0.50 < SQ < 1$  as less diversified regions.

Table 4.5

Specialisation Coefficients of south Indian states

	1976	1981	1987
Kerala	0.64	0.78	0.97
Karnataka	0.43	0.44	0.48
Tamil Nadu	0.35	0.37	0.39
Andhra Pradesh	0.63	0.59	0.52

Let us now examine the other relative extent of industrial diversification of the various regions by estimating the region's specific coefficient of specialization. Table 4.5 provides values of the coefficients for the year 1976, 1981 and 1987. This table shows that Kerala has remained in the position of less diversified region. At the same time states like Karnataka and Tamil Nadu are moving in middle level diversified regions. Andhra Pradesh, also is a less diversified region. But it has receded its magnitude during the period of analysis.

#### Structural Change and Growth Performance: The correlate

We have reached a stage wherein, one should ask the question whether there is any relation between the observed growth performance and the structural change. To be more specific, our analysis so far revealed that during a period of growth buoyancy at the national level the south Indian states in general and more specifically Kerala registered a relatively lower growth in terms of value added and productivity in the manufacturing sector. We also observed that the industrial diversification in the southern states has been rather slow and in fact the industrial structure

in Kerala moved towards concentration rather than diversification during the period. Can these two findings be correlated?

In the context of modern economies, structural changes are associated with the process of economic growth. A positive correlation between structural change and growth is postulated and could be empirically tested by using a multiple regression model as done by Awasthi (1990). Such an exercise however is not a practical proposition for the present study because of the fewer number of observations that can be gathered from the data on relevant variables. Nevertheless, one could gain some understanding about the postulated relationship between structural change and growth performance by employing the economic base study technique of Shift-Share-Analysis. Such an analysis, will also enable us to understand the relative importance of regional and structural factors in shaping the growth performance of the regions.

#### Shift-Share Analysis : The concept

The shift and share technique<sup>11</sup> has been employed in order to identify and decompose the forces behind the region's growth. The technique has been widely used as a descriptive device and an analytical tool.

The shift and share technique is a method to calculate the extent to which difference between a regions growth and the nation's growth can be explained by the regions industry-mix. It decomposes the growth of a regional variable into three

components, viz. (1) total shift or national growth-effect (2) structural shift or industry mix effect; and (3) differential shift or competitive effect.

Total shift is the overall growth of the economy against which differential performance of the region's is measured. Any region having exactly the same growth rate as the nation will have zero net shift. It will have positive shift otherwise negative net shift. The net shift is further decomposed into structural and differential shifts.<sup>12</sup>

Thus viewed, the structural shift is a measure of region's performance determined by the type of region's industrial structure. The shift is positive when the industrial base of the region constitutes of fast growing industries and is negative or zero when region specialises in declining or slow growing industries. Finally, the 'differential shift' is that part of the region's growth which remains unexplained and can be given a variety of interpretations. It indicates the extent to which growth of a particular industry in a given region is the result of some region specific factors. It is assumed, that more dynamic regions (with better infrastructure facilities, industrial climate, resource endowment and entrepreneurship etc) are expected to grow faster with a positive shift and vice-versa. Thus, it hints at some locational or competitive advantage enjoyed by one region over the other.

To explain the divergence in the industrial performance of

different states, one of the important factors to be kept in mind is the product mix in the state. Shift share analysis is used to isolate this factor. Armstrong and Taylor (1980) defined it as a method of calculating the extent to which the difference between a regions growth and the nation's growth can be explained by the region's industry mix.

Regional growth rate (gr) is defined as

$$gr = \frac{\sum_i r_i^t - \sum_i r_i^0}{\sum_i r_i^0}$$

difference between regional  
 employment in industry 'i'  
 in the gr period 't' and zero  
 -----  
 sum employment across all  
 industries in the region  
 in the initial period.

National growth rate (gn) is defined as

$$gn = \frac{\sum_i N_i^t - \sum_i N_i^0}{\sum_i N_i^0}$$

difference between national  
 employment in industry 'i'  
 in the period 't' and zero  
 -----  
 sum of employment across all  
 industries in the national  
 economy in the initial period

Regional growth at national growth rates / Industry (grn)

$$grn = \frac{\sum_i [r_i^0 (N_i^t / N_i^0)] - \sum_i r_i^0}{\sum_i r_i^0}$$

where

- r<sub>i</sub> = regional added in i<sup>th</sup> industry
- t = terminal year
- o = initial year
- N<sub>i</sub> = national value added in i<sup>th</sup> industry.

Third growth equation that would have occurred in the region if each industry had growth at the same rate as the corresponding national industry during the study period.

With the help of these three definitions the regional growth can be divided into

$$gr = (gr - grn) + (grn - gn) + gn$$

Left hand side of the equation denotes, "regional-national growth" or the difference between the regional and the national growth. On the right hand side, the first element is the structural component. It is the difference between hypothetical growth of the region and the national growth rate.  $(grn - gn)$  and is that part of the region's growth that remains unexplained (Armstrong and Taylor, 1980).

The shift and share technique has certain limitations which must be kept in mind while interpreting the results. For example, the industrial structure of a region in the base year affects the extent of shift. Thus introduces biases, especially if the period of observation is very long (Houston, 1967). The differential shift doesn't bring out region specific factors and this part of the decomposition remains a black-box (Klassen and Paclinck 1972). The method also neglects the inter-industry linkages and improperly assigns growth, based on these linkages, in to the residual rather than structural components (Brown 1969). And finally the results are sensitive to the level of sectoral disaggregation used in computation (Udai Sekhar 1983). Despite these weaknesses the technique provides a convenient frame work for understanding the regional differences in the growth with reference to the industrial structure.

The Results:

The results of the shift-share analysis is reported in the table 4.6. An overview of the table show that in none of the states the vale of structural shift is negative implying there by that the importance of structural factor in shaping the growth

Table 4.6

Results of Shift and Share Analysis

	Percentage change			Components of the shift share		
	Actual Growth	Hypothetical Growth	Total shift	Structural shift	Differential shift	
	(Gr)	(Gm)	(Gr-Gm)	(Gm-Gr)	(Gr-Gm)	
Kerala	76-81	45.91	07.47	30.81	7.63	38.44
	81-87	0.76	35.35	30.99	3.60	34.99
	76-87	47.01	42.90	04.64	8.75	04.11
Karnataka	76-81	32.50	14.50	47.60	0.60	47.00
	81-87	189.04	34.79	157.29	3.04	154.25
	76-87	95.10	61.40	43.45	9.75	33.70
Tamil-Nadu	76-81	35.94	18.62	20.84	3.52	17.32
	81-87	61.16	34.32	29.41	2.57	26.84
	76-87	119.08	54.07	67.43	4.42	63.01
Andhra-Pradesh	76-81	22.68	16.23	7.58	15.52	06.45
	81-87	18.52	36.76	13.42	5.01	18.24
	76-87	45.41	59.15	06.24	7.50	13.74

performance cannot be undermined in any of the states. When we examined the relative role of regional and structural factors, the picture that emerged was a mixed one. For instance, in Kerala the regional factors are found more dominant than structural factors



for the period as a whole. But the relative importance of regional factors are found to be more dominant in the sub-periods. The result of the analysis further tends to suggest that in a relatively more diversified state like Karnataka, characterised by an industrial mix dominated by modern industries, the regional factors are currently more important than structural factors. Similar trend was observed in Tamil Nadu also. In the case of Andhra Pradesh it was found that, except for the period 1976-81 the regional factors were found to be more dominant than structural factors.

On the whole, the results of shift-share analysis clearly brings out the positive relation between structural change and growth performance. Needless to say, in an already industrially more diversified regions like Karnataka and Tamil Nadu, the regional factors are seemingly more dominant than structural factors whereas in Kerala and Andhra Pradesh both regional and structural factors are important in explaining growth performance observed during the eighties. Thus, the analysis tend to suggest that any attempt towards improving the growth performance of regions like Kerala should address to not only region specific factors like power supply, labour condition, wages etc. but also the structural factors which have implication on inter industry demand, agglomeration economies etc. and thereby on the region's growth performance.

Notes and references

- 1     Tshikawa (1987)
- 2     Rostow(1960)
- 3     Kuznets (1971 & 1972)
- 4     This can be analyzed by using more sophisticated methods like input-output analysis. But an intelligent use of locational quotients will yield the same information as revealed by input-output method.
- 5     Udaisekhar (1983); Awasthi D.N(1991)
- 6     Kashyap, Wadhwa, Awasthi (1982)
- 7     Hoffman (1958); Chennery (1960)
- 8     Subrahmanian K.K , Pillai Mohanan P (1986)
- 9     Alag Y.K, Subrahmanion K.K, and Kashyap S.P(1971)
- 10    Isard W.G. (1960)
- 11    The shift and share technique was developed by Daniel Creamer and later modified by Dunn, Ashby and Marquillaes. For details, see Creamer (1943), Dunn (1960), Perloff et.al. (1960), Ashby (1961) and Marquillas (1972) among others.
- 12    The 'national growth effect' is termed as 'share effect', the 'structural shift is compositional mix or proportionality shifts, differential shift' as competitive effect or the regional component or regional component.

Appendix 4.I

Structure of manufacturing industries in Kerala in 1976 and 1987.

1976 Industries with						1987 Industries with					
More than average share		Less than average share				More than average share		Less than average share			
Code	Share	Code	Share	Code	Share	Code	Share	Code	Share	Code	Share
1. 231	(4.78)	226	(.10)	260	(.08)	231	(4.77)	273(.04)	211	(1.66)	236(.11)
212	(8.69)	220	(.43)	268	(1.67)	212	(4.49)	239(.02)	202	(1.05)	268(.14)
214	(10.42)	235	(1.86)	236	(.08)	214	(3.45)	274(.02)	201	(0.96)	281(.11)
264	(2.48)	211	(.37)	232	(.06)	226	(2.24)	224(.01)	215	(0.81)	288(.09)
		201	(.32)	213	(.07)	220	(2.59)	205(.04)	219	(0.78)	232(.07)
		215	(.01)	217	(.32)	261	(2.38)		229	(0.75)	209(.07)
		219	(.46)	205	(.24)	235	(2.05)		203	(0.73)	213(.06)
		229	(.43)	239	(.03)				260	(0.26)	217(.06)
									204	(0.15)	264(.05)
2. 270	(2.07)	280	(1.49)	276	(.33)	280	(5.06)		285	(1.71)	289(.49)
		284	(1.27)	281	(.19)	284	(3.66)		271	(1.37)	276(.20)
		285	(1.11)	273	(.03)				270	(0.87)	
		271	(1.63)	274	(.07)						
3. 300(3.16)	310(7.3)	313	(1.63)	323(.13)		307(8.51)	300(9.97)		324	(1.07)	321(.47)
314(3.56)	302(4.7)	324	(0.34)	317(.03)		310(8.04)	314(5.58)		315	(1.05)	303(.17)
320(2.90)	311(9.8)	315	(0.15)			302(4.38)	320(2.35)		329	(1.01)	323(.16)
		329	(0.21)			313(2.96)			319	(0.7)	331(.11)
		321	(0.17)						301	(0.6)	312(.01)
4. 335(5.88)		330	(0.03)	341(.37)		339(5.18)		344(.09)	335	(1.28)	343(.48)
		340	(0.32)	331(.61)				342(.02)	330	(0.55)	340(.42)
				349(.07)					345	(0.12)	341(.37)
5. 357(2.55)		361(1.43)	356(.01)	369(.2)		361(3.87)		376(.06)	380(1.87)	356(.39)	
370(2.04)		380(0.58)	345(.26)	342(.03)		360(3.08)		369(.04)	370(1.26)	363(.35)	
360(3.83)		362(0.60)	359(.17)	353(.09)		357(3.22)		358(.03)	389(1.2)	364(.23)	
		350(0.50)	374(.09)	387(.02)		367(2.06)		353(.02)	374(1.03)	366(.16)	
		343(0.50)	376(.59)					362(1.0)	359(0.12)	350(.65)	
								354(.12)	379(.14)		

Appendix 4.II

Share of manufacturing Industries in Tamil Nadu in 1976 and 1987

	1976				1987			
	Industries with More than average share		Industries with Less than average share		Industries with More than average Share		Industries with Less than average share	
	Cd.(Share)	Cd.(share)	Cd.(share)	Cd.(Share)	Cd.(Share)	Cd.(share)	Cd.(share)	Cd.(share)
1.	231(15.21)	206(1.67)	259(0.02)	230(.42)	231(20.33)	230(1.80)	273(0.01)	268(.04)
	212(02.10)	205(.24)	261(0.01)	236(.44)	206(2.92)	212(1.42)	244(0.01)	262(.05)
		264(.38)	227(0.04)	271(.07)		205(1.40)	259(0.02)	208(.12)
		247(1.38)	268(0.02)	204(.87)		260(.57)	245(0.02)	203(.13)
		270(.03)	262(0.07)	265(.01)		261(.03)	270(0.02)	216(.11)
		279(.01)	217(0.03)	267(.01)		226(.21)	227(0.03)	209(.10)
		242(.04)	283(0.06)	220(.12)		219(.19)	275(0.01)	235(.15)
		213(.09)	208(0.16)	202(.28)		222(.17)	272(0.01)	224(.09)
		216(.07)	245(0.07)	260(.31)		213(.13)	215(0.01)	232(.160)
		209(.05)	203(0.05)	211(.28)		217(.06)	267(0.01)	228(.08)
		228(.24)	232(0.24)	262(.31)		236(.39)	220(0.48)	202(.01)
		276(.12)	219(0.29)	210(.12)		230(.32)	289(0.68)	264(.90)
		272(.03)	226(0.46)	215(.01)		211(.31)	201(0.73)	214(.25)
		275(.02)	214(0.20)			210(.30)	247(0.86)	
2.	280(2.96)	284(1.49)	288(.01)		292(5.63)	281(.13)	301(.01)	291(.62)
	290(2.32)	289(1.14)	293(.01)			276(.06)	283(.02)	287(.02)
		281(.46)	285(.83)			283(.06)	293(.05)	284(.81)
		299(.01)	291(.03)			290(1.34)	285(.36)	
3.	311(3.42)	310(1.49)	315(.02)	307(.11)	304(3.91)	307(.17)	328(0.26)	312(0.43)
	316(2.91)	324(1.64)	326(.12)	328(.34)	310(2.25)	315(.14)	329(0.45)	323(0.63)
	305(3.77)	313(.95)	303(.89)	312(.44)		321(.01)	320(0.63)	318(0.64)
		319(1.23)	329(.78)	323(.50)		327(.01)	318(0.78)	317(0.89)
		302(1.73)	320(.59)	318(.45)		311(1.87)	302(1.05)	326(0.23)
		317(1.10)	314(.42)			313(1.87)	305(0.28)	303(0.39)
						319(1.59)	300(1.15)	316(1.56)
4.	331(2.62)	343(.94)	332(.06)	349(.07)		339(.04)	345(.05)	349(.12)
		330(.67)	333(.01)	344(.03)		342(.03)	335(.12)	333(.01)
		341(.53)	334(.07)	345(.16)		334(.02)	340(.17)	343(.72)
		340(.45)	342(.07)			336(.01)	344(.11)	330(.32)
		335(.65)	339(.04)			331(1.76)	341(.18)	
5.	352(10.07)	380(.46)	385(.01)	381(.01)	352(6.35)	351(.93)	389(.03)	387(.04)
	374(08.65)	350(1.39)	389(.03)	387(.07)	374(4.99)	357(.80)	383(.06)	369(.08)
	372(04.09)	356(.79)	383(.01)	355(.10)	372(2.24)	360(1.89)	365(0.09)	367(.13)
	360(02.59)	300(1.93)	361(.26)	369(.09)		353(1.59)	366(.14)	370(.14)
		364(.77)	376(.44)	367(.23)		380(1.41)	379(.15)	382(.17)
		351(.82)	366(.02)	370(.06)		350(1.32)	371(.27)	359(.28)
		357(.35)	379(.08)	358(.27)		356(1.19)	363(.38)	375(.42)
		354(.61)	363(.13)	359(.24)		364(1.14)	362(.52)	354(.78)
		362(.66)	375(.83)			376(.12)	381(.02)	355(.02)
						361(.07)		

Note: cd - denotes NIC codes.

Appendix 4.III

Structure of Manufacturing industries in Karnataka in 1976 and 1987

	1976				1987				
	Industries with		Industries with		Industries with		Industries with		
	More than average share	Less than average share	More than average share	Less than average share	More than average share	Less than average share	More than average share	Less than average share	
	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	
1.	231 (8.18)	272(.06)	245(.60)	212(.38)	231 (3.47)	224(.02)	230(1.77)	233(1.2)	268(.16)
	206 (3.3)	230(.53)	222(.48)	264(.52)	206 (3.23)	269(.02)	220(1.09)	270(.93)	204(.15)
	227 (2.61)	233(.01)	201(.18)	247(.06)	227 (3.06)	266(.02)	245(.79)	213(.35)	262(.02)
		220(1.08)	215(.02)	219(.20)		225(.01)	232(.29)	212(.77)	207(.14)
		211(1.15)	214(.47)	213(.37)		248(.01)	222(.77)	264(.62)	209(.13)
		205(.30)	232(.28)	274(.03)		263(.01)	201(.58)	219(.43)	229(.02)
		202(.24)	226(.45)	224(.16)		242(.01)	214(.41)	281(.37)	215(.09)
		203(.24)	235(.02)	269(.05)		205(.32)	247(.26)	236(.05)	240(.07)
		228(.15)	268(.03)	225(.09)		202(.24)	211(.24)	234(.03)	226(.06)
		204(.84)	207(.42)	279(.02)		203(.21)	235(.20)	246(.03)	210(.06)
		209(.13)	210(.18)			228(.19)	217(.18)	208(.03)	
		288(.01)	262(.02)						
2.	280 (5.77)	270(.87)	281(.19)		280 (3.06)	289(.79)	291(.06)	292(.09)	
		284(.29)	271(.41)		286 (2.08)	284(.89)	273(.06)	272(.01)	
		289(.47)	276(.18)			285(.47)	267(.05)	290(.06)	
		285(.93)	290(.01)			271(.17)	288(.03)	274(.01)	
		273(.01)	291(.02)			276(.12)	279(.01)		
3.	324 (2.14)	314(.73)	303(.55)	329(1.13)	324 (4.08)	300(1.81)	315(.44)	323(.39)	
	321 (2.65)	313(1.41)	311(.34)	315(0.05)	313 (2.82)	310(1.59)	326(.28)	319(.28)	
		300(1.41)	323(.32)	326(0.12)		314(1.22)	302(.23)	328(.19)	
		310(1.14)	319(.04)	302(0.30)		320(0.83)	316(.18)	321(.14)	
		320(.05)	328(.01)	316(0.02)		303(0.60)	301(.11)	304(.10)	
		321(.31)	301(.06)			329(0.60)	312(.05)	311(.53)	
		305(.10)	312(.05)			305(0.11)			
4.	330 (7.23)	343(1.02)	349(.36)			330(1.28)	349(.35)	340(.30)	
	335 (5.79)	331(1.12)	340(.19)			335(1.2)	344(.16)	333(.03)	
		345(.47)	332(.20)			343(.89)	332(.11)		
		341(.04)	342(.06)			331(.75)	342(.07)		
		334(.04)	339(.05)			345(.43)	339(.06)		
		333(.22)				341(.38)	334(.04)		
5.	364 (11.05)	356(0.40)	366(.03)	359(0.29)	364 (12.74)	351(1.78)	355(.02)	379(.32)	
	360 (6.74)	352(1.26)	354(.02)	350(0.25)	360 (10.68)	363(1.46)	387(.01)	383(.23)	
	374 (5.05)	351(0.66)	361(.31)	375(1.09)	374 (4.41)	372(1.19)	358(.01)	380(.22)	
	357 (6.27)	363(0.96)	379(.04)	369(0.19)	357 (4.10)	362(1.03)	385(.01)	353(.17)	
	382 (2.48)	372(1.35)	383(.05)	381(0.08)	382 (3.98)	367(.77)	366(.34)	350(.13)	
		362(0.91)	380(.20)	387(0.02)	356 (2.14)	359(.39)	354(.33)	369(.13)	
		367(0.13)	353(.31)		352 (2.01)	375(.36)	361(.32)	389(.13)	
						381(.09)	373(.03)		

Note: Cd. - denotes NIC codes.

Appendix 4.IV  
Share of manufacturing industries in Andhra Pradesh in 1976 and 1987

	1976 Industries with				1987 Industries with				
	More than average share		Less than average share		More than average share		Less than average share		
	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	Cd. (share)	
1.	226 (3.59)	220(1.09)	209(1.09)	221(0.17)	226 (4.65)	225(1.65)	209(.37)	215(.09)	268(.01)
	231 (3.10)	219(0.34)	205(0.43)	242(0.01)	231 (4.10)	220(1.28)	205(.33)	228(.08)	262(.01)
	204 (2.41)	201(1.29)	207(1.12)	245(0.79)	204 (3.49)	219(1.28)	207(.32)	232(.08)	263(.01)
	206 (2.58)	230(0.85)	236(0.01)	211(1.10)	206 (2.74)	201(1.24)	223(.27)	267(.07)	233(.01)
	251 (3.61)	210(0.58)	202(0.07)	217(0.10)	251 (3.70)	230(1.22)	236(.2)	217(.07)	
	227 (11.10)	224(0.15)	208(0.07)	214(0.10)		212(1.03)	248(.12)	214(.07)	
	225 (6.61)	235(0.09)	215(0.02)	229(0.34)		210 (.76)	202(.11)	264(.06)	
		281(0.08)	232(0.01)	222(0.13)		224 (.72)	208(.11)	229(.04)	
		270(0.04)	267(0.05)	213(0.31)		247 (.67)	261(.11)	244(.02)	
		262(0.01)	268(0.03)	250(0.01)		235 (.54)	240(.09)	234(.02)	
2.	280 (2.94)	284(.37)	276(.05)	285(.44)	280 (3.69)	274(.01)	284(1.32)	285(.3)	272(.03)
		289(.57)	271(.07)	279(.03)	227 (2.34)	269(.01)	289(1.03)	276(.08)	283(.02)
		290(.24)	272(.01)	288(.02)		281 (.47)	292(.05)	279(.01)	222(.03)
						270 (.43)	271(.04)	290(.33)	273(.03)
3.	324 (2.76)	304(0.78)	326(0.41)	320(.25)	324 (6.26)	318(1.51)	312(.72)	323(.09)	320(.82)
	313 (4.22)	301(0.02)	314(0.23)	323(.05)	313 (4.96)	303(1.34)	326(.49)	307(.05)	302(.15)
	303 (2.08)	310(1.73)	300(0.18)	312(.13)	304 (4.28)	316(1.27)	300(.41)	325(.02)	328(.82)
	311 (3.55)	316(0.30)	321(0.13)	325(.05)	301 (3.82)	315(1.24)	321(.40)	317(.01)	319(.14)
		315(1.09)	302(0.14)		310 (3.39)	329(0.98)	311(.38)	305(.01)	
		329(1.19)	319(1.41)						
4.	331 (2.38)	330(.35)	344(.01)		332 (2.29)	330(1.27)	341(.44)	349(.07)	
		340(.17)	342(.01)			336(1.16)	343(.39)	342(.05)	
		341(.14)	334(.01)			331(1.12)	345(.14)	339(.02)	
		343(.05)	345(.22)			340(0.84)	344(.11)	334(.01)	
5.	360 (8.05)	361(1.38)	379(1.31)		360 (10.72)	363(1.67)	352(.36)	381(.12)	
	354 (2.5)	363(0.44)	387(0.01)		367 (7.79)	372(1.34)	353(.26)	369(.01)	
	370 (3.26)	355(1.2)	381(0.04)		361 (5.43)	370(1.16)	364(.25)	383(.01)	
	366 (3.49)	362(1.25)	350(.06)		354 (5.37)	355(0.92)	350(.15)	351(.43)	
	357 (2.59)	374(0.50)	376(.08)			362(0.83)	376(.12)	375(.02)	
		380(0.43)	389(.87)			374(0.79)	389(.10)	382(.48)	
		359(0.05)	358(.08)			380(0.79)	371(.08)	387(.04)	
		356(0.61)	364(.09)			359(0.74)	358(.08)		
		351(0.29)	353(.18)			366(0.04)	357(.06)		
		352(0.22)				356(0.52)	365(.05)		

Note: Cd. - denotes NIC codes.

Appendix 4.V  
Share of manufacturing Industries in All India in 1976 and 1987

	1976				1987			
	Industries with		Industries with		Industries with		Industries with	
	More than average share Cd. (share)	Less than average share Cd. (share)	More than average share Cd. (share)	Less than average share Cd. (share)	More than average share Cd. (share)	Less than average share Cd. (share)	Less than average share Cd. (share)	Less than average share Cd. (share)
1	231(10.95)	204(.72)	229(.01)	275(.02)	231(5.26)	212(1.49)	229(.01)	275(.01)
	247( 3.02)	226(.55)	265(.02)	279(.01)	247(2.32)	204(1.27)	265(.01)	243(.01)
	206( 3.01)	201(.33)	243(.01)	274(.03)	206(2.53)	226(.91)	234(.01)	244(.02)
	251( 4.78)	227(1.82)	244(.01)	242(.03)	251(2.19)	201(.68)	242(.02)	269(.02)
	212( 3.02)	241(.80)	269(.03)	273(.01)		227(0.67)	215(.03)	239(.03)
		248(.25)	272(.05)	215(.33)		241(.63)	286(.03)	200(.03)
		232(.48)	200(.03)	259(.04)		248(.58)	259(.03)	268(.03)
		210(.36)	268(.05)	262(.08)		232(.54)	262(.03)	2459(.03)
		230(.39)	245(.07)	223(.05)		210(.52)	223(.04)	263(.05)
		220(.35)	267(.06)	240(.11)		230(.48)	235(.07)	213(.08)
		264(.36)	276(.07)	263(.37)		220(.44)	209(.03)	203(.09)
		219(.22)	235(.08)	213(.03)		264(.42)	241(.09)	208(.10)
		211(.52)	209(.03)	203(.12)		219(.36)	202(.10)	216(.10)
		216(.01)	249(.03)	208(.26)		211(.33)	261(.10)	217(.11)
		205(.33)	202(.03)	216(.05)		205(.31)	228(.11)	221(.13)
		222(1.04)	261(.12)	217(.09)		222(.28)	224(.13)	236(.14)
		270(.32)	223(.05)	267(.06)		214(.26)	225(.14)	260(.16)
		260(.2 )	240(.01)	276(.07)		207(.18)		
		225(.4 )	263(.37)	235(.08)				
		236(.13)	213(.08)	209(.03)				
		224(.2 )	203(.12)	249(.03)				
		221(.08)	208(.26)	202(.03)				
		271(.18)	216(.05)	261(.12)				
		228(.08)	217(.09)					
2		280(1.77)	293(.01)	287(.01)		280(1.51)	299(.01)	293(.01)
		284(.53)	288(.01)	283(.12)		284(.63)	279(.01)	287(.01)
		285(.73)	239(.02)	286(.02)		285(.61)	292(.01)	274(.02)
		289(.49)	281(.03)	290(.30)		289(.40)	288(.02)	273(.02)
		291(.2 )				270(.22)	272(.02)	283(.02)
						291(.21)	267(.04)	240(.04)
						290(.21)	276(.05)	271(.12)
						281(.18)		
3	304(2.50)	310(1.79)	325(.07)	306(.58)	304(4.24)	300(1.99)	325(.05)	306(.08)
	313(3.71)	300(1.02)	326(.12)	301(.13)	310(3.7 )	324(1.77)	326(.10)	317(.15)
	311(2.24)	324(1.07)	317(.25)	307(.09)	313(3.65)	316(1.45)	323(.19)	307(.21)
		316(1.6 )	318(.33)	315(.24)	311(2.84)	312(1.42)	328(.21)	318(.25)
		312(1.29)	305(.56)	329(.65)		314(1.32)	315(.34)	305(.43)
		314(1.31)	302(.62)	321(.49)		303(.87)	329(.47)	321(.49)
		303(.64)	320(.62)	319(.73)		319(.63)		
4	330(6.26)	340(.66)	333(.51)	339(.13)	334(.16)	330(4.35)	340(.65)	333(.09)
	331(2.66)	343(1.01)	344(.07)	336(.19)	345(.26)		343(.65)	344(.08)
		341(3.5 )	349(.2)	335(.90)	323(.19)		320(.59)	335(.16)
		342(.29)	328(.27)	332(.19)			332(.23)	342(.34)
							341(.36)	

Appendix 4.V Contd....

5	374(3.36)	364(1.2 )	386(.13)	379(.03)	385(.03)	374(4.78)	364(1.95)	379(.04)	385(.04)	383(.05)
	360(3.75)	356(1.41)	383(.03)	381(.03)	373(.07)	360(3.83)	356(1.85)	381(.07)	373(.07)	389(.12)
		352(1.72)	389(.04)	358(.18)	367(.07)		352(.47)	358(.14)	377(.15)	367(.19)
		372(1.19)	387(.12)	370(.77)	369(.14)		372(1.28)	387(.21)	320(.21)	369(.24)
		361(.79)	376(.33)	355(.37)	382(.21)		361(1.10)	376(.26)	355(.26)	382(.41)
		357(.91)	359(.30)	362(.59)	351(.47)		357(1.10)	359(.42)	362(.42)	384(.46)
		353(1.34)	380(.33)	375(.42)	371(.42)		353(.99)	351(.54)	380(.67)	375(.72)
		366(.29)	350(.75)	363(.60)	354(1.12)		366(.98)	371(.75)	350(.78)	363(.90)
							354(.95)			

Note: Cd. - denotes WIC codes.



## Chapter 5

### SUMMING UP

In summing up the main findings of the study, we note that the growing literature on industrial growth in India has contributed to clarify some interesting side-lights on the analytics of planning and interventionist policies of the Government on industrial development in the country. There is but an apparent shortcoming. Most of the debates and discussions are carried out in the national context; very few of them have examined the regional dimensions of growth and structural changes with the result that our understanding of the process of regional industrialization is awfully unsatisfactory for analytical as well as policy purposes. Placed in that context, the findings of our study on the growth performance and structural changes in Kerala vis-a-vis other south Indian States should go some way towards improving our understanding on the regional industrial development in an inter-regional framework.

It transpired from our analysis of growth rates in-value added during 1976-87 that whenever the manufacturing sector at all-India level was more dynamic in terms of growth, the recorded growth rate in the south Indian states were lower than all-India and vice-versa. More importantly, during eighties when there was growth buoyancy at the all-India level the southern states recorded a decline in their growth rate. Such a trend was all the more

striking in the case of Kerala. While there was an increase in the growth rate in the sub-period 1981-87 as compared to the earlier sub-period 1976-81 at all-India level, south Indian States in general and Kerala in particular recorded a decline in growth. Overall, the growth rates in Kerala though were marginally different in magnitude, the trend synchronized with the pattern in other south Indian States. By broad industry group also, the trend was similar. The growth trends at a more disaggregated level of industrial classification also confirmed with the overall patterns observed at the macro level though some specific industry-groups did show some differences. A plausible inference that can be drawn from the experience of Kerala vis-a-vis other south Indian states is this; the industry mix in south India in general and more particularly in Kerala must have been dominated by a set of industries different from the ones in the mix at the national level. Thus viewed, inter-regional variations in industrial growth rates inter-alia are associated with the differences in the industrial structure and changes therein over time.

Our attempt at analyzing the trends in productivity growth revealed the following; (a) Kerala recorded a higher growth rate in terms of all indices of productivity as compared to south India and all India during the study period taken as a whole; (b) labour productivity growth in south Indian states in general and particularly in Kerala showed an improvement during the sub-period 1981-87 as compared to the earlier period 1976-81; (c) capital

productivity growth on the other hand registered a decline in the growth rate during the second sub-period in Kerala, other south Indian states and all-India; and (d) while the trend in partial productivity growth remained the same across different regions during the period of analysis, total factor productivity growth showed a different pattern. To be more specific, while total factor productivity growth recorded decline in Kerala as well as other south Indian states, (except Karnataka), it increased at the all-India level. On the whole, notwithstanding certain similarities in terms of the growth in partial productivity indices, there was a distinct difference in factor use efficiency and technological dynamism as shown by the indices of TFPG in Kerala and other south Indian states vis-a-vis all-India. By broad industry groups and at the two digit level, the above findings were found valid. Also, it was found that the pattern of growth observed in terms of value added growth was almost the same as that of productivity. Viewed thus, the growth in value-added was found to be nothing but a mirror image of productivity growth and by inference, growth-stimulating policies should be consistent with productivity-enhancing programmes.

The analysis of the changes in industrial structure carried out both in terms of the share of different industrial branches in the total value-added and economic base study concepts (e.g. location quotient and specialization coefficient) suggested that the degree of diversification achieved was below the national

average in all the southern States. There were of-course differences across the states in the levels of diversification within south India. Tamil Nadu which had initiated the process of industrialization long back has now a relatively high level of diversified industrial structure. In Karnataka where the spurt of industrialization has been of recent origin, the degree of diversification has been rapid though the level still remained much below Tamil Nadu and national average. What came out as the striking finding was the trend towards increasing concentration in the industrial structure in Kerala and diversification in Tamil Nadu and Karnataka. Overall, despite marginal inter-state differences in character, industrial structure in all the southern states still remained more concentrated than diversified as compared to the national level though, among themselves, Tamil Nadu has achieved the highest degree diversification and Kerala the lowest. The states of Karnataka and to some extent Andhra Pradesh also recorded a moderate diversification in their industrial structure.

In terms of industrial mix the southern states showed some marked difference with all-India and there were differences among the southern states as well. Thus, some degree of specialization in the state-regions consistent with the resource-endowments self-evident. Yet, it was encouraging to see growing share of modern engineering industries in Karnataka making a trend towards progressive diversification. The structure in Andhra Pradesh tended

to show a concentrated character similar to Kerala but there was an encouraging trend of increasing share of engineering industries in Andhra Pradesh. In Kerala the overall industrial structure remained still highly concentrated with an industrial mix marked by low shares of engineering and foot-loose industries and dis-proportionately high shares of traditional agro-based and chemical based industries as compared to other south an states and all-India.

The slow growth in value-added by manufacture and continued existence of the concentrated of the industrial mix in Kerala as against corresponding higher growth rate and progressive structural diversification at all-India and to a lesser degree, in other southern States during the eighties constituted the striking features emerging from the comparative analysis attempted in the study.

The above findings emerging from our analysis of industrial development in an inter-regional perspective tends to suggest a positive association between structural diversification and productivity/growth performance. The examination of the correlate between growth performance and structural change with the help of Shift-share analysis provided empirical support to the postulate and further revealed that in a relatively more diversified state like Karnataka, characterized by an industrial mix with fair share of modern engineering and foot-loose

industries, the regional factors are currently more important than structural factors in explaining growth variations. A similar trend was observed in Tamil Nadu which has a long history of industrialization. In the case of Andhra Pradesh it was found that the regional factors were getting more important than structural factors over time. In the case of Kerala the structural factors appeared more significant than the regional factors in accounting for the growth differentiation.

On the whole, the results of the shift-share analysis suggested a positive association between structural change and growth performance. Needless to say, in industrially more diversified regions like Karnataka and Tamil Nadu, the regional factors are seemingly more dominant than structural factors whereas in Kerala and Andhra Pradesh, both regional and structural factors are important in explaining variations in growth performance observed during the eighties. Thus the analysis tends to suggest that attempts towards improving the growth performance of regions like Kerala should address to not only region specific factors (like power supply, wages and labour relations) but also to the structural factors, which have implications on inter-industry demand, linkages, agglomeration economies etc. and thereby on the region's growth performance.

To conclude, the major findings emerging from our study of the trends in growth performance and structural changes in the

manufacturing sector of Kerala vis a vis other south Indian states underlined some lessons on the dynamics of structural changes in relation to regional industrial development in general and in particular, their import on policy initiatives for speeding up industrial development in Kerala.

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*National Industrial Classification (NIC)-70 Codes and Descriptions—An Extract*

Major Group	Group	Description
20—21		<i>Manufacture of Food Products</i>
	200	Slaughtering, preparation and preservation of meat.
	201	Manufacture of dairy products.
	202	Canning and preservation of fruits and vegetables.
	203	Canning, preserving and processing of fish, crustacean and similar foods.
	204	Grain mill products.
	205	Manufacture of bakery products.
	206	Manufacture and refining of sugar (vacuum pan sugar factories).
	207	Production of indigenous sugar, boora, Khandsari, gur, etc. from sugar-cane and palm juice.
	208	Production of common salt.
	209	Manufacture of cocoa, chocolate and sugar confectionery (including sweetmeats).
	210	Manufacture of hydrogenated oils, vanaspati ghee, etc.
	211	Manufacture of other edible oils and fats e.g. mustard oil, groundnut oil, til oil, etc. (Inedible oils shown under 315).
	212	Tea processing.
	213	Coffee curing, roasting and grinding.
	214	Cashewnut processing like drying, shelling, roasting, salting etc.
	215	Manufacture of ice.
	216	Manufacture of prepared animal feeds.
	217	Manufacture of starch.
	219	Manufacture of food products not elsewhere classified.
22		<i>Manufacture of Beverages, Tobacco and Tobacco products</i>
	220	Distilling, rectifying and blending of spirits.
	221	Wine industries.
	222	Malt liquors and malt.
	223	Production of country liquor and toddy.
	224	Soft drinks and carbonated water industries.
	225	Tobacco stemming, redrying and all other operations which are connected with preparing raw leaf tobacco for manufacture.
	226	Manufacture of bidi.
	227	Manufacture of cigars, cigarettes, cheroot and cigarette tobacco.
	228	Manufacture of chewing tobacco, zarda and snuff.
	229	Manufacture of tobacco & tobacco products not elsewhere classified.
23		<i>Manufacture of Cotton Textiles</i>
	230	Cotton ginning, cleaning and baling.
	231	Cotton spinning, weaving shrinking, sanforizing, mercersing and finishing of cotton textiles in mills.
	232	Printing, dyeing and bleaching of cotton textiles.

Major Group	Group	Description
27		<i>Manufacture of Wood and Wood Products Furniture and Fixtures—contd.</i>
	275	Manufacture of cork and cork products.
	276	Manufacture of wooden furniture and fixtures.
	277	Manufacture of bamboo and cane furniture and fixture.
	279	Manufacture of wood, bamboo and cane products not elsewhere classified.
28		<i>Manufacture of Paper and Paper Products and Printing &amp; Publishing and Allied Industries.</i>
	280	Manufacture of pulp, paper and paper board including newsprint.
	281	Manufacture of container and boxes of paper and paper board.
	282	Manufacture of pulp products not elsewhere classified like dolls.
	283	Manufacture of paper and paper board articles not elsewhere classified.
	284	Printing and publishing of newspapers.
	285	Printing and publishing of periodicals, books, journals, atlases, maps and sheet music directories etc.
	286	Printing of bank notes, currency notes, postage stamps, security presses etc.
	287	Engraving, etching, block making etc.
	288	Book binding.
	289	Printing, publishing and allied activities not elsewhere classified like envelope printing picture post card printing, embossing etc.
29		<i>Manufacture of Leather and Leather and Fur Products (except Repair).</i>
	290	Tanning, curing, finishing, embossing and japanning of leather.
	291	Manufacture of footwear (excluding repair) except vulcanized or moulded rubber or plastic footwear.
	292	Manufacture of wearing apparellike coats, gloves, etc. of leather and substitutes of leather.
	293	Manufacture of leather consumer goods (other than apparel and footwear).
	294	Scraping, currying, tanning, bleaching and dyeing of fur and other pelts for the trade.
	295	Manufacture of wearing apparel of fur and pelts.
	296	Manufacture of fur and skin rugs and other articles.
	299	Manufacture of leather and fur products not elsewhere classified.
30		<i>Manufacture of Rubber, Plastic, Petroleum and Coal Products.</i>
	300	Tyre and tube industries.
	301	Manufacture of footwear made primarily of vulcanized or moulded rubber.
	302	Manufacture of rubber products not elsewhere classified.
	303	Manufacture of plastic products not elsewhere classified (except house furnishing).
	304	Petroleum refineries.
	305	Manufacture of products of petroleum not elsewhere classified.
	306	Products of coal tar in cokeovens.
	307	Manufacture of other coal and coal tar products not elsewhere classified.
31		<i>Manufacture of Chemical and Chemical Products (except Products of Petroleum and Coal)</i>
	310	Manufacture of basic and industrial organic and inorganic chemicals and gases such as acids, alkalies and their salts, gases like acetylene, oxygen nitrogen etc.
	311	Manufacture of fertilizers and pesticides.
	312	Manufacture of paints, varnishes and lacquers.
	313	Manufacture of drugs and medicines.
	314	Manufacture of perfumes, cosmetic, lotions, hair dressings, tooth pastes, soap in any form, synthetic detergents, shampoos, shaving products, cleaners, washing and scouring products and other toilet preparations.

Major Group	Group	Description
31		<i>Manufacture of Chemical and Chemical Products (except Products of Petroleum and Coal)—contd.</i>
	315	Manufacture of inedible oils.
	316	Manufacture of turpentine, synthetic resins, plastic materials and synthetics fibres like nylon, torylen except glass.
	317	Manufacture of matches.
	318	Manufacture of explosives and ammunition and fire works.
	319	Manufacture of chemical products not elsewhere classified (including photo-chemicals, sensitised films and paper).
32		<i>Manufacture of Non-Metallic Mineral Products.</i>
	320	Manufacture of structural clay products.
	321	Manufacture of glass and glass products.
	322	Manufacture of earthen ware and earthen pottery.
	323	Manufacture of chinaware and porcelain ware.
	324	Manufacture of cement, lime and plaster.
	325	Manufacture of mica products.
	326	Manufacture of structural stone goods, stone dressing and stone crushing and stone ware.
	327	Manufacture of earthen and plaster statues and other products.
	328	Manufacture of asbestos, cement and other cement products.
	329	Manufacture of miscellaneous non-metallic mineral products such as slate products, abrasives, graphit products, mineral wool, silica products and other non-metallic mineral products not elsewhere classified.
33		<i>Basic metal and Alloys Industries.</i>
	330	Iron and steel industries.
	331	Foundries for casting and forging iron and steel.
	332	Manufacture of ferro-alloys.
	333	Copper manufacturing.
	334	Brass manufacturing.
	335	Aluminium manufacturing.
	336	Zinc manufacturing.
	339	Other non-ferrous metal industries.
34		<i>Manufacture of Metal Products and Parts except Machinery and Transport Equipment.</i>
	340	Manufacture of fabricated metal products such as metal cans from tin-plate, terne plate or enamelled sheet metal, metal shipping containers, barrels, drums, kegs, pails, safes, vaults, enamelled sanitary and all other fabricated metal products not elsewhere classified.
	341	Manufacture of structural metal products.
	342	Manufacture of furniture and fixtures, primarily of metal.
	343	Manufacture of hand tools and general hardware.
	344	Enamelling, japanning, lacquering, galvanising, plating and polishing of metal products.
	345	Manufacture of metal utensils, cutlery and kitchenware.
	347	Manufacture of metal products except machinery and transport equipment not elsewhere classified, like type founding.
35		<i>Manufacture of Machinery, Machine Tools and Parts, except Electrical Machinery.</i>
	350	Manufacture of agricultural machinery and equipment and parts.



Major Group	Group	Description
35		<i>Manufacture of Machinery, Machine Tools and Parts, except Electrical Machinery--contd.</i>
	351	Manufacture and repair of drills, coal cutting machines, earth moving, lifting and hoisting machinery cranes, conveyors and road rollers and other heavy machinery and equipment used by construction and mining industries.
	352	Manufacture of prime movers, boilers and steam generating plants such as diesel engines and parts.
	353	Industrial machinery for food and textile industries.
	354	Industrial machinery for other than food and textile industries.
	355	Manufacture of refrigerators, airconditioners and fire fighting equipment and other parts components and accessories.
	356	Manufacture, alteration and repair of general items of non-electrical machinery, components, equipment and accessories not elsewhere classified.
	357	Manufacture of Machine tools, their parts and accessories.
	358	Manufacture of office computing and accounting machinery and accessories.
	359	Manufacture of repair and non-electrical machinery, equipment, components and accessories, not elsewhere classified (such as sewing machines, automatic merchandising machines, washing, laundry, drycleaning and pressing machines, cooking ranges and ovens, other service industry machines, arms and armament etc.).
36		<i>Manufacture of Electrical Machinery, Apparatus, Appliances and Supplies and Parts.</i>
	360	Manufacture of electrical industrial machinery and apparatus and parts (such as electrical motors, generators, transformers, electromagnetic clutches and brakes etc.)
	361	Manufacture of insulated wires and cables.
	362	Manufacture of dry and wet batteries.
	363	Manufacture of electrical, apparatus, appliances and other parts such as lamps, bulbs, tubes, sockets, switches, fans, insulators (except porcelain), conductors, irons, heaters, shavers, cleaners, etc. excluding repairing.
	364	Manufacture of radio and television transmitting and receiving sets including transistor radio sets, sound reproducing and recording equipment including tape recorders, public address system, gramophone record and pre-recorded magnetic tapes, wire and wireless, telephone and telegraphs equipment, signalling and detection equipment and apparatus, radar equipment and installations, parts and supplies specially used for electronic apparatus classified in this group.
	365	Manufacture and repair of radiographic X-ray apparatus and tubes and parts.
	366	Manufacture of electronic computers control instrument and other equipment.
	367	Manufacture of electronic components and accessories not elsewhere classified.
	369	Manufacture of electrical machinery, apparatus, appliances and supplies and parts not elsewhere classified.
37		<i>Manufacture of Transport Equipment and Parts.</i>
	370	Ship building and repairing.
	371	Manufacture of locomotives and parts.
	372	Manufacture of railway wagons and coaches and parts.
	373	Manufacture of other rail road equipment.
	374	Manufacture of motor vehicles and parts.
	375	Manufacture of motor-cycles and scooters and parts.
	376	Manufacture of bicycles and cycle-rikshaws and parts.
	377	Manufacture of aircraft and its parts.
	378	Bullock-carts, push-carts, hand-carts etc.
	379	Manufacture of transport equipment and parts not elsewhere classified.

Major Group	Group	Description
38		<i>Other Manufacturing Industries.</i>
	380	Manufacture of medical, surgical and scientific equipments.
	381	Manufacture of photographic and optical goods (excluding photo chemicals, sensitised paper and film.)
	382	Manufacture of watches and clock.
	383	Manufacture of jewellery and related articles.
	384	Minting of coins.
	385	Manufacture of sports and atheletic goods.
	386	Manufacture of musical instruments.
	387	Manufacture of stationery articles like fountain pens, pencils, pens, pin cushions, tags, etc. not elsewhere classified.
	389	Manufacture of miscellaneous products not elsewhere classified such as costume jewellery, costume, novelties, feathers, plumes artificial flowers, brooms, brushes, lamp shades, tobacco pipe, cigarette holders, ivory goods, badges, wigs and similar articles.
40		<i>Electricity.</i>
	400	Generation and transmission of electric energy and distribution of electric energy to house hold, industrial, commercial and other users.
41		<i>Gas and Steam.</i>
	410	Manufacture of gas in gas works and distribution through mains to household, industrial and commercial and other users.
42		<i>Water Works and Supply.</i>
	420	Water supply i.e., collection, purification and distribution of water.
74		<i>Storage and Ware-housing</i>
	741	Cold-storage.
97		<i>Repair Services.</i>
	971	Repair of footwear and other leather goods.
	972	Electrical Repair shop.
	973	Repair of motor vehicles and motor cycle.
	974	Repairs of watches, clocks and jewellery.
	975	Repair of bicycles and cycle rickshaws.
	979	Repairs of enterprises not elsewhere classified.