

**PERFORMANCE OF STATE LEVEL PUBLIC ENTERPRISES  
IN KERALA: A STUDY OF PRE - AND POST - LIBERALISATION PERIODS**

*Dissertation submitted in partial fulfilment of the requirements for the degree of  
Master of Philosophy in Applied Economics of the Jawaharlal Nehru University,  
New Delhi*

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**JUNE, 2012**

I hereby affirm that the work for this Thesis, "**Performance of State Level Public Enterprises In Kerala: A Study of Pre- and Post- Liberalisation Periods**", being submitted as part of the requirements for award of the degree of Master of Philosophy in Applied Economics of the Jawaharlal Nehru University, was carried out entirely by myself. I also affirm that it was not part of any other programme of study and has not been submitted to any other University for the award of any Degree.

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*To My Beloved Father*

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*Abstract of the Dissertation*

**PERFORMANCE OF STATE LEVEL PUBLIC ENTERPRISES IN KERALA:  
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The present study examines the performance of State Level Public Enterprises (SLPEs) in Kerala engaged in manufacturing activities. The study is relevant in the context of the ongoing debates about the 'performance improvement' of these enterprises by the last several years. In this study the performance of these enterprises has been evaluated in terms of both physical as well as financial performance indicators. Physical performance has been examined mainly in terms of various productivity measures and financial performance has been examined by employing various profitability ratios.

The study has been done using the firm level data of 26 manufacturing firms for the period of 1981-82 to 2010-11. For the purpose of comparison we broadly divide the entire period of our study into pre-reform period (1981-82 to 1990-91) and post-reform period (1991-92 to 2010-11). Productivity growth has been estimated with both partial as well as total factor productivity measures. For the estimation of Total Factor Productivity Growth (TFPG), we employed the growth accounting approach based on translog index. The estimates made by using both single as well as double deflation procedure shows that the total factor productivity growth was relatively high during the pre-reform period comparing to the post-reform period. However, last five years of the post liberalisation period recorded a substantial improvement in the TFPG. Partial productivity indicators are also demonstrating a similar fashion. Decomposition of value added growth reveals that the contribution of labour and capital has been decreasing over time in relation to TFPG.

Financial performance of these enterprises has been examined in terms of profitability and financial leverages ratios. The result shows that the profitability ratio (Return On Asset) was not satisfactory in both the pre and post reform periods. A further division of post reform period reveals that profitability of SLPEs has improved substantially during the last five years. By employing various financial leverages ratios we could find that most of these firms have been aggressively financed its operations through borrowings. Resultant interest burden adversely affects their profitability and further expansion. We also did a panel regression analysis to identify the possible factors contributing to the profitability performance of these enterprises, which too validate the above conclusions.

**Key Words:**

SLPEs, Physical Performance, Financial Performance, TFPG and Partial Productivity

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## Abbreviations

|       |   |                                   |
|-------|---|-----------------------------------|
| BPEs  | = | Bureau of Public Enterprises      |
| CPSEs | = | Central Public Sector Enterprises |
| CR    | = | Current Ratio                     |
| DD    | = | Double Deflation                  |
| DE    | = | Debt to Equity                    |
| DEA   | = | Data Envelopment Analysis         |
| DMUs  | = | Decision Making Units.            |
| FC    | = | Finance Commission                |
| GFA   | = | Gross Fixed Assets                |
| PAT   | = | Profit After Tax.                 |
| PBIT  | = | Profit Before Interest and Taxes. |
| PC    | = | Planning Commission               |
| PEs   | = | Public Enterprises                |
| RE    | = | Random Effect                     |
| SD    | = | Single Deflation                  |
| SLPEs | = | State Level Public Enterprises    |
| SSNP  | = | Social Safety Net Program         |
| TFP   | = | Total Factor Productivity.        |
| TFPG  | = | Total Factor Productivity Growth  |
| VA    | = | Value Added                       |
| VRS   | = | Voluntary Retirement Scheme       |
| WPI   | = | Whole Sale Price Index            |

## Chapter I

### Introduction

Kerala which is a small state in the Indian union got enough attention in literature for its peculiar model of development. The central theme implicit in Kerala's experience and the "Kerala model" of development is the capability of a society with relatively low income to achieve high quality of living levels (Subrahmanian et al, 2000). However many of the literature are sceptical about the sustainability of such a model,<sup>1</sup> it is mainly on the ground of relatively poor growth of the productive sectors. One of the reasons for this poor growth is that the growth of industrial sector in the state is in stagnation or near stagnation by the last few decades<sup>2</sup>. There are so many factors which are responsible for the poor growth of this industrial sector, one among many is that at the time of formation of the state Kerala inherited a weak industrial base (Pillai, 1994), only the Travancore region had accounted few modern manufacturing industries<sup>3</sup>. So in order to create a strong industrial base in the state, the government had to take the role of an entrepreneur. As a result a number of modern manufacturing enterprises were set up in the state sector. Now Kerala has the largest number of state level public enterprises<sup>4</sup> (SLPEs) in the country<sup>5</sup>. However these enterprises faced severe criticism due to growing inefficiencies<sup>6</sup>. Beside this, the ongoing liberalisation and marketisation programmes at the national level caused the expansion of private sector and it is now presumed that these manufacturing enterprises have to sustain and grow in a more competitive environment than any other periods.

The performance SLPEs in Kerala in the liberalisation period have not so far attracted the enough attention that they deserved either by the general public or the academic<sup>7</sup>.

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<sup>1</sup> For instance, see Franke and Barbara 1999, and Kurien 1999

<sup>2</sup> See George, 1993, and Subrahmanian, 2003

<sup>3</sup> Tharakan and Isaac, 1986

<sup>4</sup> A public sector enterprise is defined as a company which is registered under the companies Act of 1956 in which not less than 51 per cent of the paid up share capital is held by the Central Government or any State Government or any Local Self-Governments or partly by the Central Government and partly by one or more State Governments.

<sup>5</sup> Bureau of Public Enterprises, 2012

<sup>6</sup> See Subrahmanian, 1994.

<sup>7</sup> There are few studies related to the performance of these enterprises during 1980s, which we will discuss latter.

Further, we do not have relevant analytical account on the performance of these enterprises. The present study is an attempt to fill this gap in literature by analysing the physical and financial performance of SLPEs in Kerala engaged in the manufacturing activities.

Before going to discuss the issues and objectives of the present study, it is relevant to narrate the historical background of the origin of public enterprises. The motives for the establishment of public enterprises were different in developing and developed countries. Public enterprises were emerged as a matter of economic and historical necessities in the developing countries. At the time of independence private indigenous sector in these countries did not have the enough capital to set up big enterprises and also were not sufficiently organised to secure loans from the financial institutions. Apart from these necessities the ideological consideration to set up a socialistic pattern of society also boosted the setting up of Public Enterprises (PEs) in the developing countries. Many third world countries therefor opted a strategy of economic development based on state ownership and much control of the industrial sector. Nationalisation and takeover of companies that were incurring losses were led the mushroom in numbers of these enterprises. However, by far the largest numbers of the state enterprises in developing countries were established as the results of the government's development strategies (Mariam and Mengistu, 1988).

### **1.1 Historical Background of Public Enterprises in India**

The public enterprises in India have been established as a matter of historic necessity along with ideological commitment to establish a socialistic pattern of society. At the time of independence there were hardly any private enterprises to build a strong industrial base in the country (Dutta, 1997). So the task to rebuild the economy came upon the government. The policy holders were realised the necessities of state control on the means of production and distribution. Along with these socialistic ideology and historic necessities large number of PEs have been set up to occupy the commanding heights of the economy, to fill up the gaps in areas critical for the development of the country and provide wherewithal to finance its planned economic growth (Sankar et al, 1986).

The historical growth of public enterprises in independent India can be traced back to various industrial policy resolutions. The industrial policy resolution of 1948 stated that the government would expand its existing units and start new one in the fresh field with a view to the expansion of production for more equitable distribution in order to ensure a socialistic pattern of society (Singh, 1997). Further the industrial policy resolution of 1956 based on the Mahalanobis model which replaced the existing one accorded a predominant role to the state owned enterprises and the state was imposed to assume direct responsibility for industrial development. The resolution exclusively reserved 18 industries for PSEs these include all key industries which are strategic importance, public utility services and those industries which required heavy investment. In consort with these industrial policy resolutions successive five year plans were given specific priorities for public sector enterprises (Amiya Bagchi, 1992)<sup>8</sup>. The first plan (1951-56) document says that, 'The scope and need for development is so great that it is best for public sector to develop those industries in which private enterprises is unable or unwilling to put the resources to run the risk involved'. The first five year plan has given Rs. 1960 crores to the public sector which was 10 per cent of total plan outlay. Nevertheless after the initial concentration of investment in the key areas public sector began to spread in to all areas of the economy including modern manufacturing activities (Mishra, 2009). This has led to a phenomenal growth of public sector and the number of central public enterprises (CPEs) has increased from 21 by the end of first plan, (1956) to 176 by 1980 and further rose to 244 in 2012<sup>9</sup>.

## **1.2 The Growth of State Level Public Enterprises in India**

Most of the states in India have its own public enterprises engaged in a variety of activities. Such enterprises have come to be widely known as the State Level Public Enterprises (SLPEs). A large number of SLPEs were come to be existence on account of the historical factors and pragmatism than the ideological consideration. Many of them were owned by the former princely states prior to the formation of present states of the Indian union (Sankar et al, 1986). Along with the historical factors a major chunk of them were established to fulfill certain social as well as economic objectives. They were mainly set up by various states to act as an instrument for accelerating the pace of

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<sup>8</sup> The growth of central public enterprises in India under various five year plans has been given in Appendix C Table No. C.1

<sup>9</sup> Department of PEs, 2011.

development, to provide direct and indirect employment to people, to control of inflation, to ensure equitable distribution of scarce commodities, mopping up of monopoly profits, to create surplus for further expansion and lead to the development of a particular region and (Rao et al, 1994).

Every state has nationalised transportation, energy, public utility, promotional, financial and service sectors. Beside this there are so many manufacturing enterprises ranging from traditional to modern manufacturing enterprises such as electrical, electronic and engineering industries. In 2006-07 there were 1045 SLPEs in our country with an investment of Rs. 3, 33, 44140 crores. It constitutes 13.2 per cent of GDP and 61.5 per cent of public sector GDP (Mishra, 2009b). Table 1.1 provides details of the SLPEs in various states in terms of number of organisation, total investment and employment.<sup>10</sup>

Table 1.1  
Macro View of SLPEs in India as on 31<sup>st</sup> March 2007

| States           | No of SLPEs | Total Investment<br>(Rs. in lakhs) | Employment (Nos.) |
|------------------|-------------|------------------------------------|-------------------|
| Andhra Pradesh   | 35          | 32,99291.1                         | 2,65,081          |
| Assam            | 39          | 215097.3                           | 36,349            |
| Bihar            | 21          | 1,20456.87                         | 24,197            |
| Delhi            | 12          | 1129386                            | 28,613            |
| Goa              | 16          | 44860.78                           | 3418              |
| Gujarat          | 45          | 46,16912.5                         | 1,35,188          |
| Haryana          | 21          | 12,17208.2                         | 38,112            |
| Himachal Pradesh | 21          | 3,88632.15                         | 42,589            |
| Jammu & Kashmir  | 20          | 4,42087.62                         | 30,098            |
| Karnataka        | 65          | 38,38704.2                         | 1,58,916          |
| Kerala           | 89          | 8,39633.31                         | 94,885            |
| Madhya Pradesh   | 35          | 19,69205.2                         | 83,232            |
| Maharashtra      | 55          | 24,41415                           | 2,34,588          |
| Orissa           | 32          | 9,39867.25                         | 31,586            |
| Rajasthan        | 25          | 1,647182.7                         | 57727             |
| Punjab           | 27          | 13,91501.4                         | 91,369            |
| Tamil Nadu       | 55          | 15,23206.1                         | 2,52,898          |
| Uttar Pradesh    | 55          | 28,07753.1                         | 1,35,381          |
| West Bengal      | 66          | 34,89674.8                         | 75495             |
| Total            | 837         | 3,33,44140                         | 18,71805          |

Source: Department of Public Enterprises 2007, Government of India.

<sup>10</sup> Only states having more than 20 SLPEs are given in this Table,1.1

Among the states Kerala stands first in terms of number of SLPEs (89 working enterprises in 2007) followed by West Bengal and Karnataka with 66 and 65 SLPEs respectively. But in terms of investment Gujarat stands in the first position with an investment of Rs. 46,16912.5 lakhs followed by Karnataka with an investment of RS. 38,38704.2lakhs, West Bengal with RS 34,89674.8 lakhs and Andhra Pradesh with Rs. 32,99291.1lakhs in 2006-07. In terms of total investment Kerala has only the position of 11 even though it stood first in terms of the total number of SLPEs. Total number of employment in these enterprises were 18,71,805 during the same period. But in terms of employment Andhra Pradesh holds the first position with total number of employment of 2,65,081 person followed by Tamil Nadu, Maharashtra Karnataka and Utter Pradesh. It is important to note that a heavy presence of SLPEs has seen in South Indian states and these four states together accounts near 30 per cent of the total SLPEs, 29 per cent of the total investment and 41.23 per cent of total employment of the total SLPEs in the country in 2006-07.

### **1.3 Theoretical and Empirical Literature**

The following section deals with some theoretical issues such as the role of the state in the economy, the objectives of the public sector and the criteria for the evaluation of the performance of public sector enterprises with an extensive literature support.

#### **1.3.1 Role of the State in the Economy**

The theoretical literature on the performance of public enterprises are revolved around two vital subjects such as role of state in the market and how to evaluate the performance of these PEs. The role of government in the economy is always a bone of contention. Critics of the role of government have two arguments: one is that the government is not needed: Coasian bargaining<sup>11</sup> leads to efficient solutions, the other is that government is rife with inefficiencies, such as those associated with red tapes and rent seeking<sup>12</sup> (Stigliz, 1998).

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<sup>11</sup> Coasian bargaining: when one party's activity adversely impacts the welfare of an unintended third party, one tends to think that an external cost (negative externality) has been generated, and that the activity in question has been carried too far, and that the impacted person should be compensated.

<sup>12</sup> Rent-seeking is an attempt to derive economic rent by manipulating the social or political environment in which economic activities occur, rather than by adding value.



Fundamental theorem of welfare economics says that market itself would produce efficient allocation of resources. This is based on the Adam Smith's faith in the invisible hand leading the self-interested decision of each person to maximise the wellbeing of the nation as a whole. But in the presence of imperfect information and incomplete market the economy will not be Pareto efficient. In other words whenever the markets are incomplete or the information is imperfect they do not work in the way that Adam Smith envisaged (Stiglitz, 2003). There will always be some government intervention by which the government can make every one better off (Greenwald and Stiglitz, 1986). So the state intervention in the economic life of the community is an accepted item of agenda of the modern governments. Indeed it was regarded as an essential and inescapable part of the obligations of modern governments to address economic imbalances, safe guard the interest of the community as a whole, to plan for over all progress and prosperity to undertake and execute schemes, and projects vital to the needs of the nation (Malya and Singhvi, 1971). It should be emphasised that the debate on the role of public enterprises is not be intended for either as an attack on market mechanism or as an attempt to prove the undesirability of any form of economic activity by the public sector (Baumol, 1983). So it can be concluded as, there is a role for government in the economy and also a role for the market and it suggests a third way between the socialism and laissez-faire (Stiglitz, 2003).

### **1.3.2 Social and Economic Objectives:**

There are different perspectives on how the performance of public enterprises should be evaluated. It is mainly because they meet two apparently contradictory objectives. These objectives can be broadly classified in to social as well as economic objectives. Being publicly owned, they are expected to pursue various activities in the public interest and at the same time achieve economic goals and generate cash flows in excess of their cash outflows (Aharoni, 1981). Earning of profits is neither the only nor the main consideration of a public enterprise. There are other considerations such as social equity, employment, balanced development and it is difficult to assign specific weights to these objectives. In 1951, the country's first five-year plan noted: "In the public sector the direction of investment is not governed exclusively by the profit-and-loss calculus; it has taken into account wider social considerations" (Government of India, 1951).

However there were seems to be strong support to the economic goals of these enterprises. Public Enterprises especially in the manufacturing sector are not only established to attain certain social objectives, but there are economic factors which outweigh these social objectives at least in the case of commercial PEs such as creation of surplus for further industrialisation, appropriate use of resources etc. As we noted earlier they are formed as an instrument for creating surplus for further industrialisation in most of the developing countries especially in in India. Public sector was expected to "...augment the revenues of the state and provide resources for further development in fresh fields" (Krishna, 1988). The term Public Enterprises cannot be treated as public goods, though both carry the same word 'public'. They are not 'public' in the sense of providing goods or services at free cost or at a nominal cost; they are essentially commercial organisations (Iyer, 1991). However these social and economic objectives can be reconciled at least in the case of public enterprises engaged in the commercial activities. For instance a plant may be located in a backward area in part to achieve the objective of regional development. Once the location decision is made, however, this objective has been achieved and the plant can still be operated according to commercial principles (Jonson, 1981). Further Shankar et al (1990) states that any PEs need to pass three stages during their way of growth. According to them in the first stage, it has greater responsibilities towards the fulfilment of political goal, in stage two, it has to balance between social and commercial goals and in the final stage the PEs has to overcome the constraints imposed by the socio-political goals and manage its affairs on commercial lines.

### **1.3.3 Performance Evaluation Criteria**

Performance of an enterprise can be viewed in many different angles. However in a broader sense two aspects requires special attention. The first one is physical performance and the next one is financial performance. In the following section we shall discuss these two performance indicators with the available literature.

#### **1.3.3.1 Physical Performance**

In literature it is the productivity and efficiency are the two propound parameters of measuring physical efficiency of an enterprises. There are various methods to measure the productivity of an enterprise. While dealing with the performance criteria for the

evaluation of public enterprises. Arjun Sen, Gupta committee (1984) suggested Total Factor Productivity Growth (TFPG) as the indicator for physical performance along with the partial productivity measures<sup>13</sup>. Dholakia (1978) compared the productivity performance of public enterprises with private firms in the manufacturing sector for the period of 1960-61 to 1975-76 and found that the productive efficiency of public enterprises has been increasing since 1960-61 whereas the productivity of private firms has not shown any upward trend rather it was fluctuating during the study period. Further Agarwal (2001) estimated the partial as well as total factor productivity of 58 CPEs engaged in the manufacturing activities for the period 1990-91 to 1998-98. The study showed a consistent decline in partial as well as total factor productivity (TFP) in several industrial groups especially in fertiliser, engineering and consumer goods industries.

### **1.3.3.2 Financial Performance**

Financial performance is the most popular measure in research for the evaluation of public enterprises and is usually examined with various profitability ratios. Profitability is the profit making ability of an enterprise and is based the concept of profit. Traditionally profit is defined as the differences between total revenue and total cost. However there are differences in opinion by taking profit as a sole criterion for evaluating the performance as in the case of private enterprises. It is argued that the performance of a public enterprise cannot be judged in the form of profit but it can be judged in the form of what it adds to the flow of goods and services in the economy as measured by gross national profits; it is the total value of sales of the enterprise and not its profits that should be taken as a measure of its contribution to the wellbeing and progress of the society (Jaiswal, 1971). Further Sen (1983) states that measuring the performance of public enterprises in terms of profitability as in the case of private enterprises is not justified, however in the absence of a well-established alternate criteria for the evaluation of these enterprises, people tend to judge them in terms of profit, it might be partly unjustified.

Contrary to this, various studies have reasonable arguments for taking profitability as a criterion for the evaluation of the performance of PEs. It is widely accepted that profits

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<sup>13</sup> A detailed discussion about various productivity measures has been done in the second chapter.

are necessary for self-financing of their further expansion. If the profits of these enterprises are not adequate then they have to depend on government and other financial institution and ultimately it will affect their survival due to heavy interest burden. So a policy of profits is necessary to build up adequate reserves which are necessary to build funds for improvement and modernisation (Varshney, 1959). The best measure of performance of a PEs in the developing country is the return from the funds invested in it and it will help the firm for its own expansion (Galbraith, 1961). Further V.K.R.V. Rao (1962) also expressed the same view, "Public Enterprise must be carried on a profit making basis, not only in the sense that public enterprise must yield an economic price... but must also get for the community sufficient resources for financing a part of the investment and maintenance expenditure of government".

The arguments for profits can also be justified from the social point of view. If these enterprises are not in a position to meet their working expenditure it will adversely affect the society as they (PEs) required assistance from the government in the form of subsidies and grants. The loss of these enterprises will leads to fiscal deficit as due to subsidies and reduced revenue in the form of taxes. So in order to avoid decline in government revenue, it is necessary either to device an appropriate system of taxes on public enterprises or to direct them to earn profits (Antony, 1992). Rao (1962) further states that "profits constitute the surplus available for saving and investment on the one hand and contribution to national social welfare programme on the other, and if public enterprises do not make profits the national surplus available for stepping up the rate of investment and the increase of social welfare will suffer a corresponding reduction".

A number of profitability measures are suggested by the different commissions set up to suggest reforms in PEs. A conference on the public sector held in prime minister's office has accepted return on investment has an indicator of financial performance and has suggested a 20 per cent return on capital invested in these enterprises<sup>14</sup>. Arjun Sengupta committee set up to suggest policies for the improvement of the performance of Central Public Enterprises (CPEs) has suggested two important financial performance measures such as gross margin on assets and net profit to net worth<sup>15</sup> for profit making

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<sup>14</sup> Quoted from Antony,1991.

<sup>15</sup> Net worth is paid up capital plus reserves and surplus subtracted by accumulated losses and intangible assets

enterprises. Further the report of the study group on reforms of the SLPEs (2002) set up by the planning commission evaluated the performance of different SLPEs with a wide range of profitability ratios such as gross profit margin, rate of return, debt equity ratio and set a bench mark for all these measures which has different for different sectors. Various finance commissions (FC) also suggested different benchmarks for each profitability measures they used. For instance, thirteenth FC suggests that state government enterprises should attain a 5 per cent dividend to equity ratio and 12 per cent net profitability ratio<sup>16</sup>.

There are plenty of studies on the performance of CPEs in India and used different financial performance measures. We are just reviewing the recent studies only. Mishra and Lakshmi (2006) analysed the financial performance of CPEs during the post liberalisation period by using various profitability ratios and found that the CPEs are performed well during the post-liberalisation period. Nagaraj (1997) analysed the performance of CPEs by using profitability ratios along with some macro aggregate variables such as public sector's share in total output, saving, investment and employment and he found that the profitability of these enterprises increased substantially after reforms. In another study (2006) he analysed the performance of these enterprises since 1950 by using some selected some macroeconomic aggregates along with profitability ratios and found that public sectors share in domestic output has increased steadily since 1960 to 1980 and remains stagnant from 1985 onwards with a decrease in public sector share in domestic investment. Jain and Yadav (2005) also studied the financial performance of CPEs for the period 1991 to 2002 by using various profitability ratios and found that they earned a satisfactory rate of return on capital employed during this period. Further Mishra and Kiranmai studied the financial performance of SLPEs in India for the period 1991 to 2003 and found that during this period many SLPEs incurred net losses<sup>17</sup>.

#### **1.4 State Level Public Enterprises in Kerala: A Profile**

From the previous section (section 1.2) we could understand that Kerala has the largest number of state public sector units in the country having 120 SLPEs of which 89 units

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<sup>16</sup> See Government of India, 2009

<sup>17</sup> Studies related to the performance of SLPEs in Kerala has been discussed in section 1.6

are working in 2010-11<sup>18</sup>. Of these, 35 enterprises are directly engaged in the manufacturing activities in 2010-11. There are so many reasons behind the establishment of large number of public enterprises in the state sector. At the time of formation of the state Kerala inherited a weak industrial base (Pillai, 1994), only the Travancore region had accounted few modern manufacturing industries<sup>19</sup>. The private investments in the states were very little mainly because of the entrepreneurs in the state were either not capable for larger investment or they were not keen to invest in risky ventures.<sup>20</sup> "So one of the reasons for this large number is that the state taking the role of a pioneering entrepreneur to enthuse private entrepreneurs to follow suit" (Government of Kerala, 2001). Another important reason was that the central sector investment in the state was negligible; Table 1.2 clearly shows that Kerala accounted only 2 to 3 per cent of central government investment at any point in time.

Table 1.2

Central Sector Investment in Kerala at Various Points in Time

| Year | Investment (Gross Block) as on March 31 <sup>st</sup> |        | Percentage Share in Total Investment |
|------|---|--------|--------------------------------------|
|      | All India   | Kerala |                                      |
| 1971 | 3,885   | 116    | 2.99                                 |
| 1981 | 8,116   | 423    | 2.33                                 |
| 1991 | 68,119  | 1,307  | 1.59                                 |
| 2001 | 4,11,865  | 9,893  | 2.40                                 |
| 2011 | 12,63,664   | 28,455 | 2.26                                 |

Source: Public Enterprises Survey, Various issues, Department of PEs, Government of India

So in order to fulfill certain objectives such as creation of employment opportunities, ensure balanced regional development, generate surplus for further industrialization the government had to come forward in the productive sectors. Initial five year plans were also given greater attention to the public sector enterprises. The second third and subsequent plan periods, witnessed establishment of large number of public enterprises. Along with the establishment of new enterprises takeover of the private companies that were incurring losses in order to protect the interest of employees were also enhanced

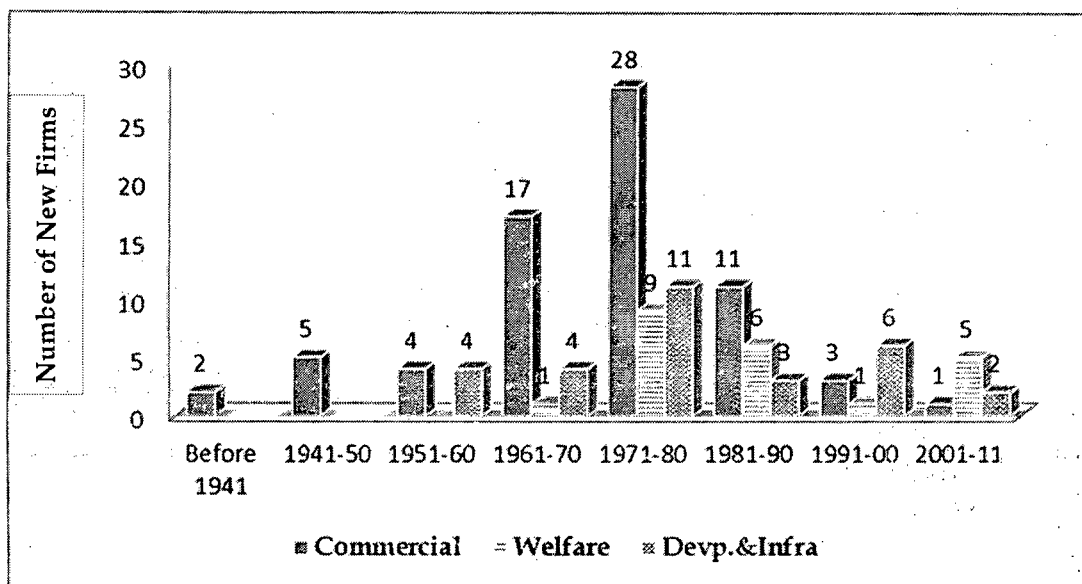
<sup>18</sup> Bureau of public enterprises, 2012.

<sup>19</sup> Tharakan and Isaac, 1986.

<sup>20</sup> For instance, see Pillai, 1989, and Beena, 1991

the mushroom in numbers of these enterprises<sup>21</sup>. As a result the number of publically owned companies has increased from 7 in 1950 to 37 by 1970 and it further rose to 85 in 1980. Formation of public enterprises in the state sector during various periods is given in chart 1.1 below.

Chart 1.1  
Formation of SLPEs in Kerala Across 1941 - 2011



Source: Bureau of Public Enterprises, Review of PEs in Kerala, Various issues

Note: Commercial enterprise includes modern manufacturing, traditional industries and trading units

The chart 1.1 above shows that there is a significant increase in the number of new public enterprises during the 1970s especially in the commercial units. However after the 1990s the growth of public enterprises in terms of number especially in commercial units has been decreased and the newly formed enterprises were accounted mainly in development and infrastructure and welfare units. Hence, we could see that among the public enterprises manufacturing enterprises<sup>22</sup> holds a key position in numbers in most of the years. These enterprises constitute around 23.03 per cent of the total output, 16.98 per cent of the total employment and 11 per cent of the total

<sup>21</sup> The oldest industrial units such as Travancore sugar and chemicals Ltd (1937) and Metropolitan engineering company Ltd (1945) were private companies and came under government control in 1974 and 1980 respectively.

<sup>22</sup> Coming under commercial units in chart 1.1.

investment in the organized manufacturing sector of Kerala in 2010-11<sup>23</sup>.

Though there has been an impressive growth in the number of public enterprises in Kerala especially in the manufacturing sector over the years, their performance has been shabby and dismal (Mathew, 1997). During the 1980s they were faced serious criticism due to growing inefficiencies and they were treated as a stumbling block for economic development (Subramanian, 1994). In many of these enterprises accumulated loss roughly equals to the total equity investment made during 1980s (Government of Kerala, 1990). Poor performance of many of the enterprises started imposing heavy financial burden on the state and many economists suggested that the role of the state should be restructured enabling it to act more as a catalyst than as an entrepreneur (Pillai, 1994). Given the poor financial health of the government, it was no longer possible to provide financial aid regularly to loss-making public units. So the state government began to rethink on the role of these enterprises in the economy in the early 1990s.

As a result a number of reform programme were under taken after the 1991 along with the policy changes in the Indian economy. However it is to be noted here that the reform programs initiated at the state level on the public enterprises was little different from the reform policy measures at the central level and what has done in many other states. As we discussed earlier the reform programs at the central level focused heavily on the disinvestment and privatisation while the reform policies in Kerala focused mainly on the restructuring of loss making enterprises than the privatisation of the existing units. Many of the states, especially Andhra Pradesh also considered privatisation of their public enterprises as a part of policy reform<sup>24</sup>. As a part of reform and restructuring programs many SLPEs in Kerala including Kerala Automobiles Ltd, Keltron Electro Ceramic Ltd, Steel Complex Ltd (SCL), Transformer and Electricals Kerala Ltd (TELK), etc., were registered<sup>25</sup> under Board of Industrial and Financial Reconstruction (BIFR) as per the amendment of Sick industrial Companies (special provision) act of 1992.<sup>26</sup>

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<sup>23</sup> Planning Board, 2011.

<sup>24</sup> See Appendix C, Table. C.2 for state wise number of privatised firms as on 2003

<sup>25</sup> The criteria for referring to the BIFR was that; those companies in which the accumulated loss equals or exceeds the net worth (paid up capital plus reserves)

<sup>26</sup> The original SICA was passed in 19985 as per the recommendations of T.Tiwari commission set up



Public Sector Restructuring and Internal Audit Board (RIAB) were formed in 1994 to execute reform initiatives in these SLPEs. RIAB mainly focuses on audit matters, analysis of performance and make recommendation for financial restructuring. RIAB evolved a seven-fold categorisation of SLPEs for restructuring and renovation. These categories includes the closing down of enterprises with negative net worth and strengthening of the enterprises which have positive net worth and earning profit<sup>27</sup>. Further Kerala industrial revitalisation fund board was set up by RIAB with statutory power to monitor the flow of funds to these enterprises, to modify, revise or reschedule the recoveries from the assisted undertakings and to review the performance of public sector industrial undertakings and other industrial undertakings on a periodic basis. Third administrative reform commission (1997) also dealt with the performance of public sector enterprises and made suggestion such as more autonomy to these enterprises, and establishment of a proper performance evaluation mechanism. Further the UNDP assisted Technical Assistance project on public sector reforms implemented during 1999-2001, with the support from Commonwealth Secretariat, London<sup>28</sup>.

The next government which came to power constituted the Enterprises Reforms Committee (ERC) in 2001 to initiate comprehensive reform programs and in March, 2002 the government approved the approach paper on SLPEs reforms. This approach paper recommended the government's active participation only in areas with strategic importance and high social relevance. On the basis of the ERC report, Government orders were issued for closure of ten manufacturing companies. The government further introduced a Social Safety Net (SSN) programme for reducing the number of workers in SLPEs. It consists of a financial compensation package and a welfare and economic sustainability package for retired employees which replace the voluntary retirement scheme in the 1994. Consequently from 1994 to 2005 about 4832 employees were took VRS/ SSNP and a total of Rs. 12633 lakhs were paid as compensation to these employees (Bureau of Public Enterprises, 2005)<sup>29</sup>.

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in 1981.

<sup>27</sup> For more details See Choudary, R.C, 2002.

<sup>28</sup> Bureau of public enterprises, 2005

<sup>29</sup> Firm wise details of the implementation of VRS from 1994 onwards have been given in Appendix C, Table. C.3

Restructuring and strengthening programmes were continued and in 2006 the government introduced a new action plan for these enterprises as a part of the industrial policy. This action plan include appointment of professionals as chief executive officers of these enterprises, one time settlement of financial dues to the banks and other financial institutions, monthly monitoring of the performance of these enterprises, annual budgeting system, conversion of government loans to equity, mutual support and co-operation between the government departments in the case of sales and purchase of goods and services, and tie-up with central public enterprises (State Planning Board, 2010)<sup>30</sup>

### 1.5 Context of the Study

Despite all the reforms and restructuring programs discussed in the previous section, the SLPEs in Kerala were continued to make losses. In 2001-02 the SLPEs in the manufacturing sector registered a loss of Rs. -15.05 crores which was further raised to Rs 69.49 crores in 2005-06. However since 2006-07 onwards these enterprises were continually registering profits, see table 1.3. In 2006-07 they registered a net profit of Rs. 94.24 crores which further rose to 127.47 crores in 2008-09. This momentum has been continued and the net profit of these enterprises rose to Rs. 295.79 crore in 2010-11.

Table 1.3

Performance of SLPE in Kerala

| Particulars                        | 2005-06       | 2006-07       | 2007-08       | 2008-09       | 2009-10       | 2010-11       |
|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Profit Making Units                | 12<br>(38.7)  | 21<br>(47.73) | 24<br>(57.14) | 24<br>(58.57) | 29<br>(78.38) | 29<br>(82.86) |
| Loss Incurring Units               | 31<br>(61.30) | 23<br>(52.27) | 18<br>(42.86) | 17<br>(41.43) | 8<br>(21.26)  | 6<br>(17.14)  |
| Total Number of Units              | 43            | 44            | 42            | 41            | 37            | 35            |
| Turnover (Rs. Crores)              | 1528.98       | 1579.01       | 1637.53       | 1932.84       | 2065.42       | 2304.42       |
| Net Profit/Loss(-)<br>(Rs. Crores) | -69.49        | 94.24         | 89.54         | 127.47        | 224.66        | 295.79        |

Source: State Planning Board, 2010 and 2011, Government of Kerala.

Note: Figures in the brackets are percentage of total number of units.

<sup>30</sup> There are different opinions about the policy measures taken during these period, to understand different views See, Businessline, 2012a, The Hindu, 2012, and Kareem, 2010.

Along with this the numbers of profit making units were increased and the loss making units were shrinking down over the years. Further there have been intense debates that these enterprises are performing well by the last several years while the performances of most of the SLPEs in other states are not satisfactory (Kareem, 2010)<sup>31</sup>. This improvement, if any, without privatisation of SLPEs in Kerala is more important in the context of the ongoing privatisation and disinvestment programs at the central level<sup>32</sup>. So the Key research question is; whether physical and financial performance of SLPEs in Kerala has been improved during the post liberalisation period?

### **1.6 Relevance of the Study**

There are only few studies regarding the performance of state manufacturing enterprises in Kerala. Beena (1991) compared the physical and financial performance of state sector enterprises with that of private sector firms for the period 1975 -1988. The study found that public sector enterprises performed better in terms of growth in value added, output and also in partial and total factor productivity growth. However in terms of financial performance private firms found to have better performance compared to public sector. Pillai (1989) examined the performance of state sector undertakings in Kerala for the period 1977-84 by using the data released by the bureau of public enterprises, Kerala. The study found that the technological backwardness contributed to low productivity and poor financial performance. The study also revealed that inventory management is less efficient in SLPEs. Further the study has done a case study by selecting few profit and loss making companies and found a variety of factors which had directly or indirectly contributed to the performance of these enterprises. Mathew (1997) examined the various system of performance evaluation existing in the public sector undertakings. The study also examined the financial performance of SLPEs for the period 1992-95 by using some macro level financial variables. The study further undertook a survey to understand management system of practices, production and marketing strategy and human resources base in the state manufacturing firms. Antony (1992), examined the efficiency in the form of capacity utilization, productivity and profitability, of 4 central public sector enterprises in Kerala for the period 1977 to 1989.

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<sup>31</sup> However there are different views about the 'performance improvement' of these enterprises, they says that the so called improved performance is just 'dressing up' rather than any real significant improvement in performance see, Business line, 2012a

<sup>32</sup> See Business line, 2012b

By dividing the study period into two such as 1977-78 to 1982-83 and 1983-84 to 1988-89 he found that labour and total factor productivity of central public enterprises in Kerala has been increased at the same time capital productivity was showed a slight decline and capacity utilisation of most of the firms is less than 75 per cent and these firms could attain a net profit only in 1981-81. The study also found that there is a declining trend in central sector investment in Kerala.

However there has been no any study on the performance of SLPEs enterprises in Kerala engaged in the manufacturing sector during the post liberalisation period even though these SLPEs still holds a significant portion of the manufacturing sector in the state<sup>33</sup>. In this background the present study is an attempt to evaluate the physical and financial performances of SLPEs in Kerala.

### **1.7 Objectives of the Study**

Basic objective of the present study is to analyse if there has been any improvement in the performance of SLPEs in Kerala during the post liberalisation period. As a corollary to this we will be analysing both the physical and financial performance of SLPEs in Kerala engaged in manufacturing activities. So the present study set the following specific objectives;

- To examines the physical performance of state level public manufacturing enterprises in Kerala
- To analyse the financial performance of state level public manufacturing enterprises in Kerala.

### **1.8 Data Base**

The study made use of the data collected from the profit loss accounts and balance sheet of public sector manufacturing companies published annually in the Review of Public Enterprises by the Bureau of Public Enterprises, Government of Kerala. In order to compare the physical and financial performance of different periods the data is collected for 30 years from 1981-82 to 2010-11. To understand a clear picture of public enterprises in India we also made use of the data published in various issues of Public Enterprises Survey, Department of Public Enterprises, Government of India, National survey on

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<sup>33</sup> Details are given in the section 1.4

SLPEs (2007) by the Department of Public Enterprises, Ministry of Heavy Industries and Public Enterprises, Government of India, the report of the study group on reforms of SLPEs set up by the planning commission in 2002, Various issues of Economic Review published by the Kerala state planning board and various issues of Statistics for Planning, published by the Directorate of Economics and Statistics, Government of Kerala.

### 1.9 Sample Selection

Since our basic motive is to compare the physical and financial performance of SLPEs in Kerala in the post-reform period with that of the pre-reform period we have selected 26 firms engaged in the manufacturing activities. These 26 firms belong to 7 industrial groups. For the classification of firms into different industrial groups, we followed the same criteria used by the Bureau of Public Enterprises Government of Kerala<sup>34</sup>. Table 1.4 shows the number of firms coming in the each sector<sup>35</sup>.

Table 1.4  
Industry Wise Classification of Sample Firms

| Sl. No. | Industry (1)         | No. of Selected Firms (2) | Total No. of SLPEs (3) | Percentage of (2) to (3) |
|---------|----------------------|---------------------------|------------------------|--------------------------|
| 1       | Ceramics             | 2                         | 2                      | 100                      |
| 2       | Chemical             | 6                         | 8                      | 75                       |
| 3       | Electrical Equipment | 4                         | 4                      | 100                      |
| 4       | Electronics          | 3                         | 3                      | 100                      |
| 5       | Engineering          | 5                         | 8                      | 71.42                    |
| 6       | Wood and Agro Based  | 4                         | 7                      | 57.14                    |
| 7       | Textiles             | 2                         | 3                      | 66.66                    |
|         | Total                | 26                        | 35                     | 74.28                    |

Note: textiles firms in the co-operative sector are not included in the present study due to the lack of available data.

We have the intention to include as much firms as possible in the present study. But in order to ensure comparability between sub periods we chose only those firms which

<sup>34</sup> However it has been seen that in some of the years few firms were shifted in to other industrial groups, but we used the criteria followed by the Bureau of Public Enterprises in most of the years.

<sup>35</sup> Total number of firms in each sector is based on the data as on March 31, 2011. Only the working firms are included in the total number of SLPEs. The details of firms coming under each industrial sector has given in the Appendix C, Table. C.4

were working continuously throughout our study period<sup>36</sup>. So firms incorporated after 1981-82 and closed down during the study period were excluded in the present study.

### **Limitations of the Data**

As we stated the earlier the study is based on the 26 SLPEs engaged in the manufacturing activities and the data is collected from the various issues of Review of Public Enterprises of the Bureau of Public Enterprises, Government of Kerala. The lack of audited figures is the major limitations of our data source and out of 26 firms in our samples the accounts audit is up to date only for 13 firms as on 31<sup>st</sup> March 2011. The data used for the remaining 13 firms are on the basis of the finalised accounts provided in the Review of Public Enterprises of the Bureau of Public Enterprises, Government of Kerala. The status of audit of the sample firms as on 31<sup>st</sup> March 2011 has been given in the table below

Table 1.5

#### **Arrears in Audits of Accounts**

| Number of Years in Arrears | Number of SLPEs |
|----------------------------|-----------------|
| 4                          | 1               |
| 3                          | 3               |
| 2                          | 3               |
| 1                          | 6               |
| Audit up-to-date           | 13              |
| Total                      | 26              |

Source: Bureau of Public Enterprises Kerala, 2010-11.

### **1.10 Organisation of the Study**

The study is divided in to four chapters including the present one, which has outlined the issue for research and set the objectives for the study on the basis of a quick review of the selected literature. The second chapter deals with the physical performance of SLPEs in Kerala. In this chapter physical performance has been examined in terms of various productivity measures. The third chapter deals with the financial performance of the SLPEs in Kerala. In this chapter we examined the financial performance with various profitability measures and also found the determinants of profitability by employing a panel regression. Finally, the fourth chapter gives a summary of major findings of the study and states the issues for further research emerged from the present study.

<sup>36</sup> We have not considered the textiles firms in the co-operative sector since the data source does not cover these firms and the difficulty in getting data for the study period.

## Chapter II

### Physical Performance of State Level Public Enterprises in Kerala

The previous chapter dealt with the context of the study and set certain specific objectives for the study and discuss the criteria for the evaluation of public enterprises with the available literature support. Present chapter is devoted for a detailed estimate of the physical performance of State Level Public Enterprises (SLPEs) in Kerala. Here the physical performance has been evaluated in terms of various productivity measures. In this chapter we may compare the trends in productivity growth of the SLPEs in Kerala during the post-reform period (1991-92 to 2010-11) with that of the same in the pre-reform period (1981-82 to 1990-91). The study itself admits the limitations of comparing the physical performance of two decades of post-reform period with the 10 years of pre reform period. But due to the lack of adequate and reliable data prior to 1980s, we are bound to start our study from 1981-82 onwards<sup>1</sup>.

The rest of the chapter is organised as follows. Section-1 deals with a brief discussion on the concept of productivity and a comprehensive review about different methods for measuring productivity. A brief review of the recent studies on the productivity growth of the Indian manufacturing sector is also included in this section. Section 2 explains the methodology used in this study to measure the total factor productivity growth (TFPG). Measurement of output and inputs are also given in this section. In section 3 we examine the trends in output and inputs growth as a prelude to the analysis of productivity growth. Section 4 examines the trends in partial productivity growth. Estimated result of TFPG has been given in section 5 and the final section gives a brief summary of this chapter.

#### 2.1 A Discourse on the Methodology of Measuring Productivity:

Productivity is generally defined as a ratio of volume of measures of output to a volume of input use (OECD, 2001) and it is the marginal contribution of a factor to the output growth of a product. Gross output of an industry could be expanded either by

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<sup>1</sup> This study, in fact, has used the data from 1981-82 but since in the estimate of growth of first year is not available, the study may be considered to start from 1982-83.

increasing the volume of factor inputs or by increasing the productivity of existing factors. Brahmananda (1982) rightly states that the productivity improvements along with the increase in the quantities of factors of production will also be the additional source of output increase. Since the increase in factor inputs especially capital has been facing several challenges in a developing country like India such as the scarcity of the factor inputs or the saturation of scarce factors, productivity enhancement is most warranted. It needs no more emphasis that increase in the productivity growth is the well stated goal of policy makers for launching the economy on a higher growth trajectory. Further it has been realised that economic growth without productivity growth become unsustainable and does little for raising the standard of living<sup>2</sup>. At micro level, productivity growth is a crucial factor in determining the competitiveness of an industrial unit. If productivity is increasing in a firm it means that factors of production are manifesting an increase in their output efficiency. More simply it means getting more output from the same inputs or alternatively, using fewer inputs to obtain the same output (Tretheway et al, 1997). So productivity growth is the key element in achieving and maintaining a high level of performance in an industrial unit.

There are many different productivity measures. The choice between them depends on the purpose of productivity measurement and the availability of steadfast data. Broadly, productivity measures can be classified as single factor productivity measures (partial productivity measures) as well as multifactor productivity measures (total factor productivity measures). Partial productivity is calculated by dividing the total volume of output by the total volume of an input. Most commonly used partial productivity ratios are output per man-hour termed as labour productivity<sup>3</sup> and output per unit of capital, termed as the capital productivity<sup>4</sup>. But as a measure of productivity, partial productivity ratios have lots of limitations. It ignores the fact that productivity of an

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<sup>2</sup> See Krugman, 1994 for his view on the low productivity and economic growth. He identifies that absence of productivity growth was one of the reason for the slowing down of the economy of Soviet Union. He also predicted a fading away of the so called "East Asian miracle" as productivity growth has become low in these countries during 1990s. However his view has been questioned by many scholars, for instance see, Peter and Huang (1997)

<sup>3</sup> Labour input can be taken either as the total number of working hours or total number of person employed in an industrial unit. Due to lack of sufficiently long and dependable data series we used total number of person employed as labour input even though total working hours is more preferable than number of person employed, for more details, see OECD Manual, 2001

<sup>4</sup> Other relevant partial productivity measures are raw material productivity and energy productivity.





input is also depends upon the level of other inputs used. For instance, in an economy labour productivity can be improved because of technological change enhancing the capital or due to increase in the number of machines even though the quality of labour force remains the same (Balakrishnan, 2004). So an unambiguous judgement on the overall growth in productive efficiency is not possible with partial productivity analysis. Total factor productivity approach will help us to overcome these problems up to certain extent (Hashim, 2003).

### **2.1.1 Measurement of Total Factor Productivity Growth**

Total factor productivity (TFP) as a concept was first formalised with the work of Tinbergen in 1942. However many scholars trace back its origin to the empirical work of Solow (1957) by failing to recognise the fact that there were many other scholars such as Johnson (1950), Schmookler (1952), Abramovitz (1956), had developed the concept of TFP and also measured it before Solow (Chen 1997). The drive behind the formulation of TFP concept was the understanding that besides the traditional inputs of labour and capital there are some other factors which pushes the production to increase. Initially it was interpreted as technological progress, but latter it has been recognised that besides technological progress TFP comprises other factors such as better utilisation of resources, learning by doing, improved skill of labour and so on (Ganev, 2005). So growth in total factor productivity could be considered as a measure of changes in the quality of production process. It is imperative to mention here is that TFP is neither superior nor a substitute to partial productivity measures<sup>5</sup>. Despite the limitations described in the previous part, partial productivity measures have its own advantages and applications especially in the policy field. "Labour productivity is a measure of potential consumption and, as such, a leading claimant for the indicator of standard of living, which makes it important in any programme of poverty reduction" (Balakrishnan, 2004). So we estimated both partial as well as total factor productivity growth in the present study.

There are various approaches to measure total factor productivity growth. However data envelopment analysis (DEA), production function and growth accounting

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<sup>5</sup> To know more about a comparative discussion regarding TFP and conventional partial productivity measures, see Baumol et al, 1992 and Balakrishnan, 2004.

approach merits special attention. DEA is a non-parametric technique used to estimate TFP change and to decompose such a change into technical change and technical efficiency change. This DEA-Malmquist Index is commonly used to evaluate the relative efficiency of a number of industrial units. DEA has become a popular subject since it was first described by Charnes A, W.W. Cooper, and E. Rhodes in 1978 and further refined by Caves et al in 1982 and Fare et al in 1994. In DEA a production frontier is empirically constructed using linear programming methods from observed input output data of sample decision making units (DMUs). The primary advantage of DEA is that it doesn't require an assumption of a functional form relating inputs to outputs. It can also handle multiple input and multiple output models. Since DEA is good at estimating "relative" efficiency it can be used for a better comparison among the firms (Rahman et al, 2009). But it is neither a perfect method of measuring productivity nor free from shortcomings. The main disadvantage of non-parametric approaches is their deterministic nature. Data Envelopment Analysis (DEA), for instance, does not distinguish between technical inefficiency and statistical noise effects (Luis and Juan, 2000). It also suffers with computational complexities and does not provide statistical inferences for the estimated parameters (Lieberman and Dhawan, 2005).

Production function method is a parametric approach for measuring total factor productivity<sup>6</sup>. In the parametric approach an explicit functional form of a production function is specified and estimated econometrically. Simply, the production function approach begins with the specification of a production function. This production function represents how inputs are combined to produce output. There are various methods to measure TFP in econometric approach. The most commonly used production function measures are Cobb-Douglas production function and translog production function. Cobb-Douglas production function requires some basic restrictive assumptions such as perfect competition, constant returns to scale and a factor price elasticity which is equal to one. On the other hand translog production function is a more generalised function than the Cobb-Douglas production function because it is not constrained with the assumptions such as constant return to scale and unitary elasticity of substitution. However production function approaches has many drawbacks such as it assumes technological progress to be disembodied and exogenously determined. The

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<sup>6</sup> Production function approach is otherwise called as econometric estimation approach.

biggest disadvantages of using econometric approach are undoubtedly its complexity in measurement. In this approach the problem such as multicollinearity, autocorrelation and requirement of a large sample often causes serious challenges to the correct estimation of parameters of production function (Trivedi et al., 2000).

The stochastic frontier production function approach postulates the existence of technical inefficiencies of production of firms involved in producing particular outputs (Battese and Coelli, 1995). In this approach the measurement of firm specific technical efficiency is based upon deviations of observed output from the best or efficient production frontier. Simply, the distance from the frontier is the measure of inefficiency, if a firm's actual production point lies on the frontier it is perfectly efficient and if it lies below the frontier then the firm is said to be technically inefficient. So the ratio of the actual to potential production defines the level of efficiency of an individual firm (Herrero and Pascoe, 2002). In the stochastic frontier models the error components is composed of two parts of which a symmetric component captures the effect of factors outside the firm's control. The major shortcoming of the parametric production frontier approach is that this model is incapable to accommodate multi-output technologies which are quite common in manufacturing sector. It is well known that inappropriate and unnecessary aggregation of outputs and inputs often results in misrepresentation of the structure of production function, which may also affect the degree of technical efficiency. Another short coming is that even if input prices data are available, the effects of scale economies and of allocative inefficiency on TFP changes cannot be separated from each other (Bauer, 1991).

Most commonly used method of measuring TFPG is the growth accounting approach. It examines how much of an industry's rate of change in gross output can be explained by rate of change of combined inputs. A systematic approach on growth accounting was first undertaken by Stigler in 1947. Abramovitz (1956), Kendrick (1956), Solow (1957), Denison (1962, 1974), Jorgenson and Fraumeni (1987), Goldar (1986) and Srivastava (1996) were contributed much to this approach. Under growth accounting approach we can obtain estimates of TFP growth as the difference between output growth and a weighted average of growth in inputs. Thus growth accounting measure estimates TFPG residually. This residual includes the effects of technological progress, scale of production, learning by doing, technical efficiency etc. "Growth accounting approach is based on the assumption

that producers are price takers in both output as well as inputs markets, so that output prices are equal to the marginal costs of production and factors are paid their respective marginal products" (Hashim et al, 2009). It also assumes technological progress to be embodied and exogenously determined. Under these conditions, the residual measures outward shifts in the production function over time. It must however be pointed out that in essence there is no real difference between the production function estimation and the growth accounting approach as far as the underlying methodology is concerned (Black, 1962).

There are various approaches within the growth accounting technique for estimating productivity growth such as Kendrick Index, Solow Index, and Translog Index. Kendrick's measure is based on a linear production function that confines itself to labour and capital as factor inputs. The assumptions underlying this index is constant returns to scale, perfect competition and payment to factors strictly according to their marginal product(i.e.) the total earning of labour and capital in the base year will exactly equal to the output of the year. This means that total factor productivity in the base year will be equal to unity by definition. Even though the Kendrick index is easy to calculate and simple to understand, it suffers from the assumption that the underlying production function is linear in nature and that it does not allow for the possible diminishing marginal productivity of factors

Solow's measure of TFP uses the Cobb-Douglas production function with the assumptions of constant returns to scale, Hicks' neutral technical progress and the factor payments being equal to their marginal products. Though Solow's measure has an advantage of simplicity in calculation it faces serious criticism because of the assumptions of unitary elasticity of substitution between factors of production. On the other hand the translog index of technological change is based on a translog production function characterized by constant returns to scale. It allows for variable elasticity of substitution and does not assume Hicks' neutrality. The present study is based on translog index since it has a relative advantage over previous two such as it does not make rigid assumptions about the constant elasticity of substitution between factors of production and Hicks neutral technological progress.

### **2.1.2 Value Added Frame Work: Advantages and Limitations**

In the present study TFPG has been estimated by using growth accounting approach based on the value added frame work. We use the value added frame work due to the following reasons. Value-added based productivity measures are weighted averages of their components and can be compared across sectors or industries (Cobbold, 2003). In addition, under conditions of profit maximisation by firms, the value-added approach is more consistent with firm's aims than the gross output concept (Van der Wiel, 1999). The value added frame work has certain limitations also. Intermediate input is treated differently from labour and capital in the value-added approach (Jorgenson et al, 1987; Dean and Harper, 2000). So it restricts the role of technological change by assuming that such change only affects the usage of capital and labour so that intermediate inputs cannot be the source of improvements in productivity (Gollop, 1979).

### **2.1.3 Measurement of Real Value Added: Single as well as Double Deflation Methods**

Productivity measures are sensitive to the measurement of value added. The value added can be measured by both single as well as double deflation procedure. Goldar (1986) and Ahluwalia (1991) measured the real value added in terms of single deflation (SD) procedure by deflating the nominal value added with appropriate whole sale price index. However such a measure is valid only with the assumption that the prices of materials relative to the value of output remain more or less constant over the period of analysis (Balakrishnan and Pushpangadan, 1994). They further state that if the prices of raw material will change over time, then the estimated value of productivity based on SD procedure will be flawed, there for the double deflation (DD) method is desirable. In double deflation method the value of output is deflated by an output price index and value of input are deflated by an input price index. Their study found an acceleration in TFPG during 1980s in SD method as what shown by Ahluwalia (1985, 1991), but this improvement was absent in the double deflation method.

However the estimation of real value added on the basis of double deflation procedure is not free from shortcomings. The basic problem in estimating the real value added by double deflation method is in the estimation of an appropriate price index for material inputs. The weights attached to each input group play a significant role in the

determination of overall input price index. To show the sensitivity of TFPG to the weights used for the input groups, Dholakia and Dolakia (1994) estimated the real value added in the Indian manufacturing sector for the period of 1970-71 to 1988-89 by using three alternative set of weights; such as (a)WPI (1970-71 = 100) of CSO, (b) the weights based on the inputs and out puts of the entire manufacturing sector used by Balakrishnan and Pushpangadan (1994) and (c) a separate weights index estimated by them for registered manufacturing sector only. Their study reports three different and contradictory results in the growth rate of value added in Indian manufacturing; There was an acceleration in TFPG during 1980s as compared to the 1970s while using WPI (1970-71 = 100). At the same time a deceleration in TFPG is found in the 1980s when weights for the whole manufacturing sector has been used as in the case of Balakrishnan and Pushpangadan (1994) and there was a much subdued acceleration in TFPG during the 1980s when the weights for the registered manufacturing sector has been used.

So the double deflation method would provide different set of results for different set of weights but single deflation procedure would provide only a unique answer. However as we stated earlier single deflation procedure is also having serious drawbacks mainly because, it assumes that the prices of raw materials relative to value of output remain more or less constant over the period of analysis. Since both the methods have its own advantages and limitations, we used both single as well as double deflation procedure in the estimation of real value added.<sup>7</sup>

#### **2.1.4 Existing Studies on Total Factor Productivity: A Brief Review**

In the following section we make an attempt to review the existing studies on the productivity performance of public sector enterprises in Kerala. Since literature on the productivity performance of public sector enterprises are very few and most of the studies are date backed to pre-reform period we incorporated some relevant studies on the productivity growth of Indian manufacturing sector to get an idea about the performance of Indian manufacturing sector during the post-liberalisation period.

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<sup>7</sup> However the partial productivity estimates given in the following analysis is based on the SD because the estimated results by using the DD method does not seems much differences.

A study by Pillai (1989) on the performance of SLPEs in Kerala for the period 1977-85 reveal that TFPG was negative in most of the industries. P.L. Beena estimated both partial and TFPG of state manufacturing enterprises in Kerala by employing translog production function for the period 1975 to 1988. By dividing the entire period in to two sub periods as 1975 to 1981 and 1981 to 1988 she found that TFPG has improved in the later sub period as comparing to the previous period. Manufacturing as a whole, TFPG has been increased from 0.99 per cent to 8.7 per cent during 1981-1988. She also made a comparison of state public manufacturing enterprises in Kerala with selected manufacturing firms of the private sector in the state and found that the TFPG was very high in the public sector firms as comparing to their private counterparts. Further Agarwal (2001) estimated the partial as well as total factor productivity of 58 CPEs engaged in the manufacturing activities for the period 1990-91 to 1998-98. The study showed a consistent decline in partial as well as total factor productivity (TFP) in several industrial groups like in fertiliser, engineering and consumer goods industries during the post-liberalisation period. So the study concludes that the CPEs failed to experience major technological change during the post reform period.

Studies on TFPG of the Indian manufacturing sector during the pre-reform period gives us mixed result. Ahluwalia (1991), found a poor performance with respect to TFP growth in Indian manufacturing in the later part of seventies and a turnaround in the first half of the 1980s. Contrary to this Srivastava (1996) found an improvement in productivity in the second half as compared to the first half of 1980s. Balakrishnan and Pushpangadan(1994) found a decelerating trend in TFP during 1980s. Further, Rao (1996), found an increase in TFPG during 1970s and a sharp fall in the early years of 1980s and a revival in the latter part of the eighties.

There has been an intense debate on the effects of economic reforms on productivity growth of the Indian organised manufacturing. Studies of Uchikawa (2001), Balakrishnan and Pushpangadan (2002), Goldar and Kumari (2003), Goldar (2004), Bhandari et al (2010), are unanimous in finding a decrease in TFPG in Indian manufacturing during the post reform period. On the contrary Srivastava (2000), Unel (2003), Raj and Malathi (2007), Hashim et al (2009), Parameswaran (2009), and Dash et al (2010) found multifarious results in productivity growth of Indian manufacturing sector. Unel's study reflects that the average annual growth rate in TFP has been higher in the

reform periods (1991-92 to 1997-98) as compared to the pre-reform periods (1979-80 to 1990-91). By dividing the post reform period into three as 1992-98; 1998-02; and 2002-06, Hashim et al found that TFPG has been increased during first period, slumped in next and rose sharply in the final sub-period. Parameswari (2009) estimated total factor productivity of Indian manufacturing sector for the period 1992-93 to 2005-06 by production function method. His study found that in ten industries out of twelve of his study, productivity has continuously increased from 1992-93 onwards. Thus, the empirical results on TFPG are also not without controversies. The present study does not contribute to the resolution of the controversy. Instead, we may attempt to compare the productivity growth of the SLPEs in Kerala during the post liberalisation period with pre-liberalisation period.

## 2.2 Total Factor Productivity Growth: Methodology

For the two input framework taking value added as output, labour and capital as inputs, the translog index of TFP is given by the following equation<sup>8</sup>.

$$\Delta \ln TFP(t) = \Delta \ln Y(t) - \left[ \frac{SL(t) + SL(t-1)}{2} \times \Delta \ln L(t) \right] - \left[ \frac{SK(t) + SK(t-1)}{2} \times \Delta \ln K(t) \right]$$

In this equation, Y is output (value added),

L = labour input,

K = Capital inputs,

SL = income share of labour (in value added) and

SK = income share of capital. SL and SK add up to unity,

Change in ln TFP is the rate of technological change or the rate of growth of total factor productivity. Using the above equation, the growth rates of TFP have been computed for each year. Having obtained the TFPG for different years, estimates of TFP growth rate

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<sup>8</sup> This method is also used by Goldar and Kumari 2003, Goldar 2004, Hashim et al 2009.



have been made mainly for three periods, 1981-82 to 1990-91 (pre-reform period), and 1991-92 to 2010-11 (post-reform period) and for the entire period (1981-82 to 2010-11)<sup>9</sup>.

## 2.2.1 Measurement of Inputs and Output

The method adopted for the measurement of output and inputs are explained briefly in the following section<sup>10</sup>.

Output: Real value added is used as the measure of output. Both single as well as double deflation procedure is used to get the measure of real value added. The data bases give us the value of sales and change in stock. From this we calculated the value of gross output. Value of gross output thus obtained is deflated by appropriate whole sale price indices obtained from the index number of whole sale price in India (1993-94 =100), published by the Economic Adviser Ministry of Commerce and Industry, Government of India. Appropriate WPI is used for each firm on the basis of their nature of operation. In double deflation procedure real value added is obtained after deducting real intermediate input from deflated gross output<sup>11</sup>. To obtain real intermediate input raw material and energy price index has been constructed from the input output transaction table of India 1999-00 of CSO. After constructing the raw material price index and the energy price index we multiplied the book value of raw material and cost on the consumption of power and fuel with the raw material and energy price indices respectively.<sup>12</sup> The real intermediate inputs then obtained have been subtracted from the real gross output to get real value added.

Labour: Total number of person engaged in an industrial unit is taken as the measure of labour input. Since the construction of labour hours is a difficult task and also not

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<sup>9</sup> Only three periods, viz., 1981-82 to 1990-91 and 1990-91 to 2010-11 and 1981-82 to 2010-11 would have served the major purpose of present study. However in order to understand the TFP growth in the post reform period we again divided this period in to three, viz., 1991-92 to 2000-01 , 2001-02 to 2005-06 and 2006-07 to 2010-11.

<sup>10</sup> A detailed explanation is given in Appendix A.

<sup>11</sup> To obtain real value added by the single deflation procedure, the value-added series has been deflated directly by a suitable price index.

<sup>12</sup> The method used for the construction of raw material price indices and energy price indices are given in details in Appendix B.

possible with the available data, we used the number of person employed as the measure of labour input by admitting the short coming of such estimates.

Capital: Gross fixed Asset (GFA) at 1993-94 prices is taken as the measure of capital input. Since the book value of GFA is in historical cost, we have to convert the book value of capital into capital at replacement cost. For constructing the capital stock series of each firm, we have converted reported GFA into replacement cost by taking 1995-96 as the base year on the basis of a revaluation factor. For computing the revaluation factor we have followed Srivastava's (1996) procedure<sup>13</sup>. Having obtained the revaluation factor for each firm, capital stock series is constructed by using perpetual inventory accumulation method<sup>14</sup>.

Having reviewing the various productivity concepts, different methods and the methodology for measuring TFPG for the present study we are going to estimates the productivity growth of SLPEs in Kerala in the following section. From the review of existing studies we could understand that neither TFPG nor partial productivity measures are superior to each other. At the same time both the measures are its own advantages and inherent limitations in predicting the productivity growth. So we estimate both partial as well as TFPG in this study. Before going to look productivity measurement it is seems to be important to measure the trends in output and input growth. The following section will give the trends in output and input growth in various sub periods.

### **2.3 Trends in Output and Input Growth**

The growth in output and inputs portray a distinct pattern across the sub-periods, justifying the classification of sub-period defined in the present study. In the pre-reform period we saw the output growth at an impressive rate of 10.08 per cent per annum and a sharp decline in the post reform period, see Table 2.1 below. All the variables show a declining trend in growth rate during the post reform period. Among the variables, employment has declined sharply during the post reform period, after registering an

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<sup>13</sup> Many studies such as Parmeswaran (2002), Atish (2008) were also used Srivastava's (1996) procedure.

<sup>14</sup> The details regarding the construction of capital stock series is given in Appendix A

impressive growth of 6.32 per cent per annum during the pre-reform period it has fell down to to a negative growth of -1.08 per cent in the post reform period.

Table 2.1  
Trends in Output and Input Growth of SLPEs in Kerala

(Per cent)

| Period                                      | Gross output | Value Added | Employment | Capital |
|---|--------------|-------------|------------|---------|
| Pre -reform period<br>(1981-82 to 1990-91)  | 10.08        | 11.01       | 6.32       | 8.92    |
| Post -reform period<br>(1991-92 to 2009-10) | 4.43         | 4.59        | -1.08      | 3.32    |
| Whole Period<br>(1981-82 to 2009-10)        | 6.18         | 6.88        | 1.22       | 5.06    |
| 1991-92 to 2000-01                          | 4.59         | 5.49        | -0.45      | 3.09    |
| 2001-02 to 2005-06                          | 0.42         | 1.11        | -5.45      | 3.85    |
| Last Five Years<br>(2006-07 to 2010-11)     | 9.50         | 10.19       | 2.03       | 3.26    |

Source: Calculated from the Review of Public Enterprises, Various years, Bureau of Public Enterprises, Kerala.

The negative growth rate of employment in the post reform period was mainly due to various schemes introduced during the post reform period such as voluntary retirement scheme and social safety net programme which we discussed in the introductory chapter. Since one of the objective behinds the establishment of these enterprises is the creation of employment opportunities as we discussed in the introductory chapter, this negative growth in employment is shabby and dismal. It is also appear from the above table that the last five years shows significant improvement in the growth rate of output and value added. The employment growth rate has also become positive during this period after showing a negative growth during the previous two sub-periods. It is also relevant to note that the growth rate of capital remains more or less same during the post reform periods.

## 2.4 Partial Productivity Growth in SLPEs in Kerala:

In the present section at first we are going to look the growth rate in labour productivity. Table 2.1 clearly shows that SLPEs as a whole registered a growth of 4.58 per cent in labour productivity during the entire period of our study. Table 2.1 also reveals significant variations between pre and post-reform periods in labour productivity. The state level manufacturing enterprises as a whole registered a growth rate of 6.68 per cent per annum during the pre-reform period against corresponding figure of 3.16 per cent during the post liberalisation period. Further division of post liberalisation period also shows considerable differences in labour productivity growth rate. The decline in labour productivity during the post liberalisation period can mainly be attributed to the sharp decline in labour productivity during the two sub periods such as 1990s and 2001-02 to 2005-06. From the Table 2.1 we could find that the labour productivity growth rate was 3.44 and 1.13 per cent respectively during these periods. However a recovery in labour productivity could be seen in the last five years of post-liberalisation period though it was less than the pre liberalisation period.

Table 2.2

Partial Productivity and Capital Intensity Growth in SLPEs in Kerala

| Period                                   | Labour Productivity Growth (%) | Capital Productivity Growth (%) | Capital Intensity Growth (%) |
|--|--------------------------------|---------------------------------|------------------------------|
| Pre -reform period (1981-82 to 1990-91)  | 6.68                           | 6.44                            | 3.26                         |
| Post -reform period (1991-92 to 2010-11) | 3.16                           | 2.95                            | 4.61                         |
| Whole Period (1981-82 to 2010-11)        | 4.58                           | 4.52                            | 3.92                         |
| 1991-92 to 2000-01                       | 3.44                           | 2.29                            | 3.60                         |
| 2001-02 to 2005-06                       | 1.13                           | 1.42                            | 7.88                         |
| Last Five Years (2006-07 to 2010-11)     | 5.11                           | 5.63                            | 1.37                         |

Source: Authors own calculation

Since the capital size, use of machinery and tools will enhance the level of output and hence the productivity of labour, it will be more fruitful if we look the trends and

pattern in capital intensity during the study period. For this purpose we also estimated the capital intensity (capital to labour ratio) of the SLPEs in Kerala. From the Table 2.2 it is observed that the annual average growth rate in capital intensity of the manufacturing sector as a whole has been increased from 3.26 in 1980s to 4.61 in 1990-91 to 2010-11. Capital intensity showed an all-time high figure of 7.88 per cent growth during the 2001-02 to 2005-06 periods. We found earlier that, it was a period of lowest growth rate in labour productivity which implies that labour productivity growth has not mainly associated with the capital intensity growth in the case of SLPEs in Kerala. However causation is required here is that the increase in capital intensity during this period was mainly due to decrease in the number of employment rather than significant increase in the investment of capital.

Generally it is felt that growth in output is almost accounted for the higher growth of inputs especially capital in the developing countries (Manpreet and Kiran, 2008). Further labour productivity should be analysed in relation to the capital productivity growth rate as the labour productivity alone could lead to erroneous results and misleading inferences (Subrahmaian, 2003). So it will be more fruitful if we make an analysis of the trends in capital productivity growth of these enterprises during our study periods. Productivity growth of capital input also shows more or less similar trend as in the case of labour productivity. Table 2.2 shows that it has been declined sharply during the post liberalisation period; declined from 6.44 per cent during the pre-reform period to 2.95 per cent in the post reform periods. So it can be inferred that liberalisation didn't help to improve the capital productivity and output growth as what we generally expected in these enterprises. This decrease was mainly on account of the substantial decline in capital productivity during the first two sub periods of the post reform period. However a recovery could be seen in the last five years of the post-liberalisation periods. The low capital intensity ratio and high capital productivity growth implies that during this period capital has used more efficiently than the previous periods.

### 2.4.1 Industry wise Analysis of Partial Productivity Growth

The overall analysis of partial productivity growth rate may not reveal the exact picture of productivity growth in each industry. So we now turn to analyse the partial productivities at the disaggregated level in the following section. From the Table 2.3 it can be observed that there has been a decrease in labour productivity growth during the post reform period in most of the industries except in wood and agro based industries. The decline is more severe in the textiles industry where it fell sharply from 12.65 per cent in 1980s to 5.48 per cent during the post reform period. At the same time deceleration in labour productivity is modest in the case of ceramic industry in which labour productivity has decreased from 11.5 per cent previous periods to 10.07 per cent in the latter period.

Table 2.3  
Industry wise Labour Productivity Growth of SLPEs in Kerala

(Per cent)

| Industry/Period        | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | Last Five Years<br>(2006-07 to 2010-11) |
|------------------------|--|---|---------------------------------------|---|
| Ceramic & Refractories | 11.50                                      | 10.07                                       | 10.25                                 | 18.15                                   |
| Chemical               | 10.38                                      | 8.32  | 9.14                                  | 16.02                                   |
| Electrical & Cable     | 10.10                                      | 8.00  | 8.65                                  | 15.03                                   |
| Electronics            | 16.61                                      | 8.30  | 10.88                                 | 6.59                                    |
| Engineering            | 7.04                                       | 3.34  | 4.49                                  | 4.13                                    |
| Wood & Agro Based      | 11.74                                      | 14.87                                       | 13.32                                 | 9.56                                    |
| Textiles               | 12.65                                      | 5.48  | 9.65                                  | 4.07                                    |

Source: Same as Table 2.1

During the last five years labour productivity has increased significantly in three industries such as ceramic chemicals and electrical industries. Meanwhile the electronics, agro based and textile industries registered a decline in labour productivity growth. The growth rate in labour productivity is highest in industries like ceramic electronic and agro based industries during the whole period under study.

Since as we stated earlier the size of capital and use of machinery will also help to improve the labour productivity along with the efficient utilisation of labour, we attempted to estimate the capital intensity of various industrial groups. From the Table 2.4 we can see that the capital intensity growth was increased in chemical, engineering and textiles industries during the post-reform period where as it was high in ceramic, electrical, electronics and agro based industries during the pre-reform period. So relatively better growth of labour productivity in ceramics, electrical and electronic industries in the pre-reform period can largely be attribute to the higher growth in capital intensity rather than the efficient utilisation of labour. Contrary to this in the case of chemical and textiles industry the capital intensity growth was negative and labour productivity was high during the pre-reform period, implying that the labour productivity growth was not associated with the increase in capital intensity.

Table 2.4

Industry Wise Capital Intensity Growth of SLPEs in Kerala

| Industry/Period        | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | Last Five Years<br>(2006-07 to 2010-11) |
|------------------------|--|---|---------------------------------------|---|
| Ceramic & Refractories | 10.15                                      | 5.63  | 7.31                                  | 4.13                                    |
| Chemical               | -0.92                                      | 4.54  | 2.84                                  | 3.09                                    |
| Electrical & Cable     | 12.11                                      | 3.42  | 8.87                                  | 2.71                                    |
| Electronics            | 12.49                                      | 3.47  | 6.27                                  | -2.94                                   |
| Engineering            | 2.83                                       | 5.04  | 4.35                                  | 2.06                                    |
| Wood & Agro Based      | 11.59                                      | 10.72                                       | 10.21                                 | 3.92                                    |
| Textiles               | -1.93                                      | 6.51  | 3.89                                  | -0.75                                   |

Source: Same as Table 2.1

A disaggregated level estimation of capital productivity growth has given in the Table 2.5. We can see that chemical, engineering and textiles industries showed a decrease in the productivity growth of capital during the post liberalisation period, whereas ceramics, electrical, electronics and agro based industries showed an increase in capital productivity during the same period. The relatively lower capital productivity growth of

ceramics, electrical and agro based industries during the pre-reform period was mainly due to higher capital intensity during the same period.

Table 2.5  
Industry wise Capital Productivity Growth of SLPEs in Kerala

| Industry/Period        | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | Last Five Years<br>(2006-07 to 2010-11) |
|------------------------|--|---|---------------------------------------|---|
| Ceramic & Refractories | 6.25                                       | 8.57  | 7.41                                  | 12.80                                   |
| Chemical               | 8.70                                       | 3.32  | 4.99                                  | 10.80                                   |
| Electrical & Cable     | -7.53                                      | 4.44  | 1.83                                  | 11.82                                   |
| Electronics            | 5.65                                       | 6.10  | 5.96                                  | 9.18                                    |
| Engineering            | 12.28                                      | -1.53                                       | 2.75                                  | 2.28                                    |
| Wood & Agro Based      | 4.47                                       | 12.36                                       | 8.41                                  | 1.26                                    |
| Textiles               | 14.39                                      | -0.23                                       | 7.02                                  | 8.19                                    |

Source: Same as Table 2.1

The lower growth of capital productivity in ceramics and engineering industries during the post-reform period cannot be attributed to capital intensity growth, since Table 2.4 shows that capital intensity of these industries were relatively better during the same period. This implies that there may be other factors such as decline in value added growth which might have hampered the growth in capital productivity. Last five years of the post liberalisation period remarked substantial improvement in the productivity growth of capital especially in ceramic, chemical, electronics and textiles industries. Meanwhile substantial decline is visible in agro based industry during this period.



## 2.5 Total Factor Productivity Growth: Estimated Results

We take up next the estimates of total factor productivity growth in SLPEs in Kerala during our study periods. From the Table 2.6 it is observed that TFPG during the entire period of our study was 3.75 and 4.05 per cent respectively in both single as well as double deflation procedure. A comparison of post-reform period with pre-reform period reveals that TFPG has been decreased in the post reform period in both type of measurement. The decline is more significant in single deflation procedure where TFPG has decreased from 4.34 per cent in the pre-reform period to 3.04 per cent in post-reform period. Meanwhile in the double deflation procedure TFPG has decreased from 4.11 during the pre-reform period to 3.82 per cent in the post reform period. It is somewhat paradoxical to observe that the opening up of the economy and the introduction of liberal economic policies intended to provide easy access to foreign technology and wide market-network do not seem to have stimulated the productivity growth.

Table 2.6  
Total Factor Productivity Growth of SLPEs in Kerala  
(Per cent)

| TFPG  | Single Deflation Procedure | Double Deflation Procedure |
|---|----------------------------|----------------------------|
| Pre -reform period<br>(1981-82 to 1990-91)  | 4.34                       | 4.11                       |
| Post -reform period<br>(1991-92 to 2010-11) | 3.04                       | 3.82                       |
| Whole Period<br>(1981-82 to 2010-11)        | 3.75                       | 4.01                       |
| 1991-92 to 2000-01                          | 2.90                       | 3.76                       |
| 2001-02 to 2005-06                          | 0.32                       | 0.85                       |
| Last Five Years<br>(2006-07 to 2010-11)     | 7.48                       | 7.77                       |

Source: Same as Table 2.1

Post liberalisation period witnessed significant variations in total factor productivity growth. From the Table 2.6 we could find that TFPG has showed a declining trend during the first two sub period of post reform period. During the period of 1991-92 to 2001-02 TFPG estimated by single deflation procedure was 2.90 per cent and it further

decreased to 0.32 per cent during the period of 2001-02 to 2005-06. TFPG estimated by using double deflation procedure also shows a similar trend, in which TFPG was 3.76 and 0.85 respectively during these two sub periods. However last five years of the post liberalisation period showed substantial improvement in TFPG. During this period TFPG was 7.48 per cent and 7.77 per cent respectively in single and double deflation procedure respectively.

### 2.5.1 Industry wise Analysis of TFPG in SLPEs in Kerala

An inter industry wise estimates of TFPG is given in the Table.2.7 below. Among various industrial groups in SLPEs the evidence is mixed. Electrical and agro based industries showed a relatively better performance during the post-reform period, while electronics, engineering, chemicals and ceramic industries registered a decline in productivity growth during the same period.

Table 2.7

Industry wise Total Factor Productivity Growth of SLPEs in Kerala

| Industry/Period           | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | Last Five Years<br>(2006-07 to 2010-11) |
|---------------------------|--|---|---------------------------------------|---|
| Ceramic &<br>Refractories | 8.46<br>(7.15)                             | 4.05<br>(4.95)                              | 5.48<br>(6.25)                        | 9.31<br>(10.24)                         |
| Chemical                  | 6.31<br>(5.52)                             | 1.01<br>(2.05)                              | 2.94<br>(2.75)                        | 3.66<br>(4.12)                          |
| Electrical &<br>Cable     | 0.34<br>(-1.25)                            | 5.96<br>(6.25)                              | 3.58<br>(4.12)                        | 7.19<br>(6.37)                          |
| Electronics               | 7.35<br>(6.71)                             | 4.63<br>(5.63)                              | 5.59<br>(4.87)                        | 6.39<br>(5.26)                          |
| Engineering               | 3.74<br>(3.36)                             | -0.23<br>(1.05)                             | 0.60<br>(1.21)                        | 4.09<br>(5.68)                          |
| Wood & Agro<br>Based      | -0.37<br>(-1.24)                           | 1.25<br>(2.01)                              | 0.78<br>(1.03)                        | 2.20<br>(3.46)                          |
| Textiles                  | -1.16<br>(-2.63)                           | -0.73<br>(-1.45)                            | -1.07<br>(-1.89)                      | 0.87<br>(1.25)                          |

Source: Same as Table 2.1

Note: figures in the non-brackets are TFPG using single deflation procedure and in the brackets are TFPG using double deflation procedure.

The decline is more severe in engineering and chemical industries. After registering a better positive figure of 3.74 per cent and 3.36 per cent in single and double deflation methods respectively during the 1980s, engineering industry registered a negative figure of -0.23 and -0.03 in TFPG during the post liberalisation period. TFPG was

negative in textile industry during both the pre and post liberalisation period. The last five years of the post liberalisation period witnessed significant improvement in TFPG in all the sectors.

## 2.6 Decomposition of Value Added Growth

In this section we will examine the relative contribution of labour, capital, and TFPG in the value added growth during our study periods. From the Table 2.7 we can clearly see that the growth rate of value added is high during the pre-reform period, and it has declined approximately about 50 per cent during the post reform period.

Table 2.7  
Sources of Output (Value Added) Growth

| Periods                                    | Single Deflation |                    |                  |                 | Double Deflation |                   |                  |                 |
|--|------------------|--------------------|------------------|-----------------|------------------|-------------------|------------------|-----------------|
|  | VA Gr            | L                  | K                | TFPG            | VA Gr            | L                 | K                | TFPG            |
| Pre-reform period<br>(1981-82 to 1990-91)  | 11.01            | 2.06<br>(18.75)    | 4.40<br>(39.96)  | 4.34<br>(39.41) | 10.57            | 2.06<br>(19.50)   | 4.40<br>(41.62)  | 4.11<br>(38.88) |
| Post-reform period<br>(1991-92 to 2010-11) | 4.59             | -0.55<br>(-11.92)  | 2.10<br>(45.68)  | 3.04<br>(66.24) | 5.37             | -0.55<br>(-10.18) | 2.10<br>(39.02)  | 3.52<br>(71.16) |
| Whole Period<br>(1981-82 to 2010-11)       | 6.88             | 0.29<br>(4.25)     | 2.84<br>(41.23)  | 3.75<br>(54.52) | 7.14             | 0.29<br>(4.09)    | 2.84<br>(39.72)  | 4.01<br>(56.19) |
| 1991-92 to 2000-01                         | 5.49             | 0.47<br>(8.56)     | 2.12<br>(38.61)  | 2.90<br>(52.83) | 6.09             | 0.21<br>(3.52)    | 2.12<br>(34.78)  | 3.76<br>(61.71) |
| 2001-02 to 2005-06                         | 1.10             | -1.26<br>(-114.16) | 2.17<br>(185.50) | 0.32<br>(28.65) | 1.76             | -1.26<br>(-71.59) | 2.17<br>(123.29) | 0.85<br>(48.30) |
| Last Five Years<br>(2006-07 to 2010-11)    | 10.19            | 0.76<br>(7.49)     | 1.96<br>(19.18)  | 7.48<br>(73.33) | 10.49            | 0.76<br>(7.28)    | 1.96<br>(18.64)  | 7.72<br>(74.08) |

Source: Same as Table 2.1

Note: figures in the parentheses are percentage contribution of corresponding variable in value added growth. VA Gr = Value added growth

The sources of value added growth shows significant changes over time. During the pre-reform period capital and TFPG together accounted more than 80 per cent of the value added growth. At the same time the contribution of labour input in value added growth was 18.75 per cent and 19.5 per cent in single and double deflation procedure respectively. The slump in value added growth in the post-reform period can be attributed to the sharp fall in the contribution of labour as well as capital input.

Contribution of labour input to value added growth has become negative during the post reform period and the contribution of TFPG has increased from 38.88 per cent to 71.16 per cent during post-reform period in double deflation procedure.

Further division of the post-reform period also shows significant differences in the sources of output growth. The contribution TFPG in value added growth has increased during 1991-92 to 2000-01 comparing to the period, 1981-82 to 1990-91. The collapse in the growth of value added during the period 2001-02 to 2010-11 can be attributed to the sharp decline in TFPG and negative contribution of labour input. However the last five years has shown dramatic improvement in the value added growth. TFPG accounted 73.33 per cent of the growth of value added during this period.

## **2.6 A Brief Summary of the Present Chapter**

In this chapter we examined the productivity growth of SLPEs in Kerala by employing both partial and total factor productivity measures. As a prelude to productivity analysis we estimated the growth rate of output, value added and relevant inputs. We could see that the growth rate of most of these variables is decreased during the post liberalisation period. The decline is more severe in employment growth rate and it became negative during the post liberalisation period.

Estimated results of partial productivity growth are also showed a decline in post reform period. Productivity growth of labour and capital is declined about 50 per cent in post reform period compared to pre liberalisation period. However capital intensity was relatively low in pre-reform period and it showed an improvement in post reform period, implying that the better productivity growth of labour in the pre reform period was not due to the increase in capital intensity. Industry wise estimation of partial productivity growth showed that except in wood and agro based industry the labour productivity has declined during the post reform period. Chemicals, engineering and textiles industries registered a decline in capital productivity during the post reform period whereas ceramics, electronics and electrical industries showed an improvement during the same period. The study further showed that the relatively lower capital productivity growth of ceramics, electrical and agro based industries during the pre-reform period was mainly due to higher capital intensity.

Total factor productivity growth rate was estimated by using growth accounting approach based on translog index. Value added is used as a measure of output and to get the real value of value added both single as well as double deflation procedure were used. The estimated result showed that the TFPG of manufacturing as a whole is decreased during the post reform period in both single as well as double deflation methods. It implies that contrary to the expectations, reform failed to generate the TFP growth in SLPEs in Kerala. The growth in TFP portrays a distinct pattern across various sub periods of post liberalisation period, justifying the classification of sub-period defined in the present study. TFPG has been slumped significantly during first two sub periods of the post liberalisation period; on the other hand it has been increased substantially during the last five years of the post liberalisation period. We further found that TFPG growth has been decreased in ceramics, chemicals, electronics and engineering industries during the post reform period, where as it increased in electrical and agro based industries during the same period. Another significant point revealed in the analysis is that TFPG was negative in textiles industry during the entire period. We also made a decomposition of value added growth rate and found that the share of TFPG in value added growth is increased over time at the same the share of labour has been shrinking over time.

### Chapter III

## Financial Performance of SLPEs in Kerala

The previous chapter deals with the physical performance of state level public enterprises in Kerala by employing both partial as well as total factor productivity measures for the period of 30 years from 1981-82 to 2010-11. We find that both the partial and total factor productivity measures registered a decrease in growth rate during the post reform period. However the last five years of the post liberalisation period showed a remarkable improvement in total factor productivity growth rate. In this context it is more pertinent to examine the financial performance of these enterprises during the study periods. So in the present chapter we made an attempt to examine the financial performance of SLPEs engaged in the manufacturing sector by employing various financial performance measures.

Here at first we are comparing the financial performance of SLPEs in Kerala during the post- liberalisation period (1991-92 to 2010-11) with that of the pre-liberalisation period (1981-82 to 1990-91). A further sub divisional analysis of the post liberalisation period is also made to understand a clear picture of the recent trends in financial performance. We admit that it is highly desirable to compare the performance of SLPEs in Kerala with the SLPEs in the other states. But due to the lack of adequate and reliable data of other state manufacturing enterprises in the country for the study periods we are unable to make such a comprehensive comparison. "Even though it is highly desirable, there has been no comprehensive study on the SLPEs in India during the recent times due to the lack of adequate data and audited figures, and the difficulties in having an effective access to the nodal agencies controlling the state public sector undertakings in the various states" (Planning Commission, 2002)<sup>1</sup>.

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<sup>1</sup> However we made such an estimate for the period of 1990-91 to 1998-99 by using the available data from the report of study group on reforms of SLPEs in India set up by planning commission in 2002. The result is given in Appendix C, Table. C.7

We organised this chapter in to three broad sections. In the first section we examine the financial performance of these manufacturing enterprises at the aggregate level by using the relevant financial performance measures. This section starts with a brief description about various financial performance measures with available literature support. More disaggregated level of analysis of financial performance is made in section two. In section three we examines the determinants of profitability by employing a panel regression. A brief summary of the major findings is given in the last part of this chapter.

### **3.1.1 A Brief Discussion on Various Financial Performance Measures**

Financial performance of an industrial unit can be viewed from many different perspectives such as profitability, asset efficiency and financial leverages. The general profitability of an industrial unit can be analysed in two main different angles such as profit margin and rate of return. Margin ratios represent the firm's ability to translate each sales rupee into profit at the same time return ratios measure the overall ability of the firm to generate shareholder's wealth.

Two profit margin ratios necessitate special attention here; they are gross profit to sales ratio and net profit to sales ratio. Gross profit usually termed as profit before interest and taxes (PBIT). It is the difference between total sales revenue and total production cost. Gross profit should not be mistaken to operating surplus in which we include the cost on depreciation. Gross profit to sales is the overall measure of the firm's ability to translate each rupee of sales in to profit (Bernstien and Wild, 1998). This ratio looks at how well a company controls the cost of its operation; the larger the gross profit margin, the better for the company. Generally net profit is defined as the difference between total sales revenue and total cost including interest payment and provision for tax. In other words it can be termed as profit after interest and taxes (PAT). So net profit-sales ratio (i e, net profits as a per cent of net sales) indicates the sales margin that is ultimately left after meeting all expenses including interest and taxes. The enterprise cannot achieve satisfactory return on owner's equity in case the net profit margin is not adequate.

Profit margin ratios have inherent limitations as a measurement of efficiency. It is possible for an enterprise with low profit to sale ratio and high asset turnover to be more profitable than an enterprise with high profit margin. (Jorgenson et al, 2009). Asset efficiency or asset turnover ratio measures the efficiency with which the firm uses its assets to produce sales<sup>2</sup>. In other words Asset turnover ratio measures the efficiency with which the company is managing its investment in assets and using them to generate sales. Generally a higher ratio is considered to be better because it means that the company is doing well by using its assets to generate sales.

The profitability can also be measured by putting profit in relation to capital invested. This ratio is called as return ratio and considered as one of the important financial performance measures. The return on capital invested is one of the most successful and simple technique to aid the investment decision and performance evaluation (Bhandari, 1967). Two return ratios warranted attention here, they are: return on assets (ROA) and return on capital employed (ROCE) both the measures uses interchangeably in financial economic research<sup>3</sup>. In the present study we uses ROA as the measure of rate of return since it is one of the all-time favorites and perhaps the most widely used over all measure of firms financial performance ( Rapport, 1986 and Monteiro, 2006)<sup>4</sup>. This ratio measures the efficiency with which the company is managing its investment to generate profit. ROA can be measured in terms of profit before interest and taxes and profit after interest and taxes to total assets. First ratio (Gross profit to total asset) shows the ability of the firm to generate profit while using its resources and the second ratio (Net profit to total assets) measures what ultimately left to the investors after meeting all expenses. 'It may be reiterated that profit after tax to asset is the real indicator of company's capacity to generate wealth especially in its earning per share, this helps to propel the share prices at the bourses, thus strengthening the market cap, a real time wealth creator' (Mohnot, 2010).

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<sup>2</sup> It is the ratio of total sales revenue to total assets.

<sup>3</sup> Total Asset is the sum total of fixed assets and current assets and capital employed is the sum total of fixed asset and working capital.

<sup>4</sup>We also estimated ROCE and found no significant differences between these two results, the result is given in Appendix C, Table. C.8



Leverage is a financing strategy designed to increase the rate of return on owners' investment by generating a greater return on borrowed funds than the cost of using the funds (Damodaran, 1999). This gearing ratio measures the external finance raised by the firm through loans and advances for the operational deeds. The most important and widely used leverage measure is total liabilities as a percentage of total equity (Fatoki, 2009). Debt equity ratio measures the relative proportion of equity and debt used to finance the asset of a company. A high ratio would indicate that company has aggressively financed its operations through debt. More specifically, if it is greater than one it would be interpreted as, the major chunk of company's assets is financed through debt, and if it is less than one it indicates that the asset of an enterprise is predominantly financed through equity.

### **3.1.2 Rate of Return in SLPEs in Kerala**

We begin our analysis with rate of return since it is considered to be the best financial performance indicator<sup>5</sup>. It unifies the two concepts such as gross profit margin and asset turnover ratio and so it is considered as a concrete ratio in judging the overall rate of return on total investment in a business undertaking (Nirmala, 1990). We excluded the profit margin ratios in the aggregate analysis because of the following reasons<sup>6</sup>. The first and most important reason is that profit maximisation is not the ultimate goal of public sector enterprises and it is also possible to have high overall profit with low profit margin if the asset turnover ratio is high. But profitability ratio or return ratio is important even in the case of public sector companies because, only a reasonable return on investment would help them to sustain in the industry (Iyer, 1991). Here the rate of return is measured in terms of two profit concepts: profit net of depreciation i.e. profit before interest and taxes (PBIT), also called as gross profit and profit net of interest payment and taxes or profit after interest and taxes (PAT), also called as net profit.

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<sup>5</sup> Growth of financial parameters of these enterprises has been given in Appendix 3.2

<sup>6</sup> However we estimated the profit margin and asset turnover ratios for the sake of understanding, the results are given in Appendix C, Table. C.9 and Table. C.10

Table 3.1 clearly shows that the return on asset measured in terms of gross profit was little high during the pre-reform period. The gross profitability ratio has declined from 10.47 per cent during the 1980s to 9.79 per cent in the post-reform period.

Table 3.1  
ROA in SLPEs in Kerala

| Period                                     | (Per cent)          |                     |
|--|---------------------|---------------------|
|  | PBIT to Total Asset | PAT to Total Assets |
| Pre-reform period<br>(1981-82 to 1990-91)  | 10.47               | -3.51               |
| Post-reform period<br>(1991-92 to 2010-11) | 9.79                | 1.43                |
| Whole period<br>(1981-82 to 2010-11)       | 10.13               | -0.98               |
| 1991-92 to 2000-01                         | 9.54                | 1.93                |
| 2001-02 to 2005-06                         | 5.32                | -5.53               |
| Last Five Years<br>(2006-07 to 2010-11)    | 11.98               | 7.80                |

Source: Calculated from the Review of Public Enterprises, various years, Bureau of Public Enterprises, Kerala.

Note: PBIT = Profit before interest and taxes, PAT = Profit after interest and taxes.

Further division of post liberalisation period revealed significant differences in performance level. Gross profitability ratio was 9.54 during the first half of the post liberalisation period. It was sharply declined to 5.32 per cent during 2001-02 to 2005-06. However a remarkable recovery could be seen in the last five years of post-liberalisation period. It has been increased to 11.98 per cent during the period of 2006-07 to 2010-10 which is very close to the bench mark rate of return of 12 per cent set by the study group on reforms of SLPEs set up by the planning commission in 2002. The SLPEs in Kerala as a whole obtained 10.13 per cent per annum as return to its investment during the period under study.

However an estimate of net profitability ratio provides us a pathetic story. It was negative during the pre-reform period and also during the entire periods. During the entire period

of our study it was -0.98. It implies that the shareholders, in our case the state government incurred a loss of 0.98 per cent per annum on its investment during the entire period of study. If we are comparing the net profitability of post-reform period with pre-reform period we could see that there is slight but insignificant improvement during the post reform period, it has been raised from -3.51 per cent in 1980s to 1.43 during the liberalisation period. Further division of post liberalisation period revealed significant differences in performance as in the case of gross profitability ratio. Net profitability ratio marked an annual average net return of 1.93 per cent per annum during the 1990s. It was declined significantly to -5.53 per cent during the period 2001-02 to 2005-06. However the last five years of our study period registered significant improvement with an annual average figure of 7.80 per cent. Meanwhile Jatinder et al (2011) and Mohnot (2010) found that the central public enterprises were registered more than 10 per cent return during 2007-08 in terms of net profitability ratios<sup>7</sup>. If we are comparing with the findings of these studies we can simply say that the profitability SLPEs in Kerala is far below the performance of central public enterprises.

From the analysis so far we could find that SLPEs in Kerala has registered around 10 per cent return in terms of gross profitability ratio during both the pre and post liberalisation periods. However the net profitability ratio shows that the rate of return was not satisfactory during these periods. We could see that the net profit to asset ratio was negative during the entire period. So the satisfactory gross profitability ratio and negative net profitability ratio need to be addressed more carefully. As we stated earlier gross profits include funds for interest payment and tax provisions. If we exclude these two items (i.e., interest payment and tax provision) or taking net profit in the nominator of the formula, we could see that rate of return seems to be negative in most of the periods especially during the pre-reform period. So the financing pattern of these enterprises in the various periods needs to be analysed with suitable measures. Beena (1990) and Subramanian (1994) were stated in their study that the peculiar financing pattern of SLPEs mainly the dependence on

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<sup>7</sup> Mishra and Lakshmi, 2006, and Nagaraj , 2006 were also showed better performance of CPEs in terms of net profitability during the post liberalisation period.

external loans during the 1980s caused an erosion of surplus in the form of interest obligations. In the following section we are going to look the financing pattern of these enterprises during our study period.

### **3.1.3 Financial Leverage Ratios**

As we discussed earlier debt equity ratio measures the relative proportion of equity and debt used to finance the asset of a company. If it is greater than one it would be interpreted as the major chunk of a company's assets is financed through debt, and if it is less than one it indicates that the asset of an enterprise is predominantly financed through equity. The estimated debt equity ratio of the SLPEs was 1.98 during the entire period, see Table 3.2. It indicates that the pattern of financing of the public sector companies is highly tilted in favour of debt. Table 3.2 also reveals that debt equity ratio was relatively high during the pre-reform period with a figure of 1.98 per cent as against 1.43 per cent in post reform period. During the entire period this ratio was 1.68. It is also clear from the table that debt to equity ratio was relatively low in the last five years of post-reform period comparing to any other sub periods. One of the reasons for the low debt equity ratio during this period was because of a large portion of government loans in these enterprises were converted to equity (Business standard, July 2011). From the previous section we find that it was also period of high profitability.

Financial economists have different opinions on how to interpret debt equity ratio<sup>8</sup>. Some of them argue that higher the debt equity ratio means higher the risk and so return will also expected to be high<sup>9</sup>. But the fundamental principle in financial economics is that the rate of return on borrowed funds must be greater than the cost of using the funds (Obert and Fatiki, 2010). Borrowing can be justified as long as the return by using this debt is higher than the interest paid on debt (Bernstein et al, 1998). So it is relevant to look whether the profits generated by these SLPEs in Kerala were adequate to meet their interest payment obligations in different periods. For this purpose we used the interest coverage ratio.

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<sup>8</sup> Refer Lev Baruch, 1974, and Bernstein et al, 1998

<sup>9</sup> Risk in the form of interest obligations

Interest coverage ratio shows the safety of borrowings. This ratio is calculated by dividing a company's profits before interest and taxes (PBIT) of a period by the company's interest expenses for the same period. An interest coverage ratio below one indicates that the firm is not generating sufficient revenues to meet its interest expenses and vice versa.

Table 3.2

Leverage and Interest Coverage Ratios of SLPEs in Kerala

| Period                                      | Debt to Equity Ratio | Interest Coverage Ratio |
|---|----------------------|-------------------------|
| Pre -reform period<br>(1981-82 to 1990-91)  | 1.98                 | 0.64                    |
| Post -reform period<br>(1991-92 to 2010-11) | 1.43                 | 1.89                    |
| Whole period<br>(1981-82 to 2010-11)        | 1.68                 | 1.25                    |
| 1991-92 to 2000-01                          | 1.39                 | 1.38                    |
| 2001-02 to 2005-06                          | 1.65                 | 0.73                    |
| Last Five Years<br>(2006-07 to 2010-11)     | 1.27                 | 3.61                    |

Source: same as Table 3.1

The estimated value of the interest coverage ratio showed significant differences in various periods. It was less than one during the two sub periods namely pre-reform periods and 2001-02 to 2005-06, with an average of 0.64 and 0.73 respectively. From the analysis so far we could find that 1980s was a period of high debt equity ratio and low rate of return in terms of net profitability. So this high debt equity ratio and low interest coverage ratio up to a certain extent would explain the reason for satisfactory gross profitability ratio and negative net profitability during the 1980s. Interest coverage ratio was relatively high with an annual average figure of 3.61 per cent during the 2006-07 to 2010-11 periods. So the low debt equity ratio and high interest coverage ratio might have helped them to obtain a relatively high rate of return along with other factors during this period.

## SECTION II

### Industry Wise Analysis of Financial Performance

As far as we have discussed the financial performance of manufacturing enterprises in the state sector as a whole by employing different financial performance measures. This section will provide industry wise analysis which is a supplement to the overall analysis of the previous section. The significance of such an analysis lies on the fact that operational behavior of firms can vary between industries to industry. An aggregate analysis may not reveal the exact picture of the performance each industry. So in the following section we are going to look how different industrial groups are performing in various periods by employing important financial performance measures.

#### 3.2.1 Profitability Differentials among Industries.

We begin our industry wise analysis also with profitability ratios, since it is considered to be the best financial performance indicator<sup>10</sup>. In the first chapter we discussed that our sample consists of 26 firms belongs to seven industrial groups. Here we are comparing the performance of each industry during the post-liberalisation period with their financial performance during the pre- liberalisation period. Aggregate level analysis in the previous section showed that the last five years of the liberalisation period showed substantial improvement in terms of rate of return. Due to that reason we included the financial performance of this period in this disaggregate level analysis in order to understand the performance of different industries during this period. For the purpose of comparison we chose the profit after interest and tax to total assets (PAT/ Total Assets) as the measure of rate return since it shows what ultimately left to the investors after meeting all expenses<sup>11</sup>.

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<sup>10</sup> A detailed discussion has been given in section 3.1.1 of this chapter.

<sup>11</sup> Industry wise estimation and results of PBIT to total assets, profit margin and asset turnover ratio, and are given in Appendix C, Table. C.9 and Table. C.10

Table 3.3

## Industry Wise Return on Asset

| Industry/Period        | PAT /Total Assets ( Per cent)              |   |                                       |   |
|------------------------|--|---|---------------------------------------|---|
|                        | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | Last Five Years<br>(2006-07 to 2010-11) |
| Ceramic & Refractories | -11.10                                     | 1.45  | -4.73                                 | 11.39                                   |
| Chemical               | -3.64                                      | 8.42  | 4.40                                  | 8.85                                    |
| Electrical & Cable     | -29.36                                     | 1.05  | -9.75                                 | 12.08                                   |
| Electronics            | -2.33                                      | -25.51                                      | -19.45                                | 8.29                                    |
| Engineering            | 2.83                                       | 2.07  | 2.42                                  | 10.16                                   |
| Wood & Agro Based      | -1.62                                      | 9.31  | 5.66                                  | 13.29                                   |
| Textiles               | -28.40                                     | -8.46                                       | -15.11                                | -4.03                                   |

Source: same as Table 3.1

The industry wise estimates of rate of return revealed significant variations. Table 3.5 clearly shows that ceramic, chemicals and agro based industries showed a relative improvement in profitability during the post liberalisation period over the pre reform period. On the other hand electronics industry shows a substantial loss after reforms. Rate of return remains more or less same during both periods in the engineering industry with a positive figure of 2 to 3 per cent respectively. The textiles sector is the worst performing industry; the return was a high negative figure during both periods. However during the last five years rate of return has improved substantially in most of the industries except textile industry. Most of the industries registered more than 10 per cent return on the capital invested in these industries.

### 3.2.2 Industry wise Debt to Equity Ratio.

Industry wise analysis of return on asset showed a relative improvement in post reform period in most of the industries except electronics and textiles industry. In the following part we are supplementing the above discussion by analysing the leverage ratio at more disaggregated level.

Table 3.4  
Industry Wise Leverage Ratio of SLPEs in Kerala

| Industry/Period        | Total Debt/ Equity ( Per cent)             |   |                                       |   |
|------------------------|--|---|---------------------------------------|---|
|                        | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | Last Five Years<br>(2006-07 to 2010-11) |
| Ceramic & Refractories | 2.87                                       | 1.81  | 2.16                                  | 1.89                                    |
| Chemical               | 2.49                                       | 1.50  | 1.82                                  | 1.73                                    |
| Electrical & Cable     | 2.57                                       | 1.19  | 1.64                                  | 0.44                                    |
| Electronics            | 1.56                                       | 1.96  | 1.75                                  | 1.95                                    |
| Engineering            | 0.74                                       | 1.17  | 1.03                                  | 1.16                                    |
| Wood & Agro Based      | 0.40                                       | 0.28  | 0.32                                  | 0.32                                    |
| Textiles               | 1.05                                       | 1.76  | 1.53                                  | 2.03                                    |

Source: same as Table 3.1

Table 3.4 reveals that debt equity ratio was more than one in most of the industries except agro based industry during the entire period indicating a high dependence on borrowed capital. The lower debt equity ratio of agro based industry indicates that it has more internal funding for its operation, which might have helped the industry to get a relatively better return on asset during the entire period. Table 3.6 also reveals that leverage ratio was more than two in ceramic, chemical and electrical industries implying high dependence on borrowed capital. This high dependence on loan and the resultant interest burden might be the reason for high negative return from these industries during the 1980s. A high gearing ratio generally indicates the less financial soundness of an industrial unit because it drains out a substantial portion of the operating surplus in the form of interest payment (Nirmala, 1990). In order to clarify these arguments we also estimated industry wise interest coverage ratio for various sub periods.



### 3.2.3 Industry Wise Interest Coverage Ratio

We already stated in the first section that the borrowed capital is not harmful to an industry as loan as the cost of such loans is less than the return by using such funds. So it is relevant to know whether the profits generated by these industries were sufficient to meet their interest payment obligation.

Table 3.5  
Industry wise Interest Coverage Ratio of SLPEs in Kerala

| Industry/Period        | Interest Coverage Ratio                    |   |                                       | ( Per cent)                             |
|------------------------|--|---|---------------------------------------|---|
|                        | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | Last Five Years<br>(2006-07 to 2010-11) |
| Ceramic & Refractories | 0.94                                       | 1.69  | 0.82                                  | 3.61                                    |
| Chemical               | 0.82                                       | 5.74  | 4.10                                  | 7.86                                    |
| Electrical & Cable     | 0.27                                       | 1.25  | 0.92                                  | 3.52                                    |
| Electronics            | 0.87                                       | 0.50  | 0.63                                  | 1.24                                    |
| Engineering            | 1.05                                       | 1.89  | 1.61                                  | 4.22                                    |
| Wood & Agro Based      | 1.17                                       | 10.93                                       | 7.68                                  | 22.30                                   |
| Textiles               | 0.08                                       | 0.13  | 0.11                                  | 0.06                                    |

Source: Same as Table 3.1

Note: Measured as PBIT/ Total interest payment

Table 3.5 clearly shows that interest coverage ratio was less than one in most of the industries during 1980s, which implies that the surplus generated by these industries were not sufficient to meet interest cost on borrowings. Engineering and agro based industries were shown a figure of more than one that might have helped them to register a positive rate of return during the pre-reform period. Interest coverage ratio of the post-reform period marked little improvement in most of the industries especially in chemical and agro based industries. However textiles and electronics industries have still a figure of less than one. Last five years of the post liberalisation period shows substantial improvement in interest coverage ratio in most of the industries except in textiles industry.

### SECTION III

#### Determinants of Profitability of SLPEs in Kerala

From the analysis so far we could find that the profitability of the SLPEs in Kerala measured in terms of gross profit (PBIT as a percent of total assets) seems to be satisfactory, at the same time the net profit to total assets was negative in most of the periods. We could also find that the period with low or negative profitability was characterised by high debt equity ratio and high interest payment. So it is relevant to identify the factors which significantly affect the profitability of these enterprises. In the present section we made an attempt to identify the variables which were contributing negatively or positively to the profitability of these enterprises.

There has been growing number of papers recently that test for measures and determinants of firm's profitability in the market places. As we explained in the first section of this chapter rate of return can be attributed either to total assets or to capital employed<sup>12</sup>. However return on assets (ROA)<sup>13</sup>, is one of the all-time favourites and perhaps most widely used overall measure of financial performance (Rappaport 1986). So in this section we use the ROA as our dependent variable. It is considered that it includes all the influences of the assets' management and it is acknowledged as a key indicator of increasing company performance; it also defines their economic growth potential (Helfert, 2002). Table below will give a clear idea about the factors which are seemed in literature to be affecting the profitability of an enterprise.

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<sup>12</sup> Large Number of studies were also expressed rate of return in relation of profit to equity.

<sup>13</sup> Return on assets (ROA) = Net profit before tax/ Total assets

### 3.3.1 A Brief Review of the Existing Studies on Factors Affecting Profitability.

| Source                    | Dependent Variable                             | Explanatory Variables   | Findings  |
|---------------------------|--|---|---|
| Arif et al (2011)         | Return on equity (ROE)                         | Debt to Equity ratio (D/E), Asset Turnover (ATO) ratio and Gross Fixed Assets (GFA).  | D/E, ATO, GFA etc. are positively significant with ROE,   |
| Nagy Neil (2009)          | Return On Asset (ROA)                          | R&D intensity, Capital expenditure, Net sales, Current ratio, D/E, Inventory turnover ratio, NPM, Advertisement expenditure, and Business segment in which firm belongs | Most of these factors were significant and influencing either positively or negatively to the profitability of US firms.            |
| Singh and Pandey (2008)   | Return On Asset (ROA)                          | Current ratio, liquid ratio, Receivables turnover ratio and Working capital to total assets ratio   | All these factors had statistically significant impact on the profitability of the Hindalco Industries Limited during 1990 to 2007. |
| Huyinh and Su (2010)      | Return On Asset (ROA)                          | Debt to Equity, Cash conversion cycle, In sales and Inventory turnover days   | Negative relationships between profitability and the cash conversion cycle, and also with D/E                                       |
| Burja(2011)               | Return On Asset (ROA)                          | Sales to current assets ratio, Sales to equity ratio, Financial leverage ratio, and Expenses revenue ratio  | Efficiency of inventories, debts level, financial leverage, efficiency of capitals has significant                                  |
| Meenakshi and Vani (2004) | Net Profits of SLPEs in Karnataka              | Total number of employment, GFA, Age of the Public sector and Average Emolument.  | Age and Emoluments are not significant, GFA ha positively and number of employees negatively significant to dependent variable      |
| Antony MT(1992)           | Profit of Central Public Enterprises in Kerala | Capital Output ratio, Capacity Utilisation, and Capital Intensity   | Significant relationship among profitability and variables Capital-output ratio, capital-labour ratio and capacity utilisation.     |
| Mathew.V (1997)           | Net Profits or loss of SLPEs in Kerala         | Material consumption to sales, production, turnover, employment, working capital, Current ratio and Debt to Equity ratio,   | Consumption to sale (negatively significant) and working capital (positively) are the major determinants of profitability.          |

By surveying the existing studies, we could find that large number studies have used ROA as the measure of profitability. So as we stated earlier in the present study we use ROA as our dependent variable. The relevant variables which we found in the literature affecting the profitability of a business are given in the following part.

### **3.3.2 A Description of the Explanatory Variables**

A detailed description about the variables which we used in the present study and the signs that they are expected to hold when regressing with ROA are given below.

#### **Debt-to-equity Ratio**

Debt-to-equity ratio is a measure of a company's financial leverage. It is calculated by dividing the total liabilities<sup>14</sup> with shareholder's equity. If it is less than one it means that the company is mainly financed operation through its own sources of funds. On the other hand if it is greater than one, it implies that a company has been aggressively financing its operation with debt. Debt equity ratio as an explanatory variable of profitability seems to be contradictory results in empirical literature. It is a basic principle in finance that greater risk equals greater potential return so one might expect a high debt-to-equity ratio to generate a higher ROA (Nagy, 2009). Huynh (2010) based on the study of corporate firms in the Vietnam showed that debt equity ratio had a positive impact on profitability of these enterprises. However some studies shows the opposite results, for instance Osama et al (2011), Harjanti and Tandelilin (2007) were found that this ratio has a negative association with the profitability. It implies that the affectivity of debt on profitability varies between firms and industry (Arif et al, 2011).Theoretically the debt-to-equity ratio ought to be negatively correlated with ROA.

#### **Current Ratio**

Current ratio is the ratio of current assets of a business to its current liabilities. It is mainly used to give an idea of the firm's ability to pay back its short-term liabilities with its short-

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<sup>14</sup> Loans and obligations with a maturity of longer than one year

term assets. The higher the current ratio implies that the company is more capable of paying its obligations. A ratio under one suggests that the company would be unable to pay off its obligations if they came due at that point. The current ratio, also called as liquidity ratio, is one of the key factors which affect the profitability of a firm. So it is more important to measure profitability compared with current ratio (Eljelly, 2004). It explains the financial viability of an enterprise. Firms with fewer current assets will having problem in continuing their operations while if the current assets are too much, it shows the return on investment is not in perfect condition (Van Horne and Wachowicz, 2000). So it is expected to be a positive sign.

### **Net Profit Margin (NPM)**

Net profit margin is calculated by taking a firm's net income divided by net sales revenues. It measures how much out of every rupee of sales a company keeps in earnings. A higher the NPM indicates firms are able to generate more profits out of each unit sales. Thus a company with high NPM is likely to have higher returns on its assets<sup>15</sup>. Here this ratio is expected to be a positive sign.

### **Asset Turnover Ratio**

Asset turnover ratio measures the efficiency of a company's use of its assets in generating sales revenue. It measures the operational efficiency of enterprises. It is the ratio of firm's sales revenue to its fixed assets. Since net profit margin has its own limitation, it is relevant to incorporate asset turnover ratio as an explanatory variable of profitability. It is possible for an enterprise with low profit to sale ratio and high asset turnover to be more profitable than an enterprise with high profit margin (Jorgenson et al, 2009). So profitability can be improved by increasing total assets turnover. Obviously a higher asset turnover ratio is expected to have positive impact on profitability and low asset turnover ratio will negatively affects the firm's profitability. So the value of total assets turnover will expect to change the value of ROA.

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<sup>15</sup> Detailed explanation is given in 3.1.1 of this chapter.

### **Inventory to Sales**

The Inventory to sales ratio measures the percentage of inventories the company currently has on hand to support the current amount of net sales<sup>16</sup>. It is calculated by dividing total inventories to net sales revenue. The inventory management is a very high bearing on efficiency. Since a major chunk of inventory of SLPEs is in the form of finished goods, an increasing inventory to sales ratio would generally be a negative sign, showing the firm may be having trouble in keeping inventory down and also showing the inefficiency in marketing. This often indicates larger financial problems the company may be facing (Nagy, 2009). In this study we assume a negative relation of inventory turnover ratio with our dependent variable.

### **Emoluments per Worker**

Wages or earnings of the employees are one of the most significant determinants of profitability of an enterprise (Draca et al, 2006). Here the emolument per worker is taken as a proxy to the skill of labour. As per this assumption as emolument increases the profitability of the enterprises is expected to grow through increase in output. Emolument per employee is defined as the ratio of total emolument to total number of person employed. So it is expected to be a positive sign.

### **Capital**

Gross fixed asset is taken as a proxy to capital. Many studies<sup>17</sup> used gross fixed assets as a proxy to the size of the firm. If a firm has assets than other firms, it means that they are not only bigger in size but also better production capacity. When a company has better production capacity than the other similar company, then it has potential to generate more profit better than other related company. The studies like Lawrenze et al, (2004) and Arif et

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<sup>16</sup> Inventories in the form of raw materials (materials and components scheduled for use in making a product), work in progress (materials and components that have begun their transformation to finished goods) and finished goods

<sup>17</sup> For instance see, Arif et al, 2011 and Lwahrenze et al, 2004.

al, (2011) were found a significant positive relation of gross fixed asset on firm's profitability. So in the present study we also assume a positive relationship between ROA and gross fixed assets.

### **Employment**

Total number of person employed is taken as the measure of employment. Generally it is assumed to be positively contributed to the dependent variable. However a study by employing panel regression on the profitability of SLPEs in Karnataka (Meenakshi et al, 2009) found that employment is negatively significant with profitability. It means that given the gross fixed asset an increase in employment reduces the net profit of these enterprises, which implies over employment in these enterprises. Here the Logarithmic value of employment is used. As in the case of capital, employment is also assumed to be a positive sign in the present study.

### **Age of the Firm**

Age of the firm is taken as a proxy of experience. Age of the firm is calculated from the year of incorporation of the firm. Logarithm of age is used because additional experience of the firm is expected to have greater influence on new firms than older ones. If the age of the firm is reflected accumulated experiences, it is expected to have positive influence on profitability. But in some of the cases age of the firm reflects the age of its capital stock (Parameswaran, 2000). An older capital stock is technologically inferior to a latter capital stock in such cases the age of the firm expected to have negative impact on firm's performance. In this study we assume a positive association between age and profitability.

### **Net Sales Revenue**

Net sales are the amount of sales generated by a company after the deduction of returns, allowances for damaged or missing goods and any discounts allowed. This is an obvious candidate for a variable that would determine a firm's profitability. Since it is in a company's best interest to sell their goods in the market, one must expect that higher sales should yield a positive boost in return relative to the company's assets as compared to a lower level of sales. Logarithm of net sales revenue is used in this study.

### **Time Dummy**

A time dummy is also included in the profitability equation to capture the effects of policy changes on firm's profitability. This time dummy take the value of zero up to 1990-91 and thereafter one. This time variable supposed to capture the effects of changes in the environment brought in by policy reforms.

Finally, the remaining variables used are binaries created to reflect the sector in which the firm belongs. Study of McGahan and Porter (1997) indicated that each industry generates different form of profitability. Powell (1996) finds strong evidence that industry accounts for approximately 20% of firm financial performance. Thus it is considered crucial to have industry variables within the model.

### **3.3.3 Data Source and Method**

Present analysis is based on the panel data of 26 manufacturing enterprises coming under seven industrial groups in the SLPEs in Kerala, collected from the various issues of the review of public enterprises, published by the Bureau of Public Enterprises, government of Kerala. In order to understand the factors which affecting either positively or negatively to the profitability performance of these enterprises, the period of study is taken from 1981-82 to 2010-11. Study for such a long period will help us to understand the variable which affects the profitability of these enterprises also will help us to know up to certain extent the effects of policy changes on profitability. The data comprises of 26 manufacturing enterprises consisting of 708 observations. The study uses STATA .10.0. statistical package for the analysis and estimation

### **3.3.4 Econometric Model**

Drawing from the discussion made so far we have specified following functional form to explore the department of various factors on profitability of SLPEs in Kerala. The specific



functional form that is used in the present study is almost in tune with earlier empirical models seems in the literature.

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 \ln X_{7it} + \beta_8 \ln X_{8it} + \beta_9 \ln X_{9it} + \beta_{10} \ln X_{10it} + \beta_{11} X_{11it} + \beta_{12} D_{it} + \beta_{13} D_T + \varepsilon_{it}$$

Where:  $i = 1, 2, \dots, 26$  is an index for firms and  $t = 1981-82, \dots, 2010-11$ , is an index for time,

$Y_{it}$  = Return on asset (ROA), explanatory variables are given below as per their order.

$X_{1it}$  = debt equity ratio,  $X_{2it}$  = current ratio,  $X_{3it}$  = Net Profit Margin,  $X_{4it}$  = Asset turnover ratio as proxy to efficiency,  $X_{5it}$  = Inventory to sales,  $X_{6it}$  = average emoluments as a proxy to skill,  $\ln X_{7it}$  = GFA, as a proxy to capital,  $\ln X_{8it}$  = number of employees,  $\ln X_{9it}$  = age of the firm as proxy to experience,  $\ln X_{10it}$  = Net sales revenue,  $D_{it}$  = a dummy for various industries.  $D_T$  = time dummy, 1, for post-reform period (1991-92 to 2009-10), 0 other wise,  $\varepsilon_{it}$  = error term.

In the panel data model, the error term will usually have two components that is;  $\varepsilon_{it} = u_i + \omega_{it}$ , here  $u_i$  is called as unobservable firm specific effect, affixing to the cross sectional unit. It is time invariant and it may be random or a fixed constant. The reminder disturbances  $\omega_{it}$  is the standard error term, which is purely random and varies with individual firm and time. That is  $\omega_{it}$  always remain stochastic, with IID<sup>12</sup> (0,  $\sigma^2\omega$ ) and the  $X_{it}$  are assumed independent of the all  $\omega_{it}$  for all  $i$  and  $t$ . If the  $u_i$  is also random, it is also assumed to be uncorrelated with  $X_{it}$  and then the model is called random effect (RE) model, were the GLS technique is used. As per the specification test,<sup>18</sup> RE model was showed proper fit to the present study with data in hand.

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<sup>18</sup> Hausman and Breusch-Pagan test which will explain later

### 3.3.5 Summary Statistics of the Variables

Before presenting the estimation and results, the study presented summary of the following variables. Table 3.6 gives descriptive statistics for 26 SLPEs in Kerala for a period of 30 years from 1981-82 to 2009-10 and for a total 708 observations.

Table 3.6

Summary Statistics of Variables

| Variable      | N   | Mean       | Std Deviation | Minimum | Maximum |
|---------------|-----|------------|---------------|---------|---------|
| ROA           | 708 | -0.6278903 | 0.3980161     | -2.87   | 2.25    |
| DEBT_EQUI     | 708 | 1.7966435  | 2.3106521     | 0.02    | 16      |
| Current Ratio | 708 | 1.7063371  | 1.331683      | 0.01    | 14.06   |
| NPM           | 708 | -0.1181345 | 0.5700832     | -8.28   | 1.31    |
| ATO           | 708 | 2.0591836  | 2.1916730     | 0.02    | 18.53   |
| INV_SALES     | 708 | 0.3969856  | 0.9631961     | 0.01    | 23.4    |
| EMO_EMPO      | 708 | 1.5598955  | 3.2515233     | 0.01    | 34.28   |
| ln K          | 708 | 6.8922881  | 1.6324112     | 1.52    | 10.53   |
| Ln Employees  | 708 | 6.0291953  | 0.9406978     | 3.14    | 7.91    |
| ln Age        | 708 | 3.3432632  | 0.5312923     | 1.39    | 4.42    |
| Ln Sales      | 708 | 7.1713701  | 1.550529      | 1.08    | 10.49   |

Source: Same as Table 3.1

For checking multicollinearity between the explanatory variables, we have estimated correlation coefficients. The correlation matrix presented in Table 3.7 expressed that there is no much correlation between explanatory variables. All the correlation coefficients are below 0.5 except inventory sales and net profit margin, 0.50 and log sales to log capital 0.52. Since the explanatory variables are not correlated with each other, the regression results will not be affected by the multicollinearity problem.

Table 3.7

## Correlation Matrix of ROA with other Variables

| Variables    | ROA     | DE      | CR      | NPM     | ATO     | INV_ SALE | EMO_EMP | Ln K   | Ln Emplo | Ln Age | Ln Sales |
|--------------|---------|---------|---------|---------|---------|-----------|---------|--------|----------|--------|----------|
| ROA          | 1.0000  |         |         |         |         |           |         |        |          |        |          |
| DE           | -0.4685 | 1.0000  |         |         |         |           |         |        |          |        |          |
| CR           | 0.2015  | -0.1586 | 1.0000  |         |         |           |         |        |          |        |          |
| NPM          | 0.0845  | -0.0782 | 0.0752  | 1.0000  |         |           |         |        |          |        |          |
| ATO          | 0.2105  | 0.1013  | 0.0800  | 0.0667  | 1.0000  |           |         |        |          |        |          |
| INV_ SALES   | -0.0431 | 0.1472  | 0.0117  | -0.5021 | -0.0512 | 1.0000    |         |        |          |        |          |
| EMO_EMP      | -0.0195 | -0.0375 | -0.0020 | 0.0088  | 0.0188  | 0.0180    | 1.0000  |        |          |        |          |
| Ln K         | 0.0146  | -0.0787 | 0.0623  | -0.0065 | -0.4848 | -0.0152   | 0.2918  | 1.0000 |          |        |          |
| Ln Employees | 0.0728  | -0.0683 | 0.0460  | 0.0715  | -0.1876 | -0.0348   | -0.2967 | 0.3913 | 1.0000   |        |          |
| Ln Age       | 0.0364  | -0.0549 | -0.1140 | 0.0036  | 0.0052  | -0.0869   | 0.2908  | 0.0832 | 0.0335   | 1.0000 |          |
| Ln Sales     | 0.0788  | -0.0892 | 0.2251  | 0.2329  | 0.0781  | 0.1774    | 0.3604  | 0.5175 | 0.1973   | 0.2004 | 1.0000   |

Source: Same as Table 3.1

ROA = Return on Assets, DE= Debt Equity Ratio, CR = Current Ratio, NPM = Net Profit Margin, INV\_ SALES = Inventory to Sales Ratio, EMO\_EMP = Emolument per Employee, Ln K= Log value of Capital, Ln Emplo= log value of number of Employees, Ln Age = log value of age of the firm and Ln Sales = log value of net sales

Before examining the regression results and its implication, it is essential to discuss the estimation procedure and diagnostic tests undertaken during the panel regression procedure. The Random Effect (RE) model seems to be the proper model fitting for the data which we use as per the Hausman (1978) specification test as well as the Breusch- Pagan test (1979). Hausman specification test indicates whether fixed-or-random effect model is reliable for the given variables and data. In other words this specification test examines whether the coefficients of the fixed and random effect models are systematic or not. If it is systematically different, then random effect models is preferable over fixed effect model and vice versa. The test yield statistically insignificant result ( $P > \chi^2 = 0.7333$ ), which indicates that the random effect model is consistent. Brush Pagan test is a further test for RE model testing whether the variance of individual error component is significantly different from zero or not, RE is turned out to be proper specification( Test:  $\text{Var}(U) = 0$  and  $p > \chi^2 = 0.0152$ ).  $R^2$  value is also satisfactory which assures goodness of fit of the model.

### **3.3.6 Results of the Estimated Model**

The result of the panel regression is given in Table 3.8 below. Table 3.8 reports the relevant variables and how they perform in the model, in addition to the parameter estimates for the final variables along with their Z value, and level of significance. In general, five variables were found to be significant with different parameter estimates, meaning that these variables are correctly affecting ROA with different extent.

The estimated RE model revealed that debt to equity ratio which is used as a proxy for leverage of the firm had a negative effect on ROA and is significant at the 5 per cent confidence interval during the study period. The regression results shows that given the time period for every one unit increase in the debt-to-equity ratio ROA drops by 0.06785 per cent. This is validating our analysis so far that high dependence on borrowing and consequent interest burden up to a certain extent causes the erosion of surplus they generated. From our analysis in the first section of this chapter we could find that the period of low profitability was also a period of high debt equity ratio and low interest coverage ratio. These finding is also in tune with the arguments of Pillai (1989), and Beena

(1991) that the high dependence on loan capital unfavorably affected the profitability of these enterprises during the early 1980s.

Table 3.8  
Factors Affecting the Profitability of SLPEs in Kerala

| Dependent Variable : ROA   |                                |         |       |
|----------------------------|--------------------------------|---------|-------|
| Variable                   | Coefficients                   | Z Value | P(Z)  |
| Debt Equity Ratio          | -0.067859**                    | -1.77   | 0.047 |
| Current Ratio              | 0.059028*                      | 3.2     | 0.001 |
| NPM                        | 0.005411***                    | 1.46    | 0.085 |
| ATO                        | 0.083752**                     | 6.07    | 0.027 |
| Inventory to sales         | -0.018282                      | 0.75    | 0.454 |
| Emo_emplo                  | 0.002491                       | 0.27    | 0.788 |
| Ln GFA                     | 0.078268*                      | 2.9     | 0.004 |
| Ln Employees               | 0.027337                       | 0.81    | 0.421 |
| Ln Age of the Firm         | 0.038341                       | 0.64    | 0.521 |
| Ln net sales               | 0.096665                       | 3.67    | 0.731 |
| DT                         | 0.088928                       | 1.53    | 0.126 |
| Chemical                   | 0.016560                       | 0.55    | 0.584 |
| Electrical                 | -0.073920                      | -1.37   | 0.171 |
| Electronic                 | -0.042301***                   | -1.66   | 0.097 |
| Engineering                | -0.019161                      | -0.91   | 0.365 |
| Agro based                 | 0.090561                       | 0.81    | 0.418 |
| Textiles                   | -0.009280***                   | -1.85   | 0.064 |
| Constant                   | -0.082251**                    | -1.82   | 0.027 |
| R2 Within                  | 0.5124                         |         |       |
| Between                    | 0.6525                         |         |       |
| Overall                    | 0.5303                         |         |       |
| Hausman Specification test | $\chi^2 = 7.78$<br>(P= 0.7333) |         |       |
| No of Observation          | 708                            |         |       |

\*- significant at 1 %, \*\* - significant at 5 per cent, \*\*\* - significant at 10 %

Source: Same as Table 3.1

On the other hand gross fixed assets which we used as a proxy for capital is positively significant at five per cent level. It means that every one unit increase in the GFA will leads to 0.078 per cent increase in profitability. The implication is that higher the investment leads to better performance in terms of return. Asset turnover ratio is also seems to be significant at five per cent level. The estimated result shows that one percent increase in productive efficiency would lead to 0.0837 increases in profitability. The net profit margin seems to be positively significant at ten per cent level but with a small coefficient. The estimated model had also revealed a significant positive relationship between current ratio and profitability. The result shows that a one percent increase in the current ratio would help to increase the firm's profitability by 0.059 percent. So the positively significant current ratio and negatively significant leverage ratio has so many implications. Major implication is that the companies that have high profitability tend to have more internal funding than the smaller one. Such companies will use less debt because the capital used is achieved from their retained earnings.

The other variables such as inventory to sales, emolument to employees, ln sales, number of employees were not seem to be significant in the above results. An earlier study on SLPEs in Kerala has found that the loss making firms has poor inventory management and it adversely affect the profitability of those firms (Pillai, 1989). In our study we find that the inventory to sales ratio has a negative coefficient but not significant at any per cent level. The possible reason may be the short comings of our inventory to sales ratio variable which we used in the present study. Some other variables such as inventory turnover days,<sup>19</sup> trade payable days<sup>20</sup> may capture the exact picture of inventory management<sup>21</sup>. Among the industries electronics and textiles industries dummy showed significant negative impact on profitability. Most of the industry dummies except the chemical and agro based industries are also showed a negative coefficient but not significant in any per cent level. Further the

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<sup>19</sup> Measure as Average inventory / cost of sales \* 365 days,

<sup>20</sup> Measure as yearend trade payables / cost of sales \* 365 days

<sup>21</sup> Lack of good and separate selling cost data for the entire period we restricted us to use inventory to sales ratio in the present analysis.

dummy of chemical and agro based industry showed a positive coefficient but not significant at any level.

### **3.4 A Brief Summary of the Present Chapter**

In this chapter we examined the financial performance of SLPEs in Kerala by employing various financial performance measures. Financial performance was measured mainly in terms of profitability. The estimated result showed that net profitability of these enterprises was not satisfactory even though they have registered a satisfactory gross profitability ratio. In order to understand the reason for this poor net profitability ratio we also estimated financial leverages by employing the debt to equity ratio. We could find that the periods of low net profitability ratio were also characterised by high debt equity ratio. Estimated interest coverage ratio also showed that it was very low in most of the periods especially during 1980s mainly due to high interest burden. In order to understand the performance of each industry a detailed analysis also done at more disaggregated level. The result shows that chemicals, engineering and agro based industries were able to show relatively better return than other industries during the study period. Textiles industry seemed to be the worst performing industry in which rate of return was negative in all the periods.

In order to understand the factors that contributing either positively or negatively to the rate of return of these enterprises the study used panel data at firm level. The specification test shows that random effect model is consistent with our data set. The regression results indicated that debt equity ratio had a significant negative impact on the profitability of SLPEs in Kerala. Resultant interest burden adversely affects the firm's profitability and further expansion. Further the result showed that current ratio, asset turnover ratio and capital has significant positive impact on profitability. Industry dummy show that electronic and textile industries have a significant negative impact on the return of these enterprises. The overall analysis tend to suggest that the pattern of financing with relatively greater reliance on the loan capital is one among the many complex set of factors responsible for the poor financial performance of SLPEs in Kerala.

## Chapter IV

### Summary and Conclusions of the Study

In concluding the present study on the performance of state level public enterprises in Kerala during the pre- and post- reform periods, we summarise the main findings of the empirical analysis and draw some implications in this chapter. As we stated earlier our present study is an attempt evaluate the physical and financial performance of these enterprises. We evaluated the physical performance of these enterprises with various productivity measures and financial performance has examined mainly with profitability ratios.

In the second chapter we examined some of the important macro variables such as growth rate of output, employment and capital. We could find that growth rate of most of these variables are decreased during the post reform period. Among this noteworthy is that of the negative growth of employment in the post reform period. Since one of the objectives behind the establishment of these enterprises was to create employment opportunities as we discussed in the first chapter this negative growth rate is shabby and dismal. We could also see that the negative growth in employment in the first and second sub periods of the post reform period is associated with lower growth in output. Further, a slight increase in employment growth in the last five years also associated with a significant improvement in the output and value added growth rate. It all implies that the reduction in employment is not a solution for improving the performance of these enterprises.

Estimated results of partial productivity growth rates are also revealed a decrease during the post reform period. We could find that productivity growth of labour and capital has been declined about 50 per cent in the post-liberalisation period compared to the pre-liberalisation period. Meanwhile capital intensity was relatively low in pre-reform period and it showed an improvement during the post reform period, implying that the productivity growth of labour in the SLPEs has not at all associated with the increase in capital intensity. It should be noted that the growth in capital intensity was not mainly because of increase in the capital investment but it was mainly on account of sharp reduction in employment growth rate. We find that the growth rate of capital has



decreased about half in the post-reform period and it remains the same around 3 per cent throughout this period. So the decrease in capital productivity was not in consequence of increase in capital but it was mainly due to the strident reduction in output growth rate. Relatively better growth rate of capital and output growth during the pre-liberalisation period and low growth rate of both during the post reform period implies that there is immense scope for further investment in the existing sector to improve the performance of these enterprises.

Arriving at TFPG estimation we have discussed the various methods and its advantages and disadvantages. By surveying the literature we could find that growth accounting approach based on translog index has its own advantages and is still popular in the productivity measurement of Indian manufacturing sector. We also used this method to arrive a conclusion about the productivity growth of SLPEs in Kerala during the pre- and post-liberalisation periods. The estimated results showed a decline in TFPG during the post liberalisation period. From the literature we could find that the productivity growth of Indian manufacturing sector has also decreased during these periods and many of them concluded that reform failed to generate growth in productivity as expected. However some studies argued for a case of time lag between reforms and productivity and found an improvement in TFPG during the noughties. From our analysis we could find that TFPG has been increased substantially during the last five years of the post liberalisation periods. Decomposition of value added growth rate showed that the major share of the value added growth rate is accounted by the growth in TFP during the last period of our study. In the first chapter we discussed about some of the policy initiative taken during this period such as monthly monitoring of the performance, training of employees at the aegis of RIAB, appointment of professionals as CEOs and more autonomy in decision making might have helped to improve the performance of these enterprises during the recent periods.

After analysing the physical performance we estimated the financial performance of these enterprises during the study period. The financial performance has been examined mainly in terms of profitability ratios. The rate of return estimated on the basis of gross profitability ratio showed satisfactory figure in both pre and post reform periods. Since the gross profit contains the provision for interest and taxes it may not reflect actually

what left to the firms and shareholders. So we estimated return on asset on the basis of net profit and we could find that it was not satisfactory or more specifically it was negative in most of the periods. Since the earlier studies on the performance of SLPEs in Kerala were blamed the peculiar financing strategy for their poor financial performance we also estimated the financial leverage ratio. The result showed that the financing of these enterprises were highly dependent on external debt. However from the literature survey we could understand that higher leverage ratio will not be harmful if the return is higher than the cost of such borrowings. For this purpose we estimated the interest coverage ratio and result showed that the surplus generated by these firms were not adequate to meet the interest payment obligations in most of the periods especially during the 1980s. So the findings of low rate of return associated with the high debt equity ratio and low interest coverage ratio tend to conclude that the peculiar financing pattern with relatively greater reliance on the loan capital is one among the many complex set of factors responsible for the poor financial performance of SLPEs in Kerala. So the study suggests that the government may consider converting a part of its loans given to these firms in to equity. This will reduce the interest burden and the surplus they are generated can be used for their further expansion, modernisation and attainment of better knowhow. Further the higher equity base will help these firms to obtain funds for their well organised programmes like product diversification and modernisation.

We further analysed the determinants of profitability of the SLPEs in Kerala. Looking in to such a dimension helped us to know the factors which are affecting the profitability of these enterprises. Estimated results of the panel regression revealed that the debt equity ratio had a significant negative impact on the profitability of these enterprises which validates our inference that the resultant interest burden adversely affects the profitability of these enterprises. Our analysis further disclosed that asset turnover ratio has significant positive impacts on the profitability of these enterprises. This implies that there is enough scope to increase the profitability of these enterprises by improving the efficiency in asset use. Capital also seems to have positive impact on the profitability of these enterprises which again states the scope of further expansion by increasing the investment in capital to improve the profitability of these enterprises.

#### **4.1 Issues for Further Research**

Some issues are required further detailed analysis in the context of SLPEs in Kerala emerged from the study. First, since the study shows an improvement in the performance of these enterprises by the last five years, it is highly desirable to compare the performance of SLPEs in Kerala with the SLPEs in other states. Second, A comparative study of the performance of these enterprises with the manufacturing enterprises in the private sector in Kerala will help us to understand whether the recent improvement in performance is in relation to the better economic environment prevailed in the state during these periods.

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## Appendix A

### Estimation of Capital Stock Series

In our study the capital variable is the gross fixed asset of the firm in 1993-94 prices. There are various methods for the construction of capital stock series. It should be stressed in the outset that there is no entirely satisfactory or universally accepted way of measuring capital stock<sup>1</sup>. Economists differ in opinion on the selection of gross fixed asset or net fixed asset as capital stock. Ideally if it was possible to devise a measure of true economic depreciation, it would be desirable to use the estimates of net capital stock for economic analysis (Ahluwalia, 1985). Since depreciation of book value is known to grossly overestimate and also the measurement of economic depreciation is very complex exercise, we used gross capital stock for the construction capital stock series. As we know book value of gross fixed asset of the firm is in historical cost, we have converted it into replacement cost by taking 1995-96 as the base year. The base year gross fixed asset of each firm has to be revalued with a revaluation factor ( $R^G$ ) to obtain base year capital stock at replacement cost. The base year capital stock at replacement cost can be computed by using the following formula;

Replacement Cost of Capital = Revaluation factor ( $R^G$ ) × [Value of Capital Stock at Historic Cost]

For computing the revaluation factor ( $R^G$ ) of each firm we make the following assumptions.

1. The life of a plant and machinery is assumed to be 20 years (CSO, 1989). Since we took the base year as 1995-96 it implies that no firm has any capital stock in 1995-96 of vintage earlier than 1976-77. For firms incorporated after 1976-77 we assumed that the earliest vintage capital in their capital mix dates back to the year of incorporation. Clearly, as stated by Srivastava (1996) the year of incorporation and the vintage of the oldest capital in the firm's asset mix may not coincide for some firms, but the assumption is made for want of a better alternative.
2. The price of capital has changed at a constant rate ( $\pi$ ) from 1976-77 or from the date of incorporation (whichever is later) up to 1995-96(base year).

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<sup>1</sup> To know more about the conceptual problems and shortcomings of the various capital stock estimates refer Goldar(1986).

$$\pi = \frac{P_t}{P_{t-1}} - 1$$

Growth rate of price of capital were obtained from the price indices of fixed capital formation in manufacturing collected from various issues of national accounts statistics of India. The constant growth rate of capital ( $\pi$ ) is not firm specific but it varies directly with the year of incorporation, provided that the firm was incorporated after 1976-77.

3. The growth rate of investment ( $g$ ) is same for all firms.

$$g = \frac{I_t}{I_{t-1}} - 1$$

Here growth rate of gross fixed capital formation in manufacturing in 1993-94 prices is assumed to apply to all firms<sup>2</sup>. Again different average annual growth rates are obtained for firms established after 1976-77.

Making all these assumptions the revaluation factor ( $R^G$ ) for the base year gross capital stock of each firm can be obtained through the following way:

Let us denote  $GFA_t^h$  and  $GFA_t^r$  are gross fixed asset at historical costs and replacement costs respectively and  $I_t$  is the real investment at time  $t$ .

$$\begin{aligned} GFA_t^h &= P_t I_t + P_{t-1} I_{t-1} + P_{t-2} I_{t-2} + \dots \\ &= P_t I_t \left[ \frac{(1+g)(1+\pi)}{(1+g)(1+\pi)-1} \right] \end{aligned}$$

And

$$\begin{aligned} GFA_t^r &= P_t I_t + P_t I_{t-1} + P_t I_{t-2} + \dots \\ &= P_t I_t \left[ \frac{(1+g)}{g} \right] \end{aligned}$$

<sup>2</sup> Gross fixed capital formation in manufacturing is obtained from various issues of National Accounts Statistics. From this value of gross fixed investment is obtained by using the following formula  $I_t = GFC_t - GFC_{t-1}$ .



Defining  $R^G$

$$R^G = \frac{GFA_t^r}{GFA_t^h}$$

Then

$$R^G = \frac{(1+g)(1+\pi) - 1}{g(1+\pi)}$$

If it is assumed more realistically that the capital stock does not date back infinitely but that the capital stock of the earliest vintage is  $t$  period old, then the revaluation factor becomes

$$R^G = \frac{[(1+g)^{t+1} - 1](1+\pi)^t [(1+g)(1+\pi) - 1]}{g(1+g)(1+\pi)}$$

GFA at replacement cost is obtained by multiplying the book value of GFA in 1995-96 (base year) by the estimated revaluation factor. This revalued GFA was deflated by whole sale price index for machinery and machine tools in order to attain the real capital stock of the base year<sup>3</sup>. After obtaining GFA at replacement cost for base year, the GFA at replacement cost for the rest of the year is computed by using the method of Parameswaran (2002).

$$K_{t+1} = K_t + I_{t+1}$$

$$K_{t-1} = K_t - I_t$$

$$K_{t-2} = K_{t-1} - I_{t-1}$$

$$K_{t+2} = K_{t+1} + I_{t+1}$$

Where  $K_t$  is capital stock at replacement cost in the base year,  $K_{t+s}$  and  $I_{t+s}$  are capital stock and real investment<sup>4</sup> at time  $t+s$ .

<sup>3</sup> We used WPI of machinery and machine tools for deflation, as plant and machinery account for 71.5 per cent of GFA (RBI, 1990:103).

<sup>4</sup> Real Investment at period  $t$  is obtained by using the formula  $I_t = GFA_t - GFA_{t-1}$ . The value thus obtained is deflated with WPI for machine and machinery for the year 1993-94.

## Appendix B

### Estimation of Real Value Added and Intermediate Inputs:

Output: Deflated value added is used as the measure of output. Both single as well as double deflation procedure is used to get the measure of real value added. The data base gives us the value of sales and change in stock. From this we calculated the value of gross output. In the single deflation procedure the value-added series has been deflated directly by suitable price indices obtained from the index number of whole sale price in India (1993-94 =100), published by the Economic Adviser Ministry of Commerce and Industry, Government of India. In the double deflation procedure at first Gross output is deflated with the appropriate price indices as in the case of single deflation procedure. To obtain real value added in double deflation procedure the value of real intermediate input is deducted from the real gross output. To obtain real intermediate inputs raw material as well as energy price indices were constructed by the procedure explained below.

A raw material price index is constructed for each industrial group in our study using the weights obtained from the input-output transaction table of India for 1999-00 published by the Central statistical Organisation (CSO). Raw material price index is constructed at more disaggregated level. For instance, in our study chemical industry is further divided into three as chemical, cements, drugs and medicine industries. A separate index is constructed for each industrial group using the weights obtained from the input-output transaction table of India for 1999-00. These weights are then multiplied with the appropriate price indices taken from the whole sale price of India, 1993-94=100 to obtain material price index of different industrial groups. The index so obtained is used to deflate the book value of raw material consumption.

Energy price index is also constructed for each industrial groups from the weights obtained from the input-output transaction table of India for the year 1999-00 as in the case of raw material price index. The weights so measured is then multiplied with the whole sale price index of India (WPI), base 1993-94=100, published by the Economic Adviser Ministry of Commerce and Industry, Government of India.

**Appendix C**  
**Tables and Graphs**

Table C.1  
Growth of CPSEs in India during Various Five Year Plans

| Particulars  | Total Investment<br>(Rs. In Crore) | Enterprises<br>(Numbers) |
|--|------------------------------------|--------------------------|
| On the eve of the 1 <sup>st</sup> Five Year Plan (1.4. 1951) | 29                                 | 5                        |
| On the eve of the 2 <sup>nd</sup> Five Year Plan (1.4.1956)  | 81                                 | 21                       |
| On the eve of the 3 <sup>rd</sup> Five Year Plan (1.4.1961)  | 948                                | 47                       |
| At the end of 3 <sup>rd</sup> Five Year Plan (31.3.1966)     | 2410                               | 73                       |
| On the eve of the 4 <sup>th</sup> Five Year Plan (1.4.1969)  | 3897                               | 84                       |
| On the eve of the 5 <sup>th</sup> Five Year Plan (1.4.1974)  | 6237                               | 122                      |
| At the end of 5 <sup>th</sup> Five Year Plan (31.3.1979)     | 15534                              | 169                      |
| On the eve of the 6 <sup>th</sup> Five Year Plan (1.4.1980)  | 18150                              | 179                      |
| On the eve of the 7 <sup>th</sup> Five Year Plan (1.4.1985)  | 42673                              | 215                      |
| At the end of 7 <sup>th</sup> Five Year Plan (31.3.1990)     | 99329                              | 244                      |
| On the eve of the 8 <sup>th</sup> Five Year Plan (1.4.1992)  | 1,35445                            | 246                      |
| At the end of 8 <sup>th</sup> Five Year Plan (31.3.1997)     | 2,13610                            | 242                      |
| At the end of 9 <sup>th</sup> Five Year Plan (31.3.2002)     | 3,24614                            | 240                      |
| At the end of 10 <sup>th</sup> Five Year Plan                | 4,21089                            | 247                      |
| At the end of 11 <sup>th</sup> Five Year Plan                | 4,36389                            | 244                      |

Source: Department of Public Enterprises, Public Enterprises Survey, Vol-1, Various issues.

Table C.2  
Status of Privatisation of SLPEs, as on March 31, 2003

| State             | Number of Enterprises | Number of SLPEs Privatised | No of Loss-Making Units |
|-------------------|-----------------------|----------------------------|-------------------------|
| Andhra Pradesh    | 128                   | 30                         | 25                      |
| Assam             | 42                    | -                          | 36                      |
| Bihar             | 54                    | -                          | 0                       |
| Delhi             | 15                    | -                          | 3                       |
| Goa               | 16                    | -                          | -                       |
| Gujarat           | 49                    | 3                          | 24                      |
| Haryana           | 28                    | 1                          | 16                      |
| Himachal Pradesh  | 21                    | -                          | 13                      |
| Jammu and Kashmir | 23                    | -                          | 16                      |
| Karnataka         | 79                    | -                          | 38                      |
| Kerala            | 109                   | -                          | 59                      |
| Madhya Pradesh    | 34                    | -                          | -                       |
| Maharashtra       | 66                    | -                          | 44                      |
| Orissa            | 67                    | 1                          | 10                      |
| Punjab            | 53                    | 1                          | 25                      |
| Rajasthan         | 29                    | 1                          | 11                      |
| Tamil Nadu        | 82                    | -                          | 47                      |
| Uttar Pradesh     | 104                   | -                          | 68                      |
| West Bengal       | 81                    | -                          | 62                      |
| Total             | 1,158                 | 37                         | 519                     |

Note: "-" means no privatisation.

Source: Mishra, R K and Kiranmai, J, 2006.

Table C.3

## Details of Implementation of VRS/ SSNP in SLPEs as on 2005

| Details of Implementation of VRS/SSNP |   |           |                  |                   |
|---------------------------------------|---|-----------|------------------|-------------------|
| Sl. No                                | Enterprises                                 | Year      | No. of Employees | Compensation Paid |
| A                                     | PERIOD FROM 1994 TO 2001                    |           |                  |                   |
| 1                                     | Steel Complex Ltd.                          | 1994      | 53               | 44.88             |
| 2                                     | Trivandrum Spinning Mills Ltd.              | 1994      | 120              | -                 |
| 3                                     | Kerala State Drugs and Pharmaceuticals Ltd. | 1995-96   | 55               | 87.38             |
| 4                                     | The Chalakkudy Refractories Ltd.            | 1996      | 130              | 178               |
| 5                                     | Kerala Soaps and Oils Ltd.                  | 1996-97   | 273              | 480               |
| 6                                     | Travancore Plywood Industries Ltd.          | 1997      | 149              | 285.06            |
| 7                                     | Keltron Power Devices Ltd.                  | 1998      | 104              | 321               |
|                                       | Sitaram Textiles Ltd.                       | 1998      | 188              | 200.51            |
| 9                                     | Steel Complex Ltd.                          | 1998      | 102              | 155.22            |
| 10                                    | Kerala State Electronic Development         | 2000      | 623              | 2661              |
| 11                                    | Kerala State Textile Corporation Ltd.       | 1995-2001 | 305              | 387.43            |
| 12                                    | Sidkel Televisions Ltd.                     | 2001      | 50               | 100               |
|                                       | Sub Total - A                               |           | 2152             | 4900.48           |
| B) BASED ON ERC's RECOMMENDATIONS     |   |           |                  |                   |
| 13                                    | Autokast Ltd.                               | 2003      | 100              | 302.71            |
| 14                                    | Keltron Counters Ltd.                       | 2003      | 247              | 1273.85           |
| 15                                    | The Kerala Ceramics Ltd.                    | 2003      | 89               | 222               |
| 16                                    | Trivandrum Spinning Mills Ltd.              | 2003      | 238              | 396.47            |
| 17                                    | Keltron Rectifiers Ltd.                     | 2003      | 99               | 408.93            |
| 18                                    | United Electrical Industries Ltd.           | 2003      | 123              | 331.28            |
| 19                                    | Kerala Soaps & Oils Ltd.                    | 2003      | 74               | 162.85            |
| 20                                    | Kerala Construction Components Ltd.         | 2003      | 105              | 164.08            |
| 21                                    | Astral Watches Ltd.                         | 2003      | 44               | 77.4              |
| 22                                    | The Metropolitan Engg. Company Ltd.         | 2003      | 119              | 345.14            |
| 23                                    | Travancore-Cochin Chemicals Ltd.            | 2003      | 38               | 194               |
| 24                                    | Sitaram Textiles Ltd.                       | 2004      | 96               | 191.69            |
| 25                                    | Scooters Kerala Ltd.                        | 2004      | 48               | 101.18            |
| 26                                    | Kerala Garments Ltd.                        | 2004      | 147              | 171.96            |
| 27                                    | Kerala State Textile Corporation Ltd.       | 2004      | 207              | 487.59            |
| 28                                    | Travancore Sugars & Chemicals Ltd.          | 2004      | 50               | 163               |
| 29                                    | Travancore Plywood Industries Ltd.          | 2004      | 255              | 650.65            |
| 30                                    | Kerala Electrical & Allied Engg. Co. Ltd.   | 2004      | 202              | 883               |
| 31                                    | Transformers & Electricals Kerala Ltd.      | 2004      | 17               | 75                |
| 32                                    | Steel Complex Ltd.                          | 2004      | 175              | 392               |
| 33                                    | Kerala State Drugs and Pharmaceuticals      | 2004      | 163              | 663               |
| 34                                    | Kerala State Salicylates and Chemicals Ltd. | 2005      | 44               | 74.89             |
|                                       | Sub Total - B                               |           | 2680             | 7732.67           |
|                                       | Grand Total                                 |           | 4832             | 12633.15          |

Source: Bureau of Public enterprises, 2005

Table C.4  
Sample Firms

|            | <b>Name of Enterprise</b>                                |
|------------|--|
| <b>I</b>   | <b>Ceramic Industries</b>                                |
| 1          | The Kerala Ceramics Limited                              |
| 2          | Kerala Clays & Ceramic Products Limited                  |
| <b>II</b>  | <b>Chemical Industries</b>                               |
| 3          | The Kerala Minerals & Metals Limited                     |
| 4          | Kerala State Drugs & Pharmaceuticals Limited             |
| 5          | Malabar Cements Limited                                  |
| 6          | The Pharmaceutical Corporation (IM) Kerala Limited       |
| 7          | The Travancore Cements Limited                           |
| 8          | The Travancore-Cochin Chemicals Limited                  |
| <b>III</b> | <b>Electrical Industries</b>                             |
| 9          | Kerala Electrical & Allied Engineering Company Limited   |
| 10         | United Electrical Industries Limited                     |
| 11         | Traco Cable Company Limited                              |
| 12         | Transformers and Electricals Kerala Limited              |
| <b>IV</b>  | <b>Electronic Industries</b>                             |
| 13         | Kerala State Electronics Development Corporation Limited |
| 14         | Keltron Electro Ceramics Limited                         |
| 15         | Keltron Component Complex Limited                        |
| <b>V</b>   | <b>Engineering Industries</b>                            |
| 16         | The Metal Industries Limited                             |
| 17         | Steel Complex Limited                                    |
| 18         | Kerala Agro Machinery Corporation Limited                |
| 19         | Steel Industrials Kerala Limited                         |
| 20         | Kerala Automobiles Limited                               |
| <b>VI</b>  | <b>Wood and Agro Based Industries</b>                    |
| 21         | Meat Products of India Limited                           |
| 22         | Oil Palm India Limited                                   |
| 23         | The Travancore Sugars & Chemicals Limited                |
| 24         | Forest Industries (Travancore) Limited                   |
| <b>VII</b> | <b>Textile Industries</b>                                |
| 25         | Kerala State Textile Corporation Limited                 |
| 26         | Sitaram Textiles Limited                                 |

Note: Subsidiaries of KSEDC has been merged with Keltron Component Complex Limited in 2009-10.

Table C.5  
Revaluation factor For Capital Stock Estimation

| Year    | Revaluation Factor |
|---------|--------------------|
| 1976-77 | 1.55               |
| 1977-78 | 1.51               |
| 1978-79 | 1.52               |
| 1979-80 | 1.51               |
| 1980-81 | 1.44               |
| 1981-82 | 1.41               |
| 1982-83 | 1.38               |
| 1983-84 | 1.34               |
| 1984-85 | 1.33               |
| 1985-86 | 1.30               |
| 1986-87 | 1.27               |
| 1987-88 | 1.24               |
| 1988-89 | 1.23               |
| 1989-90 | 1.19               |
| 1990-91 | 1.16               |
| 1991-92 | 1.13               |
| 1992-93 | 1.08               |
| 1993-94 | 1.05               |
| 1994-95 | 1.03               |
| 1995-96 | 1.00               |

Source: Authors own calculation

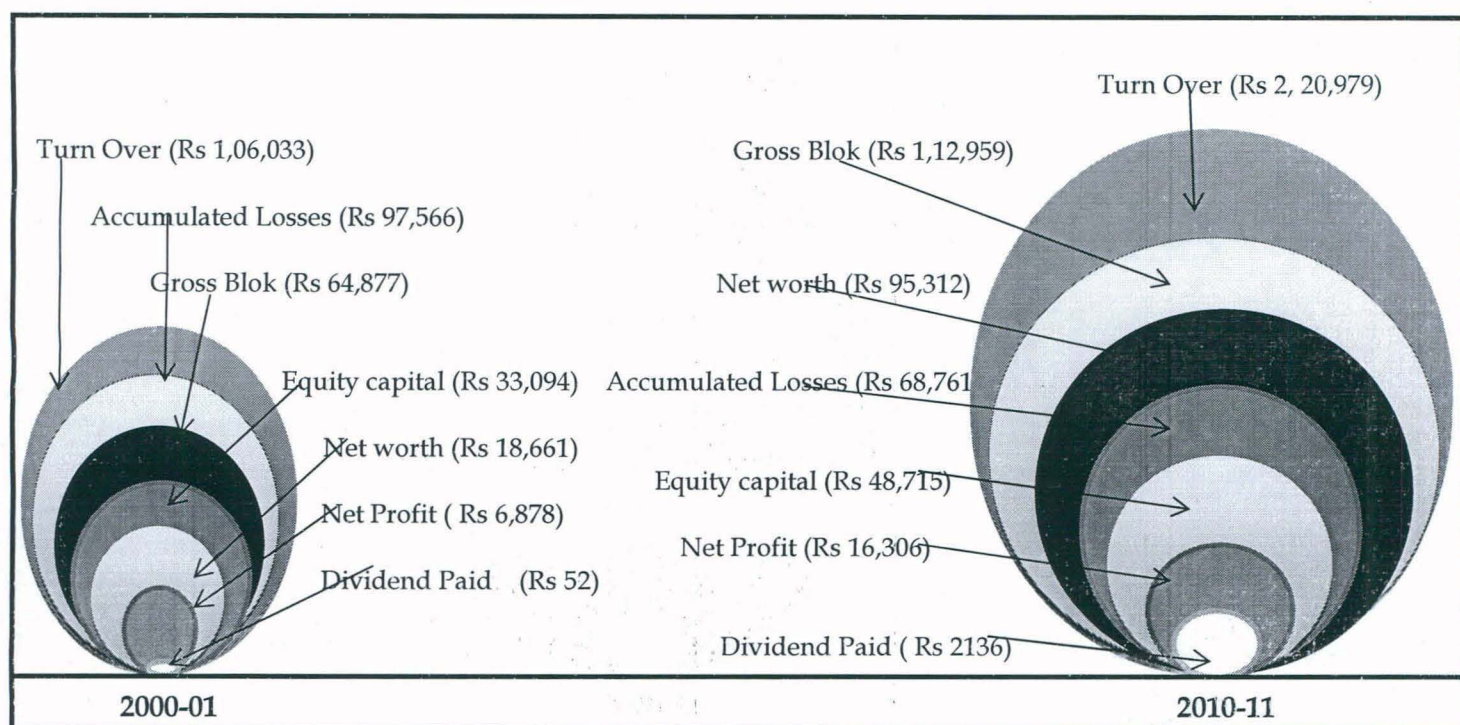
Table 6  
Raw Material Price Indices Used, 1993-94=100

| Year/Industry | Ceramic | Chemical | Electrical | Electronics | Machinery | Wood   | Agro based | Textile | Drugs&Phar | Wires&Ca | Metals | Motor Vehi |
|---------------|---------|----------|------------|-------------|-----------|--------|------------|---------|------------|----------|--------|------------|
| 1981-82       | 37.16   | 48.62    | 36.93      | 39.17       | 39.17     | 30.50  | 37.24      | 45.63   | 46.21      | 36.04    | 37.16  | 38.43      |
| 1982-83       | 38.58   | 50.49    | 38.41      | 41.17       | 41.17     | 33.87  | 39.87      | 47.08   | 48.09      | 36.98    | 38.58  | 40.38      |
| 1983-84       | 40.96   | 52.11    | 40.84      | 43.43       | 43.43     | 38.70  | 44.64      | 49.72   | 50.07      | 39.40    | 40.96  | 42.63      |
| 1984-85       | 44.92   | 54.65    | 44.62      | 47.02       | 47.02     | 43.57  | 46.74      | 52.94   | 52.65      | 42.98    | 44.92  | 46.42      |
| 1985-86       | 49.39   | 57.52    | 49.07      | 51.42       | 51.42     | 46.60  | 47.93      | 53.29   | 55.55      | 45.86    | 49.39  | 51.06      |
| 1986-87       | 50.21   | 60.03    | 50.30      | 52.75       | 52.75     | 51.57  | 52.48      | 55.72   | 58.34      | 47.41    | 50.21  | 52.48      |
| 1987-88       | 54.02   | 63.27    | 54.82      | 56.62       | 56.62     | 59.66  | 57.07      | 62.64   | 62.19      | 53.96    | 54.02  | 56.02      |
| 1988-89       | 63.57   | 65.48    | 64.34      | 64.45       | 64.45     | 62.30  | 61.88      | 64.58   | 64.61      | 64.73    | 63.57  | 64.47      |
| 1989-90       | 74.47   | 68.42    | 74.58      | 73.08       | 73.08     | 66.46  | 64.45      | 69.40   | 67.88      | 76.16    | 74.47  | 73.77      |
| 1990-91       | 79.60   | 72.47    | 79.25      | 77.72       | 77.72     | 74.22  | 71.37      | 76.22   | 71.95      | 80.29    | 79.60  | 78.88      |
| 1991-92       | 85.21   | 81.54    | 84.83      | 83.60       | 83.60     | 83.64  | 83.96      | 87.10   | 81.56      | 85.75    | 85.21  | 84.66      |
| 1992-93       | 93.06   | 92.38    | 93.71      | 93.23       | 93.23     | 95.33  | 93.98      | 92.48   | 92.91      | 95.01    | 93.06  | 93.20      |
| 1993-94       | 100.00  | 100.00   | 100.00     | 100.00      | 100.00    | 100.00 | 100.00     | 100.00  | 100.00     | 100.00   | 100.00 | 100.00     |
| 1994-95       | 109.87  | 114.88   | 110.93     | 110.05      | 110.05    | 101.94 | 113.14     | 120.63  | 115.06     | 114.20   | 109.87 | 108.93     |
| 1995-96       | 122.79  | 124.48   | 125.61     | 123.32      | 123.32    | 103.45 | 121.64     | 131.34  | 126.70     | 132.87   | 122.79 | 121.53     |
| 1996-97       | 126.50  | 128.59   | 128.74     | 126.25      | 126.25    | 112.03 | 133.48     | 127.61  | 129.56     | 132.99   | 126.50 | 125.40     |
| 1997-98       | 130.47  | 132.87   | 133.71     | 130.54      | 130.54    | 123.92 | 138.95     | 129.49  | 133.95     | 138.37   | 130.47 | 129.18     |
| 1998-99       | 132.93  | 141.17   | 136.76     | 134.61      | 134.61    | 131.35 | 155.30     | 136.71  | 141.68     | 141.35   | 132.93 | 132.04     |
| 1999-00       | 135.74  | 149.13   | 140.15     | 137.62      | 137.62    | 139.74 | 160.34     | 135.52  | 150.25     | 145.99   | 135.74 | 134.57     |
| 2000-01       | 141.74  | 157.40   | 146.39     | 142.89      | 142.89    | 151.96 | 163.08     | 140.92  | 159.01     | 153.84   | 141.74 | 139.66     |
| 2001-02       | 142.87  | 161.71   | 147.86     | 144.14      | 144.14    | 156.05 | 167.06     | 143.90  | 163.32     | 156.46   | 142.87 | 140.43     |
| 2002-03       | 146.26  | 165.90   | 151.67     | 147.99      | 147.99    | 165.11 | 171.27     | 150.53  | 167.90     | 159.61   | 146.26 | 144.07     |
| 2003-04       | 160.71  | 169.34   | 164.26     | 159.56      | 159.56    | 176.89 | 176.22     | 163.46  | 171.39     | 163.28   | 160.71 | 156.49     |
| 2004-05       | 189.25  | 183.22   | 185.95     | 179.36      | 179.36    | 181.04 | 181.71     | 166.26  | 176.10     | 173.30   | 189.25 | 177.40     |
| 2005-06       | 205.91  | 193.85   | 201.24     | 191.95      | 191.95    | 194.23 | 188.83     | 161.33  | 182.02     | 190.82   | 205.91 | 189.71     |
| 2006-07       | 231.34  | 206.94   | 227.86     | 210.42      | 210.42    | 198.74 | 201.32     | 167.71  | 189.51     | 236.34   | 231.34 | 204.96     |
| 2007-08       | 244.43  | 219.54   | 239.67     | 222.11      | 222.11    | 210.44 | 211.71     | 178.81  | 199.39     | 244.54   | 244.43 | 216.78     |
| 2008-09       | 269.40  | 244.71   | 256.50     | 242.04      | 242.04    | 221.23 | 229.14     | 194.41  | 213.35     | 239.48   | 269.40 | 237.09     |
| 2009-10       | 249.87  | 250.98   | 240.27     | 229.75      | 229.75    | 224.00 | 261.11     | 203.40  | 221.52     | 230.96   | 249.87 | 223.01     |
| 2010-11       | 259.64  | 247.85   | 248.39     | 235.90      | 235.90    | 222.61 | 245.12     | 198.91  | 217.43     | 235.22   | 259.64 | 230.05     |

Source: Authors own calculation



Figure 1  
Growth of SLPEs by Financial Parameters (Rs Lakhs)



Source: Review of Public Enterprises, various years, Bureau of Public Enterprises, Kerala

Table C.7

Financial Performance of SLPEs in Various States for 1990-91 to 1998-99

| States    | GP to sales (%) | NP to sales (%) | ROCE (%) | Debt Equity Ratio |
|-----------|-----------------|-----------------|----------|-------------------|
| AP        | 2.2             | -11.68          | 1.81     | 3.49:1            |
| Assam     | 8.48            | -30.21          | 9.68     | 2.08:1            |
| Gujarat   | 18.64           | 8.59            | 24.93    | 2.21:1            |
| Karnataka | 4.79            | -2.18           | 6.98     | 3.26:1            |
| Kerala    | 10.45           | -2.01           | 10.35    | 2.36:1            |
| MP        | 4.71            | -0.77           | 8.97     | 1.77:1            |
| MH        | -1.13           | -7.98           | -1.77    | 3.36:1            |
| Odisha    | 5.15            | 3.12            | 6.37     | 1.59:1            |
| RAJ       | 8.99            | 5.24            | 4.02     | 3.22:1            |
| TN        | 12.03           | 5.67            | 12.48    | 2.45:1            |
| UP        | 0.36            | -13.08          | 1.94     | 1.23:1            |
| WB        | -8.86           | -31.49          | -6.78    | 4.51:1            |
| All India | 4.45            | -5.67           | 4.75     | 2.37:1            |

Source: Computed from the Study Group Report, Volume-2, Planning Commission, 2002. GP = Gross Profit before interest and tax, NP= Net Profit after Tax and interest payment, ROEC = Return on Capital Employed, measured as GPBIT to capital employed

Note: Only states having 10 or more manufacturing enterprises are included in the Table

Table C.8  
ROCE of SLPEs in Kerala

(Per cent)

| Period                                     | PBIT to Capital Employed | PAT to Employed |
|--|--------------------------|-----------------|
| Pre-reform period<br>(1981-82 to 1990-91)  | 9.02                     | -6.35           |
| Post-reform period<br>(1991-92 to 2010-11) | 10.20                    | 3.11            |
| Whole period<br>(1981-82 to 2010-11)       | 11.34                    | 0.62            |
| 1991-92 to 2000-01                         | 11.37                    | 3.12            |
| 2001-02 to 2005-06                         | 7.33                     | -4.63           |
| Last Five Years<br>(2006-07 to 2010-11)    | 12.74                    | 9.83            |

Source: Calculated from the Review of Public Enterprises, various years, Bureau of Public Enterprises, Kerala.

Note: PBIT = Profit before interest and taxes, PAT = Profit after interest and taxes.

Table 9  
Profit Margin Ratios in SLPEs in Kerala

| Industry/Period                      | Gross Profit Margin (PBIT /Total Sales)    |   |                                       |                    |                    | Per cent                                |
|--------------------------------------|--|---|---------------------------------------|--------------------|--------------------|---|
|                                      | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | 1991-92 to 2000-01 | 2001-02 to 2005-06 | Last Five Years<br>(2006-07 to 2010-11) |
| Ceramic & Refractories               | 5.60                                       | 9.64  | 5.97                                  | 5.34               | 9.54               | 17.53                                   |
| Chemical                             | 10.19                                      | 13.87                                       | 12.29                                 | 16.60              | 6.44               | 9.83                                    |
| Electrical & Cable                   | 2.64                                       | 7.69  | 6.07                                  | 9.82               | 0.84               | 10.95                                   |
| Electronics                          | 12.66                                      | 6.85  | 8.72                                  | 6.29               | 7.32               | 7.65                                    |
| Engineering                          | 4.71                                       | 4.47  | 4.55                                  | 3.62               | 4.62               | 6.43                                    |
| Wood & Agro                          | 7.91                                       | 14.55                                       | 13.78                                 | 7.81               | 17.82              | 19.34                                   |
| Textiles                             | -0.85                                      | -2.70                                       | -2.10                                 | 0.23               | -8.42              | -2.86                                   |
| Manu as a whole                      | 9.54                                       | 10.20                                       | 9.67                                  | 12.50              | 6.09               | 10.60                                   |
| Net Profit Margin (PAT /Total Sales) |  |   |                                       |                    |                    |   |
|                                      |  |   |                                       |                    |                    | Per cent                                |
| Ceramic & Refractories               | -20.31                                     | 1.70  | -9.86                                 | -5.57              | -0.58              | 11.31                                   |
| Chemical                             | -11.94                                     | 10.39                                       | 3.21                                  | 14.24              | 4.73               | 7.84                                    |
| Electrical & Cable                   | -16.38                                     | 1.60  | -6.35                                 | -3.52              | -5.17              | 7.64                                    |
| Electronics                          | -3.10                                      | -23.19                                      | -16.73                                | -21.77             | -27.81             | 4.05                                    |
| Engineering                          | 0.32                                       | 0.02  | 0.11                                  | -2.12              | 1.37               | 6.66                                    |
| Wood & Agro                          | -0.82                                      | 13.26                                       | 8.74                                  | 3.31               | 22.16              | 23.28                                   |
| Textiles                             | -23.94                                     | -8.91                                       | -13.74                                | -5.90              | -16.50             | -6.97                                   |
| Manu as a whole                      | -8.63                                      | 1.93  | -1.46                                 | 2.22               | -2.65              | 6.94                                    |

Source: Same as Table C. 8

Table 10

## Asset Turnover Ratio in SLPEs in Kerala

| Industry/Period          | Total Sales /Total Assets                  |   |                                       |                    |                    | Per cent                                |
|--------------------------|--|---|---------------------------------------|--------------------|--------------------|---|
|                          | Pre -reform period<br>(1981-82 to 1990-91) | Post -reform period<br>(1991-92 to 2010-11) | Whole period.<br>(1981-82 to 2010-11) | 1991-92 to 2000-01 | 2001-02 to 2005-06 | Last Five Years<br>(2006-07 to 2010-11) |
| Ceramic & Refractories   | 0.57                                       | 1.19  | 0.98                                  | 1.18               | 1.09               | 1.35                                    |
| Chemical                 | 0.53                                       | 0.86  | 0.75                                  | 0.88               | 0.89               | 0.76                                    |
| Electrical & Cable       | 2.25                                       | 1.43  | 1.71                                  | 1.44               | 1.08               | 1.83                                    |
| Electronics              | 1.41                                       | 1.75  | 1.64                                  | 1.34               | 1.87               | 2.65                                    |
| Engineering              | 3.03                                       | 2.34  | 2.58                                  | 2.58               | 2.12               | 2.03                                    |
| Wood & Agro Based        | 0.96                                       | 0.93  | 0.88                                  | 0.89               | 0.57               | 1.56                                    |
| Textiles                 | 1.14                                       | 1.22  | 1.17                                  | 1.40               | 0.88               | 1.02                                    |
| Manufacturing as a whole | 1.03                                       | 1.13  | 1.07                                  | 1.16               | 1.06               | 1.83                                    |

Source: Same as Table C. 8

