PERFORMANCE OF MANUFACTURING ENTERPRISES IN STATE SECTOR AND PRIVATE SECTOR IN KERALA : A COMPARATIVE STUDY

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

BEENA P. L.

CENTRE FOR DEVELOPMENT STUDIES
TRIVANDRUM

1991

I hereby affirm that the research for this dissertation titled "Performance of manufacturing enterprises in state sector and private sector in Kerala: A comparative study" being submitted to the Jawaharlal Nehru University for the award of the Degree of Master of Philosophy, was carried out entirely by me at the Centre for Development Studies, Trivandrum.

Trivandrum,
31-8-1991.

Beena P.L

Certified that this dissertation is the bonafide work of Beena.P.L. This has not been considered for the award of any other degree by any other University.

P. Mohanan Pillai
Associate Fellow

K.K.Subrahmanian
Fellow

Supervisors

P.S.George
Director
Centre for Development Studies,
Trivandrum - 695 011.

Acknowledgement

I Place on record my deep indebtedness to:

K.K.Subrahmanian, for sharing the search, and putting me in the right track through critical guidance and pointing out the much needed objective angle;

Mohanan Pillai, for his constant encouragement and patient perusal of the draft;

D.Narayana, for his valuable suggestions in concretising the empirical focus of this study;

P.M.Salaludeen (Deputy Director State Planning Board, Trivandrum) and V.Shanmugan Asari (Manager, Statistical& Planning, Kerala State Industrial Development Corporation, Trivandrum), for their enormous help in the search for the inaccessible data;

Ram Mohan, for enriching the work with his stimulating ideas.

I also wish to record my gratitude to Dr. V Nanda Mohan, Dr C.Radhakrishnan, R.Anand Raj, K.P.Sunny, K.J.Joseph, Pyarelal Raghavan, Bhaskar and Geogi for their contributions during the various stages of this work.

Words are inadequate to express thanks to my friends especially Helen, Vaiju, Jaya, Sunanda, Radha Udhay, Viji, Christopher, Saikat, Mallik, Upendra, and Albin for making my stay a memorable one.

To my parents, for their patience and confidence shown on me. The rest of my family for their encouragement, among whom, special mention should be made of my eldest brother who provided me with moral and material support.

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Chapter 1

INTRODUCTION

The problem of Kerala's industrial backwardness had attracted the attention of scholars as early as the sixties, but critical enquiries into the issue have been initiated only in recent years[1]. Then again, we find that the studies in a bid to offer an explanation for industrial backwardness of the State have been mainly concerned with the question of labour militancy and high wage cost[2]. The inevitable result of this search for one single factor that would explain the state's industrial backwardness has been that several important aspects relating to production, finance, marketing etc. of the firms in both the private and public sectors remained practically untouched[3]. In particular, we do not have serious analytical accounts of the performance of the state level public sector enterprises in manufacturing except on the financial performance and positions as revealed by the balance sheet data periodically being published by the Bureau of Public Enterprises and a few studies[4] based thereon.

The present study is an attempt to fill this gap in research on state level public sector enterprises (SLPSE) in Kerala by going into such questions as physical performance, capacity utilization, productivity and factor-use efficiency along with the financial performance of a selected sample of firms in the state public sector. As the study examines the productive and operational efficiency of the firms in both state

public sector and the private sector, it may help us to comprehend some unexplored facets of the industrial backwardness of Kerala State. Further,as the analysis is carried out in a comparative framework in the sense that the performance of State Level Public Sector Enterprises (SLPSEs) is compared with the private sector enterprises, the findings of the study also help commenting upon the ongoing debate on "privatisation".

Role of Public Sector.

The study begins with a selective review of literature dealing with the role of public sector and their short-comings in the performance. Such a review is attempted with a view to put in sharp focus specific issues for research on SLPSEs in the context of Kerala. The reasons for the establishment and proliferation of public enterprises in a third world country context are ideological, socio-political and situational[5]. In the case of India,the slow development of private entrepreneurship, reluctance on the part of the private sector to risk its capital in heavy projects, the need to have government control over certain types of defence-oriented industries, the imperative of government control on investment decisions to serve certain social objectives like the spatial equity in development etc. motivated the government to play the role of entrepreneur. Also, it was thought that public enterprises are essential for preparing the country on the road of socialism. Yet, the Indian policy envisaged a role more complementary than competitive to the private sector[6].

What then are the objectives of the public sector in India? These cannot be spelt out precisely. Under different five year plans, the public sector was envisaged as a promotor of economic growth, to ensure socialistic pattern of society, to reduce the concentration of economic power in private hands, to assist the government in meeting the distributional policies, to promote exports and earn foreign exchange, and to help in the development of backward regions[7]. In fact, the performance problem in public sector enterprises arises because of the multiple objectives. Further, there is an implicit notion that one of the main aims is the maximization of social gains rather than profit.

To what extent have public enterprises in the country played the expected role? A number of studies have gone into this issue[8]. Suffice here to highlight the findings of a recent official report[9] to the effect that the public enterprises have not been able to generate adequate surplus for sustaining public investments while some of them are subsidized by the rest of the economy. Similarly, some of the infrastructural facilities provided by the public enterprises have been found to be inefficient and costly. However, it can be claimed on the positive side that public enterprises have enabled the country to achieve a large degree of industrial diversification, to reduce import dependence, to stimulate private investment and to create a large pool of skilled manpower, all of which have helped the country to achieve a high level of self-reliance, and promote a more balanced regional development of the country. Yet, the suboptimal performance of the public sector enterprises in

relation to the generation of adequate surplus has accentuated the "fiscal crisis" (deficit in the government's budgets) and caused a lot of disenchantment with the role of the public sector in India.

In fact, the inability to sustain high overall growth, to ensure efficiency, and to adapt to changing technological and market conditions, has led almost all socialist countries to experiment with various ways of loosening the centralized bureaucratic control and to move to more decentralized forms of decision making in economic matters mediated through market as an institutional device, as well as evolving a system of incentives to encourage more efficient and responsive behavior on the part of various economic agents[10]. A few of the countries have gone considerably beyond this and taken to privatisation of hitherto state-controlled activities. These developments in the socialist world have undoubtedly encouraged those, who feel that India's development strategy needs a basic change in favor of the free market and liberal policies, to suggest privatisation as a solution to the current economic crisis in India.

Analytically speaking, there are basically three dominant ways of such a change towards the privatisation: (1) de-nationalization, (2) liberalization and (3) franchising. denationalization involves transferring the ownership of public sector assets to private sector. Liberalization implies opening up of areas which are hitherto reserved exclusively for the public sector. Franchising refers to contracting out to private firms the production of goods and services which are under the

financial control of the government. Whatever be the modality, the case for privatisation is largely based on the simple postulation that the performance of the private sector is superior to that of the public sector.

Needless to add, it is a difficult task to establish empirically the superiority of the private sector over the public sector. First, many of the activities, which are under the domain of the public sector, are simply not undertaken by the private sector. Secondly, public sector enterprises are charged with non-commercial or social obligations, which may distort any comparison of efficiency. Notwithstanding these difficulties, some studies[11] have come to the conclusion that in areas, where such a meaningful comparison is feasible, private sector is relatively more efficient. But a critical assessment would show that the relative inferiority of public sector does not stem from the nature of State ownership as such, but perhaps from the external environment within which it operates. This raises the important question whether ownership does really matter for performance,or, whether it is the external environment within which the firm has to operate that primarily determines its performance[12]. Therefore, one should carefully analyse the performance of the enterprise by using appropriate criteria for judging efficiency before arriving at a decision on the case for privatisation.

Performance Criteria

In the literature, more often than not, it is the financial profitability that is used as an important criterion for the evaluation of public sector performance despite the widely accepted conceptual problems with this approach. Perhaps, as Sen[13] argues, the tendency to judge the success or failure of public enterprises based on this criteria might not be fully justified, but it is fairly inescapable in the absence of a different system or well formulated alternative criterion for performance evaluation. According to V.K.R.V.Rao the popularly accepted principle of "no-profit and no-loss" should be abandoned and the public enterprises must make profits. But he cautions that the norms applied by private business on financial performance criteria may not be the general performance evaluation model of public enterprises since their financing sources, cost of finance as well as wage and pricing policies are entirely different from private enterprises. Nevertheless, it is obvious that the discussion regarding overall or relative profitability of the public enterprises in terms of an exclusive set of financial parameters are helpful neither for judging their performance nor for diagnosing the causes of the poor performance of particular enterprises.

The problem with profitability as a criterion for evaluation is at two levels[14]. First, it can be measured differently for different purposes and the kind of measurement that is provided by conventional "income statements" may not be what is required for public sector evaluation. The profitability

criterion fails to reflect not only the social benefits and social costs of the enterprise operations but also the several important constraints within which these enterprises operate. Public profits instead of private profits could be used more appropriately in analyzing public sector performance. In public profits, direct taxes, interest payments and transfers are not treated as costs as in conventional accounting; neither is depreciation deducted since it bears no real correspondence to the actual rate of physical deterioration[15]. Similarly, it excludes non-operating income such as interest and dividend as these do not reflect the contribution to the national welfare. Secondly, profitability is not an adequate touchstone given the status of the public sector in relation to the rest of economy. This is especially true when they function under the regime of administered prices or have other objectives such as employment generation or correction of regional disparities to achieve. In the case of public enterprises, the distinction which is sought to be made between debt and equity is artificial, and perhaps even arbitrary, since the entire capital comes from one source i.e.the government. Therefore, the degree of risk involved so far as the government investor is concerned, is equal for both the components. Effectively, therefore, the key indicator in the case of public enterprises would not be net profits post tax to net worth but gross profit pre-tax to total capital employed. This ratio would more effectively reveal the productivity of the total capital.

Further, considering the heterogeneity of public enterprises in terms of their size, nature of activity, financing

pattern etc., their performance should be judged in relation to that of similar units in the private sector. For instance, it is often argued that public enterprises are engaged in long gestation industrial investments which do not attract private capital. Evaluation of its profitability at the earlier period of its gestation would not be quite fair. Evidently, in such situation, where the profits or losses of the enterprises are not the result of the management capability but of conscious state intervention, or because of the market imperfections, the use of profitability as an index of efficiency is very questionable.

The Committee on Public Undertakings and the Comptroller and Auditor General of India have indicated some broad criteria of efficiency measurement in public sector in resource allocation , resource utilization, etc[16]. The Arjun Sen Gupta Committee[17] (while agreeing with the difficulties to specify a single measure of efficiency in the case of public enterprises) has suggested an operating efficiency criterion, which includes gross margin on assets for an enterprise, net profit to net-worth for core sectors and profit making enterprises, and gross margin on sales for service enterprises. The Committee also suggested a simple monitoring of productivity and costs by examining the direction of change in indicators like capacity utilization, raw materials cost per unit of output, value added per rupee of wages etc. According to that report, the overall indicator measuring dynamic efficiency is the growth of total factor productivity, which takes into account the contribution of all inputs in the total growth of output.

From the above review it would be clear that there is no a priori ground for any indicator to qualify as the most important criterion. The choice of an appropriate criterion would obviously depend on the approach that is adopted. The controversy regarding the alternative criteria mainly stems from the fact that the performance can be viewed from several angles.

A number of studies assessing the relative performances of public and private enterprises in India have appeared over the last decades essentially emphasizing on the financial criteria. The important studies judging performance in terms of financial profitability include those by Das (1967), Sri Ram and others (1976), Dubashi and Lahiri (1967) and Bhalla and Mehta (1970). Given the fact that financial profitability is far from perfect as an indicator of overall performances, the utility of these studies is rather limited. We must, therefore, look for a set of yardsticks which remain relatively unaffected by market imperfections, the vagaries of price policy, monopolistic or other constraining marketing postures and which in this sense can be treated as more objective. These yardsticks can be found within the physical characteristics of the productive process. A disaggregation into such elements as financial efficiency and productive efficiency should capture the firm's financial viability. At the same time, it is necessary to temper the financial judgement with an assessment of productivity levels. From the viewpoint of broader considerations of total output and income generation, a distinction between the relative productivity of scarce resources at a given point of time and the relative rates of change in the productivity over a period of

time is useful. In the context of the growth of national economy, it is the index of total factor productivity that represents the most appropriate criterion for evaluating the overall performance of the public enterprises. This contention follows from the fact that the index of total factor productivity is the most comprehensive indicator of the trends in the overall efficiency of resource utilization by the economic units over a specified time period.

Among the studies assessing performances in terms of productivity a significant one is that of Dholakia(1978) who evaluated the productivity performance of public enterprises in the registered manufacturing sector with that of comparable private enterprises. The analysis carried out for the period 1960-61 to 1975-76 showed that the overall economic efficiency of the public enterprises has been more or less continuously increasing at a rapid rate since 1960-61 whereas, the economic efficiency of the private enterprises has been more or less fluctuating rather than showing any significant upward trend in the period under consideration.

At variance with the above, a recent study[18] of public and private enterprises in India's fertilizer industry concluded that, while productivity performance in the most efficient public enterprises was comparable to that achieved by the best private enterprises, productivity in the public sector as a whole was lower than in the private sector. In this case,the differences in performance were partly explained by the higher input cost in the public enterprises that resulted from their obligation to use

indigenous feed-stocks and other extraneous factors as well. A more recent evaluation done by Vashist & Kundu[19] in terms of relative efficiency of public and private enterprises in the organized manufacturing sector in India from 1960-61 to 1984-85 supports the position that public enterprises are less efficient compared to their private counterparts. Thus, there is no consensus on the relative performance of public sector enterprises; varying conclusions are arrived at in different studies. To some extent, the difference in conclusions is attributable to methodological differences[20]

The review of the literature suggests that, by far, the evaluation of public sector in India is based essentially from the sketchy information gathered from the balance sheet and profit and loss accounts of the firms, whereas the role expected of the enterprises may not be confined to financial performance. Such objectives as provision of employment, promotion of employees' welfare, contribution to growth and technical progress and the correction of the regional imbalances may often contradict objectives like generating financial surpluses for self-stability. However, financial profitability and good operating efficiency are necessary to enable the public sector to discharge social objectives as well[21]. Therefore, the evaluation of public sector enterprises from the dimensions of physical as well as financial performance as compared to the private sector constitutes a good starting point for reexamination of its role or to evaluate the case for privatisation.

State Level Public Sector Enterprises (SLPSEs)

Thus far, we have been discussing the role and performance criteria of the public sector in general. In a federal country like India, enterprises are also set by the state governments to undertake certain economic activities under their ownership/management and control. These enterprises are generally called,the State Level Public Sector Enterprises (SLPSEs) so as to distinguish them from the enterprises set by the Central Government in the state regions.

The objectives of public enterprises under the control of state governments has been to supplement and strengthen the development process taking into account the specific needs of the region. In every state in the country such enterprises are engaged in a variety of activities including agriculture, mining, traditional and modern manufacturing, financial agencies, trading and marketing, construction, services, tourism, development of the weaker sections of the society and welfare activities. Such enterprises are generally classified in to three (1) Financial Agencies, (2) Promotional Agencies and (3) Commercial Agencies. The last category mainly includes the industrial enterprises set up by the state governments to maintain control over the natural resources, take over sick units in order to check unemployment in the state, reduce spatial inequality and, in general, to promote industrial development in the state[22].

There has been a rapid growth in the number of as well as the investment in (SLPSEs) in the country. There were only

around fifty such enterprises in the country in 1951. Today, such enterprises are 827 in number and account for investment to the tune of Rs.5163 crores. There is the heavy presence of the SLPSEs in the southern region consisting of Andhra Pradesh, Karnataka, Tamilnadu and Kerala. These four southern states together account for more than 75 per cent of the total SLPSEs Enterprises investment in the country (see table 1.1).

Instructively, among all Indian States,Kerala ranks the highest in terms of the number of SLPSEs though, in terms of investment its position is proportionately low. Kerala has more than 10 per cent of the total number but has only 5 per cent of the total investment in SLPSEs. The average size of SLPSE in Kerala is around an investment of Rs.333 lakhs as against the all-India average of Rs.624 lakhs. It seems, Kerala has opted for the proliferation of state level public sector enterprises ignoring the viable size of such enterprises probably on account of non-economic reasons which may have had telling effect on the operational inefficiency and poor financial performance.

It is significant to note that state level public sector enterprises still constitute proportionately a significant component of the large and medium enterprises in Kerala. (see table 1.2). These enterprises constitute around 23 percent of units, 11 percent of gross fixed assets, and 12 percent of direct employment accounted by the large and medium industries in 1989 in the state of Kerala. Given the significant size of state level public sector investment in Kerala, an understanding of the relative efficiency and financial performance of these

Table :1.1

Share Of Capital Investment By State Government In Statutory Corporations /Companies,
(Investments in Rs.Lakh)

States	Financial Agencies				Promotional Agencies				Commercial Agencies				Total			
	No. of Enterprises		Invest-ments		No. of Enterprises		Investments		No. of Enterprises		Investments		No. of Enterprises		Investments	
	1981	989	1981	1989	1981	1989	1981	1989	1981	1989	1981	1989	1981	1989	1981	1989
Andhra pradesh	1	4	728	3573	8	10	5006	9503	28	38	8616	18309	39	52	14350	313384
Assam	1	2	89	108	6	7	1510	1719	15	25	1283	4224	22	34	1882	6051
Bihar	3	4	944	3743	7	8	1929	3803	23	26	3938	12751	33	38	6871	20297
Gujarat	3	3	1000	3118	6	8	418	2229	20	28	2954	15578	29	39	4372	20925
Haryana	3	5	224	522	9	10	2878	6313	9	9	436	869	21	24	3538	7704
Himachal Pradesh	1	1	119	450	5	6	1328	2863	8	8	1021	2456	14	15	2468	5769
Jammu&Kashmir	3	3	112	403	4	5	1284	1745	10	10	3568	4469	17	18	4964	6617
Karnataka	9	12	3014	5044	11	11	1497	4748	42	54	8070	16146	62	77	13358	25938
Kerala	4	6	1414	1338	12	12	2404	8752	51	68	9540	18779	67	86	8490	28689
Madhya Pradesh	5	5	313	553	6	6	1603	6802	19	22	3574	24478	30	33	5490	31833
Maharashtra	2	2	2674	5640	15	15	3444	4839	19	25	1422	28116	36	42	10240	38595
Manipur	1	2	15	19	2	3	91	118	1	3	313	443	4	8	419	580
Meghalaya	0	1	0	45	3	3	420	1251	6	5	842	1173	9	9	1282	2469
Nagaland	0	1	0	4	2	3	557	1021	3	7	592	1103	5	11	1282	2128
Orissa	3	3	829	8914	7	8	2721	6051	52	65	4834	10028	62	76	8584	24993
Punjab	2	2	423	1421	10	11	6630	10640	14	14	3627	5781	27	27	10680	17842
Rajasthan	4	4	2762	7969	3	5	374	655	18	26	1953	3864	25	35	5089	12488
Sikkim	2	2	105	338	1	2	22	59	8	6	370	391	11	10	497	788
Tamil Nadu	2	4	1302	2019	8	9	5185	10830	33	40	7939	16374	13	53	14426	29223
Tripura	2	2	24	42	3	3	129	337	3	3	491	1249	8	8	644	1638
Uttar pradesh	5	5	2836	40860	23	24	2850	10761	31	32	18541	127397	59	61	24227	179018
West Bengal	1	2	338	862	3	13	1503	6315	23	43	4838	11047	37	58	6679	18224
Total	57	78	14265	87495	14	186	43783	103799	436	563	91522	325104	857	827	154570	516398

Source : Govt. of India, 1984, Eighth Finance Commission Report,
and First Report of the 9th Finance Commission, July 1988.

Table 1.2

Sector-wise distribution of large and medium industries in Kerala (1988-1989)

	Central Sector	State sector	Co-operative sector	Joint sector	Private sector	Total
A. Units in production	18 (8.5)	42 (19.90	14 (6.6)	28 (13.27)	109 (51.65)	211 (100)
B. Gross Fixed Assets (Rs.crores)	782 (46.29)	360 (21.31)	26 (1.5)	67 (3.97)	453 (26.82)	1689 (100)
C. Estimated Annual Turn-over (Rs crores)	1239 (49.93)	313 (12.61)	106 (4.3)	82 (3.3)	741 (29.86)	2481 (100)
D. Direct Employment	26143 (26.96)	21416 (22.09)	3925 (4.04)	3388 (3.49)	41589 (42.90)	96941 (100)

(Figures in bracket shows percentage to total)

Source: State Planning Board, "Large and Medium Industries Including Public Sector Industries", Formulation of Eighth Five Year Plan (1990-1995), Background Paper, Government of Kerala, Trivandrum.

Table 1.3

Financial Performance of Manufacturing SLPSEs in India (1986)

State	Profit Making Enterprises	Mixed Performance Enterprises	Loss Making Enterprises	Accumulated Losses to Paid-up Capital(in per cent)
Assam	0	7	7	85
Andhra pradesh	2	3	3	73
Bihar	0	2	8	70
Goa	3	0	1	20
Gujarat	2	8	7	32
Haryana	1	2	2	72
Himachal Pradesh	0	1	5	656
Jammu&Kashmir	0	2	4	43
Karnataka	5	9	7	72
Kerala	5	17	25	240
Madhya Pradesh	0	3	5	14
Maharashtra	0	3	3	142
Manipur	0	3	3	56
Meghalaya	0	1	3	40
Nagaland	0	0	1	85
Orissa	1	2	2	120
Punjab	0	0	1	10
Rajasthan	2	5	8	75
Tamil Nadu	4	5	6	18
Tripura	0	0	1	240
Uttar pradesh	6	4	4	95
West Bengal	2	3	22	201
Total	33	80	137	

Source: Reproduced from Sankar, 1991 Op.cit.

enterprises vis-a-vis their counterparts in the private sector is of critical importance to public policy.

A recent study[23], which examined the financial accounts of 250 state level public sector enterprises in the manufacturing sector in the country has documented their poor performance: more than 50 per cent of the enterprises studied were found to be loss making ones. The picture was depressing particularly in Kerala where 25 out of 47 enterprises studied were found to be loss making ones and their accumulated losses accounted for 240 percent of paid up capital(see table 1.3). Evidently, investment in the state sector enterprises has not been yielding adequate returns with a number of enterprises continuing to incur losses beyond the value of paid-up capital in Kerala.

The reasons for the poor performance of state sector manufacturing enterprises in Kerala are complex and our understanding is embryonic. The need for a study therefore is apparent. The need also arises from the fact that studies on the state sector enterprises in general are rather limited. Even at the all-India level, there is no serious study on the performance of state level enterprises. Surveying the literature on state enterprises Chadhopadhyay[24] has observed that "really speaking, not much is known about them and it will be a good idea if research is initiated on the functioning of the government companies under the control of different states".

The limited studies available have underlined some reasons of the loss making of public enterprises. They are, inter alia, under-utilization of capacities, surplus manpower, high levels of inventories, heavy interest burden, governmental regulations, lack of effective competition, absence of managerial and non-managerial motivation.[25]. The Department of Company Affairs has also arrived at the same conclusions while analyzing the performance of the state level public enterprises.

It may be added in this connection that such studies are based on highly aggregate data with out any analytical rigor. Coming to Kerala, a few isolated studies have attempted to generate some idea about state of affairs of state sector enterprises in Kerala.

To illustrate, an analysis based on nine government companies during the period 1971 to 1974 showed that all of them were running in the most inefficient manner due to lack of modernization[26]. Another study demonstrated that the structural and organizational aspects of state sector enterprises have a bearing on their poor performance[27]. However, these studies were all based on limited number of enterprises. Further, any conclusion on the performance pattern of state level enterprises will have to be based on a comparative framework. The question is this: given the same environment is there a differential behavior between enterprises in the state sector and private sector and if so, what explains it?.

In this context some searching questions about the productivity and efficiency of SLPSEs especially in relation to their counterparts in the private sector need to be asked. The need for such a study of the physical and financial performance of SLPSEs in Kerala seems to be more urgent than ever before as there is the anguish arising from the intellectuals to plead for their closure and trust them to private sector. Apart from providing a realistic picture of the premises on which the ongoing debate on privatisation is based, the study is also expected to give some analytical insights into the constraints on industrialisation of the state of Kerala.

Objectives and Methods

In an attempt to analyse the problems in the above perspective, the present study has set before it the following objectives:

(1) to analyse the growth patterns of state level public sector enterprises in Kerala;

(2) to analyse the trends in their capacity utilization indices and ascertain the reasons thereof;

(3) to trace the trends in their partial and total factor productivity growth;

(4) to analyse their financial performance; and

(5) to suggest in the light of the findings of the study,a policy approach for dealing with them.

The study is based on the relevant data gathered in respect of a sample of large and medium manufacturing enterprises from the state public sector and the private sector in Kerala.

Details of the sample design, sources of data and methods of analysis are discussed at length in the next chapter.

Scheme of Presentation.

The study is divided into six chapters including the present one, which has outlined the issues for research and set the objectives of the study on the basis of a quick review of selected literature. The second chapter outlines the sampling design and examines the physical performance of the sample firms in terms of the growth rate in output, income (value-added), gross fixed capital stock, and employment. The third chapter is devoted to the examination of productivity changes and sources of growth. The fourth chapter estimates the trends in capacity utilisation indices and determinants. The fifth chapter deals with the financial performance of the enterprises. Finally, the sixth chapter gives a summary of the major findings and on that basis draws a policy perspective for the state level public sector enterprises in Kerala.

Notes and References

1.One of the initial attempts towards understanding Kerala's industrial backwardness was made by a seminar organized by Delhi Malayali Association in as early as 1961. However, due attention was not given to the issue subsequently until very recently. In 1984 the High Level Committee on Industry,Trade and Power dealt with the question in detail (Govt.of Kerala,1984). This was followed by a number of individual studies [K.K.Subrahmanian and P.Mohanan Pillai (1985). V.Ramachandran (1986), Alice Albin, (1988), K.K.Subrahmanian (1990) Thampi,1990.

2. The report of the High Level Committee (Govt.of Kerala ibid) had suggested the high wage cost as an inhibiting factor of industrial development in Kerala. This hypothesis was also suggested earlier by Oomman (1962). The study by Subrahmanian and Pillai (op.cit) raised serious doubts about the empirical validity of the high wage cost hypothesis at least in the organized sector and argued that the industrial backwardness is primarily due to the lopsided industrial structure of the state. Studies undertaken by Alice Albin(op.cit)) and Thampi(1990) examined the wage question in the small scale sector and argued that small industry in Kerala was characterized by lower labour productivity and high wages.

3. A recent study (Nirmala Padmanabhan,1990),is focussed on the financial performance of a representative sample of a private sector companies in the manufacturing sector in Kerala over a period of 14 years-from 1971-72 to 1984-85.

4. For example P.Mohanan Pillai (1990) and State Planning Board (1988).

5. see G.Shabbir Cheema (1982) pp.21.

6. This is clear from Indian Industrial Policy Resolutions of 1948 & 1956 which inter alia declared that heavy industries in the public sector may obtain some of their requirements of lighter components from the private sector, while the private sector in turn would rely for many of its needs on the public sector.

7.See S.K.Goyal (1981); V.V.Ramanandham(1984)

8. See for example, Sankar, Chambers, Beesly and Mishra Ravisankar (1987).

9.S.Chakravarty,(1987)

10. A.Vaidyanathan (1990).

11.Sunil Mani (1990)

12. See Tirth Raj Sharma,(1961) p.167.

13. Sen.A.K. (1983)

14.Yong C.Park(1986)

15.Yong C.Park ibid

16. K.Chandra Sekhara and K.Madhavi Latha,1990

17. Sengupta.R (1984), (mimeo).

18. Gupta, M (1982)

19. D.C Vashist and T.R Kundu (1990)

20. The study by Vashist estimated TFP index by using translog index method whereas Dholakia study followed Solow index method. Besides,the latter study uses different price deflators and weightages for both public and private sector whereas the former study followed common deflator and weightage for both sectors.

21. Chandra Sekhara Rao and Madhavi Latha, Op.cit

22.T.L.Sankar, R.Nandagopal, R.K.Mishra (1989), _

23.T.L.Sankar (1991),

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Chapter 2
PATTERNS OF GROWTH

There is an emphasise in the literature that growth is a necessary condition for the long run survival of the firms in an uncertain and constantly changing environment. The growth of firms has also been emphasised as a means of using more extensively or more effectively, existing productive resources[1]. The purpose of this chapter is to analyse the growth patterns of the large and medium modern manufacturing enterprises in Kerala as reflected in the behaviour of our sample firms. The growth pattern is seen in terms of the behaviour of macro-aggregates such as output, value-added, employment and fixed capital stock. The sample procedures, data source, the concepts, and definitions of macro variables, are discussed below.

Method of sample selection

The study has made use of data collected from the annual accounts - profit & loss account and balance sheet of public limited companies both in the private and public sectors engaged in modern manufacturing activities in Kerala. Given the large size of population we have selected a representative sample of firms. The sample is selected in such a way that the firms in both public and private sector in varying sizes and activity patterns have been adequately represented. We elaborate below the procedure involved in selecting the sample.

First, we have collected information about the total number of large and medium firms and the capital size of each firm as on 31st March 1988. On the basis of this information, we have classified the firms into eight industrial groups (strata) as shown in table 2.1. In each stratum, firms are ranked into three different size classes as presented in table 2.2.

Table 2.1
Large & Medium Manufacturing Enterprises In Kerala:1988

	State Public Sector		Private Sector	
Industry	Number	Fixed Capital Rs Lakhs	Number	Fixed capital Rs Lakhs
Electronics	8	2002	10	3244
Engineering	9	5681	10	4923
Chemical	10	24085	23	24245
Agro-based	10	4798	17	3162
Textiles	3	1625	19	15783
Electricals	3	2002	5	4987
Wood-based	2	567	8	2828
Ceramics	3	564	4	625
Total	48	41324	96	59637

Source: Large and Medium Scale Units in Kerala, Unpublished Document made available by Kerala State Industrial Development Corperation.

Table 2.2
Size Class Distribution Of Population Firms In Each Strata:1988

	Size Class			
Industry	25-500	500-1000	above1000	Total
Electronics				
Public	7	1	0	8
Private	7	1	2	10
Engineering				
Public	5	3	1	9
Private	18	2	5	10
Chemical				
Public	2	3	5	10
Private	14	1	0	23
Agro-based				
Public	7	2	1	10
Private	11	3	5	17
Textiles				
Public	1	1	1	3
Private	11	3	5	19
Electricals				
Public	2	0	1	3
Private	1	1	3	5
Wood-based				
Public	2	0	0	2
Private	6	1	1	8
Ceramics				
Public	3	0	0	3
Private	4	0	0	4
Total				
Public	29	9	10	48
Private	68	12	16	96

The sample firms are then drawn from each strata and distributed into the three different size classes. We have selected more number of firms from lower size-class compared to other two classes. This is because firms in population are more concentrated in this particular class.

Table 2.3

Size Class Distribution Of Sample Firms In Each Strata

	Size Class			
Industry	25-500	500-1000	above1000	Total
Electronics				
Public	3	0	0	3
Private	1	1	0	2
Engineering				
Public	3	0	0	3
Private	1	0	0	1
Chemical				
Public	0	1	2	3
Private	4	1	2	7
Agro-based				
Public	1	0	0	1
Private	2	0	0	2
Textiles				
Public	1	0	0	1
Private	4	1	1	6
Electricals				
Public	1	0	0	1
Private	0	0	1	1
Wood-based				
Public	1	0	0	1
Private	0	0	1	1
Ceramics				
Public	1	0	0	1
Private	1	0	0	1
Total				
Public	11	1	2	14
Private	13	3	5	21

Source: as in table 2.1.

Table 2.4
Proportion of the sample in the aggregate: Industry-wise
(percentage)

	State Public Sector		Private Sector	
Industry	Number	Fixed Capital	Number	Fixed capital
Electronics	37	27	20	29
Engineering	30	24	10	10
Chemical	30	53	30	48
Agro-based	10	03	12	23
Textiles	33	15	32	18
Electricals	33	11	20	54
Wood-based	50	27	13	49
Ceramics	71	33	25	40
Total	29	40	22	35

Source: as in table 2.1

The firms so selected from each stratum and size class added to 14 firms in public sector and 21 firms in private sector (see table 2.3). These account for 29 per cent of total number of firms in public sector and 22 per cent of total firms in private sector. Further, the sample covers 40 per cent of total fixed capital in public sector and 35 per cent of total fixed capital of private sector.

The relative proportions of the sample in the total aggregates of the large and medium manufacturing enterprises in Kerala are shown in table 2.4. There are considerable variations in the proportion of gross fixed capital and also in the number of firms in each stratum. The reasons for unequal proportions of the firms selected for the study are:

(1) The required information for all firms is not available continuously for the period of analysis,

(2) The firms that got established in the later period were not considered for selecting the samples in order to ensure comparability regarding age, etc., and

(3) While selecting the samples, care was taken to include only the firms that are manufacturing more or less homogeneous products.

Notwithstanding the unequal proportions, the sample selected for the study can be taken to represent the large and medium manufacturing enterprises in the state public sector and their counterparts in the private sector in Kerala. For evaluating the industry-wise performance, combined balance sheet of each industry for both public and private sector were prepared by giving proportionate average weightage in each variable[2]. Similarely combined balance sheet for manufacturing as a whole for both public and private sectors has been prepared. We now discusses the concepts and definitions of macro-variables used in the measurement of growth of firm.

Measurement of macro-variables

In the study output is worked out on the basis of value of sales adjusted for the stock as reported in the Balance-sheet and Profit & Loss Account of the enterprises. The study has chosen the value added function to estimate productivity change since it yields a magnitude which is distributable among the factors (viz. labour and capital) operating within the industry, while the value of raw materials included in gross value output accrues to persons outside the industry concerned[3]. Hence, income is defined in terms of value-added. The study has used gross value added concept measuring gross value added by income approach. In order to express value added at constant prices, we have deflated the current values by using

corresponding wholesale price index (1975-76=100) of that particular industrial-product so on.

In the study, the data on total number of employees is taken the measure of labour input[4]. The total employees include administrative, professional, scientific and technical personnel, supervisory staff, workers and other than workers. The study does not attempt to refine the index either by taking weighed index of labour using remuneration of different classes as weights or by making adjustments with the labour input for qualitative changes arising out of age, sex, education, occupation etc[5].

Capital is an important input in the production process. The quality and quantity of capital influences not only the productivity of capital but also that of labour and total output. In order to calculate the growth of capital input, we have generated a physical capital series in value terms from the book value of the capital assets given in the balance sheet data. The first important issue in the measurement of capital input is the selection between the capital stock and flow. Most of the empirical studies (e.g.Ahluwalia, Goldar, and Hashim & Dadi) have used the stock data under the assumption of constant relationship between the stock of capital and flow of capital series. Although the measurement of real capital stock is open to question, we have used capital stock data for our analysis since the measurement of real service of capital is difficult[6].

The second issue in the measurement of capital input is the choice between the gross stock and net stock of capital.

Eventhough the net capital stock has got its own theoretical significance in productivity analysis, most of studies adopted gross capital stock as the indicator for several reasons[7]. First,the replacement of capital assets may often postponed. Secondly, setting aside of depreciation does not represent actual transaction. It may vary from firm to firm depending upon the method adopted to charge depreciation; the method being based on some convention or determined arbitrary.

There are two methods available in the measurement of capital stock (a) the perpetual inventory accumulation method (PIAM) and (b) the method of capital census. This study has followed PIAM (Goldar 1986) for deriving gross fixed capital stock series at constant prices. The first step towards the PIAM is to obtain the bench mark of capital stock. In this study, we have taken gross fixed capital of 1975 as a bench mark year.

The gross fixed capital at

$$K_t = K_0 + \sum_{t=1}^{n} (I_t - \delta K_{t-1})$$

Where K_t = the gross capital stock at the end of the year t,

K_0 = bench mark year, I_t is the annual additional capital stock at constant price, and

δ= the annual rate of discarding[8].

The annual additions of gross investment at current prices are obtained by taking the differences between the book value of fixed capital stock of two consecutive years. We have deflated this gross investment by using wholesale price of capital good.

Growth Pattern

Now we turn to discuss the growth pattern of sample firms. The estimated rates of growth of macro variables in respect of sample firms derived by the above mentioned methodology are given in table 2.5.

Table 2.5
Growth of macro variables in the State
Public and Private Sector (Annual Average %)

Year	Output		Gross Value Added		Gross Fixed Capital		Employment	
	Public	Private	Public	Private	Public	Private	Public	Private
1975-1981	9.03	4.51	14.72	-1.91	3.81	14.69	0.82	0.10
1981-1988	10.90	5.60	6.87	3.45	19.95	7.74	0.36	1.45
1975-1988	9.90	4.50	11.10	0.72	11.26	11.67	0.61	0.84

Source: Calculation based on the combined balance sheet of the sample companies.

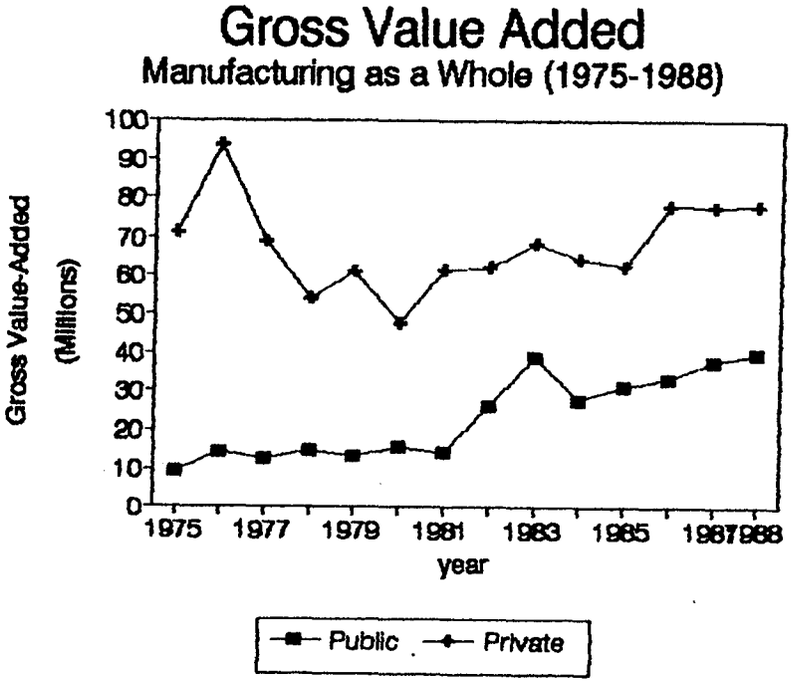
It is seen that the gross value of output in the state public sector has recorded a relatively high annual growth rate of 9.90 percent during 1975-1988 period, whereas the private sector registered a corresponding rate of 4.50 percent only. In terms of gross value added, the record of the public sector is seen marked with an annual growth rate of 11.10 percent which is ten times greater than the corresponding figure for the private sector (0.72 percent per year). The growth in output and income has been achieved mainly by a rapid growth of capital stock at the rate of 11.26 per annum in the state public sector. The stock of private sector also has increased at a rate (11.67 per cent) slightly higher than that of the public sector.

Instructively, the growth rates in employment were as low as 0.61 per cent and 0.84 percent per annum for the public and private sectors respectively. It is interesting to note, that the rate of increase in the capital stock is not accompanied by a corresponding increase in the value of output or income particularly in the private sector. This has implications on the sources of productivity, a detailed discussion of which is attempted later.

Patterns of change

Let us examine whether the rates of change in growth pattern have maintained any systematic relationship over time.For this we have plotted absolute figures of corresponding variables,on a graph (see graph 2.a). (2.1 ?)

Graph 2.1



From this graph, it is clear that the year 1981 is a point of departure. So we have divided the whole period of study into two sub-periods, 1975-1981 and 1981-1988 to identify the patterns of their variables. As suggested by the graph, there is a difference in the growth pattern between these two phases (see table 2.5). During the first phase (1975-1981) the gross value of output for the state level public sector as a whole increased by 9.03 percent per year, which is slightly lower than the growth rate (10.90 percent) recorded in the second phase. On the other hand,gross value added recorded relatively higher growth rate of 14.72 percent in the first phase as compared to the growth rate of 6.87 percent in the second phase. But, for the private sector, the rates of growth of gross value of output and value added rose by 5.60 percent and 3.45 percent respectively in the second phase as against as growth of 4.51 percent and negative growth of (-1.91) percent during the first phase.(see table 2.5)

The rate of growth of capital stock for the public and private sector was 3.81 percent and 14.69 percent respectively in the first phase, from where, it rose to 19.95 percent in the case of public sector and declined to 7.74 percent in the private sector in the second period.

As for employment, the state public sector recorded a relatively low growth rate of 0.36 percent per annum in the second phase as against a growth rate of 0.82 percent in the first phase whereas, private sector moved up by 1.45 percent from a figure of 0.10 percentage in the first period.

From the above discussion it is clear that public sector manufacturing units followed essentially a pattern of growth different from the private sector. While public sector grew faster than the private sector in terms of gross value of output and value added, the growth rate of gross fixed capital and employment was more or less same for both the sectors.

Table 2.6
Industry-wise Variations in the
Growth Rates During 1975-1988 (Annual Average%)

Growth	Gross Value Added		Output		Gross Fixed capital		Employment	
	Public	Private	Public	Private	Public	Private	Public	Private
>10	Eng Chem Elect Electro Cera	Agr Text Electro	Eng Chem Elect	Electro Agro	Eng Chem Electro Agro Wood	Eng Chem Electro Text		Eng Agro
5-10		Wood Cera	Electro			Cera		
0-5	Agro	Eng Chem	Cera Agro	Eng Chem Elect Text Wood Cera	Elect Text Cera	Elect Wood Agro	Electro Chem Elect Eng Wood	Electro Chem Wood Text Cera
<0	Text Wood	Elect	Text Wood				Text Agro Cera	Elect

Notes:
Electro = Electronics, Eng = Engineering, Chem = Chemical,
Elect = Electrical,
Agro = Agro-based, Wood = Wood-based, Text = Textiles,
Cera = Ceramics.

Inter-industry shifts

So far we have discussed the average behavior of the macro variables. Coming to industry-wise details, we present estimates of annual average growth rate of value of output for eight industries between 1975-1988 in table 2.6. In the case of Engineering, Chemical and Electrical industry, public sector has a relatively higher growth rate (greater than or equal to 10) whereas private sector showed growth rate less than or equal to 5. The other four industries show a reverse trend in which the rate of growth of output for private sector is significantly higher than that of the public sector.

From table 2.7, it is clear that Engineering, and Ceramics in the state public sector registered higher growth in the first phase than the second phase whereas private sector showed relatively better performance in the second phase as compared to the first.

Table 2.7
Inter-Industry Growth Rates of Output
During 1975-88(Annual average%)

Industry Groups	Public		Private	
	Phase1	Phase2	Phase1	Phase2
Electronics	4.21	17.10	19.32	48.20
Engineering	17.30	10.10	2.12	3.24
Electrical	43.11	-4.01	13.01	-4.02
Chemical	1.12	9.01	3.02	6.98
Textiles	-15.23	2.77	4.10	2.90
Ceramics	2.10	1.11	0.10	13.21
Agro-based	-13.21	15.11	19.21	15.01
Wood-based	-9.10	-3.02	7.11	3.20
Mfg.as whole	9.03	10.90	4.51	5.60

Source: as in table 2.5.

At the same time, in the case of Textiles, Agro-based and Wood-based industries, the performance was just opposite. However, Electronics and Chemical industry showed an enhanced growth in the second phase as compared to the first phase for both the sectors whereas the Electrical industry's growth has slackened during the second phase.

As for income generation, Chemical, Electrical, Engineering industry showed growth rate much higher in the state public sector as compared to the private sector. In Electronics, Textiles, Agro-based,Wood-based and Ceramics industries, private sector gives a higher growth in the value added than the state public sector.

Here an attempt can be made to see whether there is any variation in income generation over the years and across the industries. Industries like Chemical, Electronics,and Agro-based in both the sectors showed substantial growth in the second phase as compared to the first phase . However the reverse is seen in the case of Engineering and Textiles industries. But in the case of Electrical industry, the rate of growth of gross value added declined in the public sector whereas it rose sharply from negative growth rate in the case of private sector. In the case of Wood-based industry the public sector showed a decrease and private sector showed marginal increase in the second phase as compared to the first phase. Further,when Ceramics industry in the public sector showed declining trend in the second phase private sector showed sharp increasing trend (see table 2.8).

Table 2.8
Growth in Value Added:Inter-industry Pattern
During 1975-1988 (Annual Average%)

Industry Groups	Public		Private	
	Phase 1 1975-1981	Phase 2 1981-1988	Phase 1 1975-1981	Phase 2 1981-1988
Electronics	-0.11	17.10	10.30	23.01
Engineering	22.95	7.05	4.10	0.11
Electrical	36.11	1.23	10.01	-14.12
Chemical	5.98	16.02	1.15	5.21
Textiles	10.50	-4.00	10.30	8.70
Ceramics	3.11	0.44	3.12	10.08
Agro-based	-53.12	1.01	11.20	19.03
Wood-based	8.14	-15.01	5.21	6.13
Mfg.as a whole	14.72	6.87	-1.91	3.45

Source: as in table 2.5.

Table 2.9 presents data on the average annual growth rate of gross fixed capital for all industries for public and private sector. The rate of growth of fixed capital showed marginally upward trend in the second phase compared to the first phase in the case of Engineering industry for both public and private sectors. In Ceramic industry the rate of growth of gross fixed capital has increased sharply in the second phase.In the case of Ceramics,Textile and Wood-based industry both public and private sectors showed declining trend in the second phase compared to first phase. Agro-based industry in public sector showed relatively lower growth in the second phase whereas private sector reflected opposite trend.

Table 2.9

Inter-industry Pattern In Gross Fixed Capital Stock During 1975-1988 (Annual Average %)

	Public		Private	
Industry Groups	Phase 1 1975-1981	Phase2 1981-1988	Phase1 1975-1981	Phase2 1981-1988
Electronics	19.04	4.10	14.21	2.13
Engineering	5.98	8.10	6.00	8.11
Electrical	0.11	0.10	2.01	7.12
Chemical	3.20	21.11	18.90	8.10
Textiles	10.10	1.22	13.09	7.91
ceramics	0.11	6.22	-1.18	12.10
Agro-based	9.21	3.01	2.80	13.21
Wood-based	3.22	1.34	21.03	3.97
Mfg.as a whole	3.81	19.95	14.69	7.74

Source: as in table 2.5.

Electrical industry recorded relatively higher growth in the first phase in private sector. But the chemical industry showed quite different pattern from all other industries.

We now examine the differences between public and private sectors in the growth of employment. As shown earlier in table 2.5, growth of employment was negative for industries like Electrical industry in private sector and for Textiles, Agro-based and Ceramics in public sector.

A further break-up of the above trend regarding employment in to two distinct phases (1975-76 to 1981-82) and (1981-82 to 1988-89) revealed that all industries other than Engineering, Chemical and Electrical, in state public sector registered a negative growth during the second phase. Similarly

Textiles, Electronics and Electrical industry in private sector showed declining trend in the second phase.

Table 2.10

Inter-industry Pattern in Employment During 1975-1988 (Annual Average %)

Industry Groups	Public		Private	
	Phase 1 1975-1981	Phase 2 1981-1988	Phase 1 1975-1981	Phase2 1981-1988
Electronics	2.10	-0.90	5.79	-0.97
Engineering	0.10	4.01	10.10	13.00
Electrical	1.00	0.11	1.02	-2.01
Chemical	4.20	1.00	2.31	5.00
Textiles	0.10	-1.12	1.01	-1.32
Ceramics	-0.99	-0.10	2.23	0.98
Agro-based	0.30	-3.11	16.01	5.99
Wood-based	7.01	-2.00	0.05	0.01
Mfg.as a whole	0.82	0.36	0.10	1.45

Source: as in table 2.5.

A perusal of the industry wise performance further showed that the growth of employment declined in the second period (1981-1988) for all industries except Engineering for both the sectors, and Chemical industry in the private sector. In the state public sector Ceramic industry showed marginal increase in the second phase.

Summary

To summarise our findings on the patterns, the rate of growth of output and value added are high in case of public sector as compared to the private sector though gross fixed capital increased slightly at a higher rate in private sector.

On the whole, the performance of the public sector firms appeared relatively better than their counterparts in the private sector for the period as a whole. Also, the pattern showed no difference as between the two phases. There were however some inter-industry differences. As for the employment, the growth rates in both the sectors were found to be low, though it showed signs of improvement in the private sector. In the public sector, we observed a positive association between the growth of output, value added, and fixed capital in three industries namely Engineering, Chemical and Agro-based. The Electronics industry in state public sector showed very good performance in terms of income generation (value-added) even though the output's growth rate is lower than that of capital stock. On the other hand, Textile and Wood industry showed negative growth in the case of output and value added whereas it showed modest growth in its capital stock. Ceramics and Electrical industry performed well as far as income generation and output were concerned but it was accompanied by a very low growth of its capital stock.

Coming to the private sector, the growth rate in output,value added and fixed capital despite high capital stock growth, Engineering, Chemical and Electrical industries showed poor growth of output and income generation. Then industries get higher weightage, their poor performance led to overall unsatisfactory record of macro variables. Electronics and Agro-based industries in private sector are able to perform better in the case of income and output generation and the magnitude of this growth is higher than the growth of capital stock. Meanwhile Textile industry is better in income generation compared to its

output.On the other hand, Ceramics and Wood-based industries showed more or less the same pattern in the growth of output and value added.

Once we go for periodisation, a strong divergence can be noticed in the growth of output, value added, fixed capital and employment for both public and private sector industries. Further, it is clear that this divergence can be seen more in public sector industries compared to its counterparts private sector.

Macro behaviour as such is not an adequate indicator of performance.In order to gather a better idea of efficiency we shall undertake analysis of productivity, capacity utilisation, and its determinants in the subsequent chapters. In the next chapter, we shall discuss the productivity trends of state public and private sectors.

Notes and References

1. Penrose, E.T, 1980 and John Eatwell,1971.

2. Weights has been assigned to each variable according to the mean value of the proportion calculated for fourteen year period corresponding to that firm within that industry.

3. Griliches, Z and Ringstead,V, 1971, Bruno (1978), Goldar (1986).

4. Sinha and Sawney,1970

5. Goldar,1986.

6.Goldar, 1986, Griliches and Jorgenson, 1986.

7. R.P.Katyal and B.K. Gupta,1984

8. The discarding rate is 2 percent,
   See C,Radhakrishnan Nair (1989)

Chapter 3

PRODUCTIVITY TRENDS

The previous chapter dealt with relative growth in output/income, capital investment and employment of the State level public enterprises as compared to the private sector firms covered in our sample of the manufacturing sector in Kerala. The rate of growth of output/income is the sum of the rate of productivity growth and the contributions of all inputs. So viewed, the next step in the study should be concerned with productivity trends and sources of growth in the sense of relative contributions of different factors of production to the output/income generation. The analysis is carried out in terms of both partial and total factor productivity growth. We shall also discuss the determinants of partial productivity growth of labor and capital.

This chapter is divided into three sections. The first section briefly reviews selected literature on the measurement of productivity and discusses the methodology adopted in the study. Second section presents the trends in the growth of labor productivity, capital intensity and capital productivity for the public sector and private sector manufacturing enterprises in the aggregate and different industrial groups. There is also an attempt to discuss determinants of partial productivity growth. Third section gives estimates of the TFPG and sources of growth.

Section I

Concept of Productivity

Generally, productivity is denoted by the ratio of output to any or all associated inputs. The ratios of output to particular inputs can be termed as partial productivity ratios. Given that the labor and capital productivity indices manifest wide and divergent movements across industries, an unambiguous judgement on the overall growth in the productive efficiency is not possible on the basis of partial productivity analysis. One way of getting out of this problem is to supplement the analysis with estimates of total factor productivity indices. This (TFPG) is a measure of the growth in output that cannot be explained by growth in inputs and, as such, has been called a measure of the "unexplained residual". Conceptually, this residual can be thought of as measure of the degree of technological progress (Cowing and Stevenson,1981)[1]

Technological progress implies advancement in the knowledge of the art of production. This can take many forms such as new products, new techniques of manufacture and new methods of organization. But productivity means improvement in the quality of inputs and labor, better utilization of plant and equipment, and economies of scale in addition to technical progress. Thus, total factor productivity is a much broader concept of efficiency than technical progress.

In the decades since the second world war, developments in the field of productivity research have been accompanied by advances in closely related areas of economic theory, like the theory of index numbers and the development of flexible functional forms that are less restrictive in representing economic relationships such as production functions and cost functions[2]. Advances in these areas have strengthened the theoretical foundations of TFP measurement. A change in the index of TFP equals the difference between revenue-share weighted output growth rates and cost-share weighted input growth rates. It is usually assumed that output and input markets are competitive and that firms maximize profit subject to constant returns to scale of production and that market prices are taken as parameters. Under these assumptions, output and input elasticities are equivalent to the observed revenue shares of each output produced and cost shares of factor inputs.

Most of the earlier studies on productivity changes in Indian industry and particularly in the industries in Kerala are confined to the analysis of partial productivity of labor and capital and also total factor productivity by using the Kendrick method and Solow index, which differ from one another with regard to the weighing scheme involved. The main limitation of Kendrick method is that it assumes marginal product change in the same proportion so that the ratio remains constant irrespective of the shift in the production function. It gives fixed weights under the assumption that the difference between two indices are small if the growth rate of labor and capital are not very different. Solow has proposed yet another measure of technical change in his

famous 1957 article, in which technical change is interpreted as a short-hand expression for any kind of shift in the production function. Such a shift is indicated by the inclusion of a time trend variable. Technical change is assumed to be neutral in the Hicks disembodied sense. Further, it provides changing weights (current period value shares).

In some of the recent studies we have observed the use of approximation to the Divisia index, (Banerji (1975), Sastry (1984), Ahluwalia (1985) and Goldar (1986)). The primary disadvantage of the Index number approach is the assumption of a very specific functional form for the underlying cost function[3]. On the other hand, the non-parametric approach is free of this disadvantage, but it is computationally more complex and the measures of the shifts in technology are only lower bounds to the true shifts[4].

Nelson(1981) provided detailed criticism and evaluation of the productivity approach[5]. It was pointed out that empirical results on TFP change should not be interpreted as measuring technical change only in the sense of a shift in the frontier of production possibilities because of the implementation of a new generation of technical knowledge. Instead, the measures must be interpreted quite broadly by including changes in such factors as industrial and plant organization, engineering know-how or changes in response to disruptions in the production process that affect capacity utilization in the short run.

Methodology

The main features of the methodology followed in the present study can be outlined as follows. It is based on models of producer behavior that incorporates a production function. By using explicit production models, we are able to unify the treatment of a large and diverse range of problems, analysis of the sources of economic growth, and determination of productivity growth and the distribution of the value of output among productive inputs. The substitution among inputs and productivity growth are treated symmetrically in our model of production.

There is an extensive literature on the choice of an appropriate index of TFPG. When we compared all the measures of TFPG, Translog measure was found to have some advantages in application. In particular, this functional form allows elasticity of substitution to vary. Moreover, the assumption of Hick's neutral technical change along with variable elasticity of substitution enables the function to disentangle the effects of substitution from the effects of TFPG on output growth and also it gives weighted average of the current and previous period value shares. We, therefore, considered Translog approach for the empirical analysis of the data even though it is far from perfect.

Consider a specific form of the production function in defining value added in terms of data on quantities and prices[6].

$$\ln V = \alpha_0 + \alpha_K \ln K + \alpha_L \ln L + \alpha_T T + (1/2)\beta_{KK} (\ln K)^2 + \beta_{KL} \ln K \ln L + \beta_{KT} \ln K T + (1/2)\beta_{LL} (\ln L)^2 + \beta_{LT} \ln L T + (1/2)\beta_{TT} T^2 \quad - (1)$$

Value added is a translog function of capital and labor inputs. The translog production function is characterized by constant returns to scale if and only if the parameters satisfy the conditions

$$\begin{aligned} \alpha_K + \alpha_L &= 1 \\ \beta_{KK} + \beta_{KL} &= 0 \\ \beta_{KL} + \beta_{LL} &= 0 \\ \beta_{KT} + \beta_{LT} &= 0 \end{aligned}$$

If we consider data at any two discrete points of time, say T and T-1, the growth rate of output can be expressed as a weighted growth rates of capital and labor inputs plus rate of productivity growth.

$$\ln V(T) - \ln V(T-1) = \bar{V}_K (\ln K(T) - \ln(K(T-1)) + \bar{V}_L (\ln L(T) - \ln L(T-1) + V_T \quad ..(2)$$

Where weight are given by average value shares

$$\bar{V}_K = (1/2)((V_K(T) + V_K(T-1))),$$

$$\bar{V}_L = (1/2)((V_L(T) + V_L(T-1))),$$

$$\bar{V}_T = (1/2)(((V_T(T) + V_T(T-1))).$$

We refer to the term V_T as the translog index of the rate of productivity growth. This has been shown by Diewert (1976).

Since the total factor productivity is derived as the difference between the growth of value added and the weighted sum of the growth of labor and capital, any errors of measurement in any of these variables affect the estimate of the total factor productivity growth.

Section II

Trends in labor productivity

The estimated output-labor ratio for the whole period (1975-1988) indicated that the productivity levels of state level public sector as a whole are relatively poor as compared to their counter parts in the private sector. (see table 3.1). We observed the same trend with respect to the level of labor productivity in all industries.

However, the picture with respect to the growth rate of labor productivity ratio on the whole was different: The state public sector as a whole recorded a growth rate of 10.49 per cent per annum as against a corresponding negative figure of (-) 1.10 by the private sector. The better performance recorded by the public sector as a whole was probably due to above average growth rate achieved by electrical and engineering industries. However when we sub-divide the entire period of study into two phases, we observed that the state public sector as a whole and also some industries like ceramics and wood-based showed a marginal decline in the growth rate whereas, private sector showed an improvement during the second phase. Electronics, chemical and agro-based industries in both state public sector and private sector recorded better growth trend in the second phase (1981-1988) compared to the first phase (1975-1981). In contrast, engineering, electrical and textiles industry in both the sectors showed a decline in the second phase (1981-1988).

Table 3.1

Level and Growth rate of Labor Productivity: State Public and Private Sector (Annual Average %)

Industry		1975-1988		1975-1981		1981-1988	
		Public	Private	Public	Private	Public	Private
Electronics	a)	276500	364500	14200	22600	41100	50300
	b)	2.11	14.90	-7.10	4.15	10.11	24.01
Engineering	a)	16650	349400	12700	277700	20000	410800
	b)	12.21	-9.01	23.30	-6.31	3.14	-12.02
Chemicals	a)	44100	111300	28800	100500	57200	120500
	b)	9.01	-0.11	2.30	-0.11	15.02	-0.11
Electrical	a)	25900	45397	32300	46753	20300	44041
	b)	16.10	-2.12	35.08	9.11	1.31	-12.01
Textiles	a)	6150	49400	5300	46300	7000	52100
	b)	3.12	4.15	6.31	3.97	2.00	4.03
Agro-based	a)	5330	36500	5028	35200	5589	37600
	b)	-1.06	4.92	-3.55	-5.06	1.07	13.47
Wood-based	a)	6700	11400	8400	10000	5300	12700
	b)	-7.11	6.00	1.30	4.90	-13.10	6.00
Ceramics	a)	5300	11800	7900	8900	3800	13500
	b)	2.14	6.03	4.01	2.01	0.60	9.01
Mfg.as a whole	a)	21000	63500	14400	58400	28700	69600
	b)	10.49	-1.10	13.89	-2.10	6.51	2.00

Notes:

a - Represents ratio of labor productivity in Rupees.
b - Represents the annual average growth of labor productivity in per centage.
Mfg.as a whole - Represents weighted average of all industries.

Source: Calculation based on the combined balance sheet of the sample companies.

Needless to say, capital size or technology plays a dominant role in determining the level of output and hence the labor productivity. The reasons for the lower levels of labor productivity in the state public sector enterprises may be due to

such practices as over-manning. In this context it is useful to study the pattern of capital intensity (measured by K/L ratio) of the state level public sector enterprises vis-a-vis the private sector ones.

Trends in Capital Intensity

The average ratio of capital to labor during the period 1975-1988 appeared lower in state public sector as compared to private sector as a whole. Industry-wise results also indicated the same pattern (see table 3.2).

When we divided the study period into two phases, 1975-1981 and 1981-1988, we observed that the level of capital intensity for both sectors and its selected industries (except, agro-based wood-based and ceramics industries) increased in the second phases. The ratio of capital intensity in ceramics industries for state public sector and in agro-based and wood-based in private sector, had declined in the second phase. Further, it is seen that this ratio has been continuously rising except in agro-based industry in the private sector. The rate of growth of capital-to-labor ratio lies between 16 and 3 per cent for both the sectors except engineering in private sector and wood-based industry in the state public sector. The wood-based industry in the state public sector showed negative growth (-0.10 per cent) as against a growth rate of 12 per cent achieved by the counterparts in the private sector. In the case of engineering, we observed the opposite pattern: when public sector showed

upward growth trend (5 per cent) the private sector showed declining trend (-4 per cent).

Table 3.2

Level and Growth Rate of Capital Intensity in the State Public Sector and Private Sector. (Annual Average%)

Industry		1975-1988		1975-1981		1981-1988	
		Public	Private	Public	Private	Public	Private
Electronics	a)	28900	79100	1300	41500	35400	111300
	b)	10.10	16.01	17.41	8.01	5.00	22.11
Engineering	a)	57100	802200	46300	378100	66400	1165700
	b)	5.00	-4.03	5.90	-3.00	4.10	-5.10
Chemicals	a)	148600	215400	72000	160000	214200	263000
	b)	10.00	9.01	1.10	16.92	19.98	3.08
Electrical	a)	70000	77525	71500	56411	68700	98639
	b)	-1.00	5.00	-2.10	1.01	-0.11	7.09
Textiles	a)	900	52800	2000	32200	18000	70500
	b)	3.70	10.00	6.01	12.01	1.99	8.99
Agro-based	a)	17000	115700	13300	139000	20100	95700
	b)	3.40	-2.39	-0.22	-13.69	6.50	7.29
Wood-based	a)	20600	45900	19500	30900	58800	21600
	b)	-0.10	12.00	-4.11	20.90	2.01	4.10
Ceramics	a)	4600	38500	44200	2960	4640	44100
	b)	4.01	6.02	1.10	-3.01	5.98	10.04
Mfg.as a whole	a)	78300	141400	41200	101600	121500	187700
	b)	10.65	11.31	2.98	15.01	19.59	7.01

Notes:

a - Represents ratio of capital intensity in Rupees.
b - Represents average rate of growth of capital intensity in terms of per centage.
Mfg as a whole - Represents weighted average of allindustries.

Source: as in table 3.1

The rate of change between "sub-periods" had showed considerable variability. The rate of growth of capital intensity in the public sector increased by 19.59 per cent in the second

phase as against the rate of growth 2.98 per cent in the first phase whereas, private sector experienced higher annual growth rate (15.01 per cent) in capital intensity during the first period 1975-1981 as compared to 7.01 per cent in the later period (1981-1988). Chemical and wood-based industry in state level public and private sector showed the same kind of divergence between these two phases. Engineering and textile industry in both sectors showed very little change in the second phase (1981-1988) compared to the first phase whereas electrical, agro-based and ceramics industries witnessed higher growth in capital intensity during the second phase.

Trends in Capital Productivity

Turning to capital productivity, it is seen from table 3.3. that the aggregate average ratio is lower in the state public sector (0.32) as compared to private sector (0.53). Industry-wise also, we find that the same pattern was repeating in all except two industries viz., electronics and agro-based industries. This ratio showed a declining trend in public and private sector over the entire study period 1975-1988. However, the decline is much greater in private sector (-11.01 percent) as compared to the state public sector (-0.16 per cent). In terms of growth of this ratio, engineering, electrical, chemical, textiles and ceramics showed relatively better performance in the state level public enterprises. Electronics, agro-based and wood-based industries experienced higher growth in the private sector.

Table 3.3

Temporal movements in the Ratio of Capital Productivity and Growth in State Public Sector and Private Sector
(Annual Average %)

Industry		1975-1988		1975-1981		1981-1988	
		Public	Private	Public	Private	Public	Privat
Electronics	a)	0.92	0.49	0.66	0.55	1.13	0.44
	b)	-2.10	-1.21	-19.90	-4.11	13.10	2.01
Engineering	a)	0.29	0.59	0.27	0.73	0.31	0.48
	b)	8.00	-5.10	18.00	-2.13	-1.00	-7.87
Chemicals	a)	0.37	0.58	0.40	0.72	0.34	0.46
	b)	-1.07	-10.01	3.10	-17.20	-4.04	-3.17
Electrical	a)	0.37	0.52	0.45	0.46	0.30	0.57
	b)	16.90	2.02	36.01	-9.03	1.55	11.00
Textiles	a)	0.27	0.31	0.36	0.37	0.19	0.27
	b)	3.14	-1.09	4.20	-3.00	3.00	1.01
Agro-based	a)	0.42	0.33	0.41	0.27	0.42	0.39
	b)	0.08	7.31	-12.81	8.62	11.13	6.18
Wood-based	a)	0.34	4.00	0.44	3.20	0.25	4.70
	b)	-7.31	7.10	4.00	15.90	-16.00	-2.10
Ceramics	a)	0.14	0.31	0.18	0.30	0.12	0.32
	b)	3.20	0.10	3.00	4.10	3.40	-2.01
Mfg.as a whole	a)	0.32	0.53	0.35	0.66	0.28	0.37
	b)	-0.16	-11.01	10.91	-16.99	-13.08	-4.01

Notes:

a - Represents ratio of capital productivity in Rupees.
b - Represents the annual average growth of capital productivity.
Mfg.as a whole Represents - weighted average of total industries.

Source: as in table 3.1

Now let us examine whether the rates of change in capital productivity have any systematic relationship to time. Each groups demonstrated a somewhat different pattern of movement in productivity over time - reflecting more different patterns in the component industries. There has been a significant decline

in the case of growth of capital productivity ratio for state public and private sector during the period of 1981-1988. The same trend can be observed for three industry groups viz., chemical, electrical, and textiles (see table 3.3).
Engineering and wood-based industries showed declining trend in the second phase compared to the first phase for both sectors whereas, electronics industry accelerated in the second phase. The rate of growth of capital productivity of agro-based and ceramics industries in public sector augmented marginally since 1981 whereas private sector decreased slightly in the second phase.

As seen in an earlier chapter, capital grew at the rate of 11 per cent per year in both public and private sectors, but rate of growth in output was much less, 9.90 percent in public sector and 4.50 per cent in private sector. It naturally followed that the growth in capital productivity was proportionately lower and more so, in the private sector. One of the major reasons for the declining trend in capital productivity is probably the under-utilization of their capacity. The question of the determinants of productivity changes of firms in state public sector vis-a-vis private may be taken for a detailed analysis.

Determinants of Productivity Growth : Labor

First, we deal with the determinants of labor productivity. In the literature dealing with structural changes, there is the Verdoorn's Law, which suggests a positive linear relationship between labor productivity and output growth. The positive association between labor productivity and output growth

emerges in Verdoon's law because a higher rate of growth in output would enable the industry to take advantage of technological progress and scale economies[7]. Thus viewed, capital intensity can also be considered as another important determinant of labor productivity. In fact, Hirschman has put forth the hypothesis that labor productivity is more in capital-intensive than in labor intensive industries[8]. Also it has been argued that there exists a close relationship between the occupational structure of the manufacturing workforce and industrial productivity[9]. Similarly, several other economic and non-economic factors such as wage rate, capacity utilization, trade unionism, government regulations etc. can be identified as important determinants of labor productivity growth. The point to emphasise is that on the basis of existing studies and taking into consideration the data availability, one can identify for empirical testing a set of causal factors which influence labor productivity.

Following the above procedure, we have examined the relationship between labor productivity and some of the above-mentioned determinants. The following type of multiple regression equation is fitted by employing ordinary least squares method separately both for the state public sector and the private sector in Kerala.

$$LP_t = a+b_1 O_t + b_2 W_t + b_3 I_t + b_4 Cu_t + U_t \quad \ldots\ldots (3)$$

where

LP_t = Labour productivity,

O_t = Gross Value-Added,

I^t = Capital intensity,

W_t = Wage rate,

Cu_t =Capacity utilization,

U_t is the usual error terms.

We have only considered four quantitative explanatory variables in the equation. Some variables (e.g. the pattern of employment) though important were not considered for want of relevant data. The results of the estimated equations separately for the state public sector and the private sector are given below in table 3.4.

Table 3.4
Regression Estimates.

Dependent Variable:	Labor productivity	
Explanatory variable	Estimated coefficients.	
	State Public Sector	Private Sector
Constant	109.67538 (3.63411)	5.22423 (0.06403)
Value-added	0.00082 (34.50175)*	0.00059(2.53400)*
Wage rate	-0.00079 (-3.70866)*	0.00017(0.59509)
Capital Intensity	-0.01639 (-1.00683)	0.07186(1.4287)
Capacity utilisation	-0.33873 (-1.11679)	1.75377(1.37455)
Adjusted R^2	0.9970	0.8797
Durbin-Watson	1.8145	1.9398

Notes: Figures in parentheses represents t-value
"*"denotes significance at 5 per cent level.
Figures in bracket devoid of star denotes that it is not significant at even 10 per cent level.

A high R^2 in both the equations testifies the overall goodness of fit or the predictive power of the postulated model. That is to say, the postulated relationship between labor productivity and the determinant variables both in the public

sector and private sector is statistically significant. The estimated values of regression coefficients suggest that among the four quantitative variables considered, only one viz., value-added was found to be a statistically significant common factor in exerting a positive influence on the labor productivity both in the public sector and the private sector. The rest of the variables such as wage rate, capital intensity and capacity utilization were not found associated with the variations in labor productivity; the regression coefficients were found statistically insignificant.

The association between labor productivity and growth in value added has, as expected, taken a positive sign. It must, however, be recalled that growth rate in employment has been sluggish both in the state public and private sector. Clearly, the welfare implications of productivity gains with sluggish growth in employment are dubious. Further, it is disturbing that the coefficient of wage rate has taken negative sign in the state public sector and also it is statistically significant at 5 percent level. This tends to suggest that the wages paid in the public sector enterprises has no relationship with the labor productivity - perhaps employment and wages are determined by other extraneous factors in the state public sector enterprises. In other words, state public sector enterprises are characterized by low productivity and high wage syndrome in Kerala. In contrast, there is a positive relationship between labor productivity and wage rates in the private sector enterprises though the coefficient was not statistically significant.

The pattern observed with respect to wage-rate in the state public sector vis a vis the private sector was broadly found true in respect of other variables like capacity utilization and capital intensity in relation with the labor productivity.

Determinants of Capital Productivity

We now attempt an empirical testing of the determinants of capital productivity. The variables that may determine the growth of capital productivity in manufacturing industries are postulated as growth of output, changes in capital intensity, variations in capacity utilization, and the rate of returns to capital. A positive relationship between capital productivity and the above determinant variables are postulated. As compared to labor productivity analysis, there is an additional factor used in the analysis of capital productivity. This is the return to investment. In theory, there exists a close positive association between capital productivity and rate of returns to capital. The return on capital is measured as the difference between the gross value added and the total wage payments. The rate of returns to capital is now obtained by dividing the returns to capital by the stock of fixed capital. The analysis is carried out in the frame work of multiple regression models which enable us to obtain estimates of the effect of each independent variable on the dependent variable.

$$KP_t = a + b_1 O_t + b_2 I_t + b_3 CU_t + b_4 R_t + U_t .$$

Where,

KP_t = Capital productivity,

O_t = Gross value added,

I_t = Capital intensity,

CU_t = Capacity utilisation,

R_t = Rate of return, and

U_t = Error term.

The regression results separately for the state public sector and the private sector are shown in table 3.5.

Table 3.5.
Regression Estimates.

Dependent Variable: Capital productivity		
Explanatory variable	Estimated coefficients.	
	State Public Sector	Private Sector
Constant	0.0764 (1.606)	0.4676 (0.221)
Capital Intensity	-9.6942 (-1.954)	-1.7566 (-1.718)
Capacity utilisation	1.224 (3.084)*	3.9358 (0.975)
Rate of return	0.8597 (7.436)*	1.0523 (3.421)*
Adjusted R^2	0.9970	0.9879
F-Value	340.49	133.05

Notes: Figures in parentheses represents t-value

"*"denotes significance at 5 per cent level.

The regression results suggest that capital productivity in the manufacturing industries of Kerala is largely influenced by the rate of return. The changes in the rate of capacity utilization influence to some extent, the capital

productivity but this is found only in state public sector. The estimated values of regression coefficients of capital intensity are negative and statistically insignificant both for the state level public and private sector enterprises in Kerala.

Section III

Trends in total factor productivity

The foregoing analysis of partial factor productivity growth suggests that the expansion of output (income) in manufacturing outstripped that of either labor or capital input. This underscores the importance of the "other factors" in contributing for output growth. In order to capture the relative significance of these "other factors", we take our analysis in the direction of total factor productivity growth (TFPG).

Estimates of TFPG presented in table 3.6 reinforce the perception of the differential performance between the state public and private sectors. The annual growth rate of TFPG for public sector as a whole is about 2.77 per cent, while for private sector it is negative -4 percent. Industry-wise also the same pattern with different magnitudes is observed. In the case of electronics industry public sector has revealed relatively better performance as compared to the private sector In contrast, TFP growth in textiles and agro-based industries, public sector showed slightly lower growth as compared to the private sector. Electrical industry in public sector showed relatively very high growth (16.98 per cent) during the entire study period 1975-1988 whereas private sector showed 3 per cent growth. Wood-based

industry in state public sector showed negative growth in TFP whereas, private sector registered a slightly higher growth.

The preceding discussion was on the growth performance of individual industries during the entire study period (1975-1988). What however would be analytically more meaningful is to examine the individual industry wise performance during the sub-periods. Such a periodisation is important due to sharp deviation in growth rates which we observed from the graph 3.a.

Graph 3.1

Table 3.6

Total Factor Productivity Growth in the State Public Sector and Private Manufacturing Sector (Annual Average %)

Industry	1975-1988		1975-1981		1981-1988	
	Public	Private	Public	Private	Public	Private
Electronics	6.00	4.00	-5.01	-1.31	16.12	9.00
Engineering	11.15	-5.90	21.97	-3.00	1.03	-9.10
Chemicals	2.10	-4.20	3.05	-8.11	1.15	-1.02
Electrical	16.98	3.00	35.10	-10.00	1.05	15.00
Textiles	1.11	4.56	10.20	3.90	-8.01	5.10
Agro-based	4.18	6.10	-12.71	3.85	18.66	8.03
Wood-based	-4.90.	1.00	1.10	-4.00	-11.00	4.98
Ceramics	2.16	4.50	3.32	2.40	0.70	6.00
Mfg.as as a whole	2.77	-4.00	0.99	-7.99	8.70	-1.01

Mfg. as a whole represents weighted average of all industries.

Source: as in table 3.1

TFPG for public sector initially goes up in the first period and showed declining trend in the second phase whereas private sector fell substantially in the first phase and begins to show little improvement in the second period. The same trend is followed by chemical, electrical, textiles, wood-based and ceramics industries for both the sectors. But in the case of electronics, and agro-based industries, the rate of growth of TFP showed relatively better record in the second phase (1981-1988) for both the sectors, whereas engineering industry recorded good performance in the first phase (1975-1981).

Table 3.7

Total Factor Productivity Indices of State Public and Private Sector Industries in Kerala

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Mfg.as Whole														
Public	100	144	132	139	129	139	125	184	212	110	109	116	130	136
Private	100	85	81	42	54	26	50	50	54	50	48	59	61	51
Electronics														
Public	100	5	74	98	89	136	71	112	101	173	202	203	198	181
Private	100	102	112	115	116	108	94	107	99	113	102	68	153	156
Engineering														
Public	100	127	173	185	214	246	233	235	225	264	281	246	227	239
Private	100	96	96	96	68	72	79	84	17	16	14	1	11	16
Chemical														
Public	100	127	114	125	100	125	116	155	185	68	67	80	102	122
Private	100	75	95	51	62	29	53	49	56	59	58	49	63	43
Electrical														
Public	100	299	328	305	334	324	311	318	278	276	257	232	187	317
Private	100	134	119	103	128	114	152	150	118	54	105	142	48	60
Textile														
Public	100	159	-61	73	193	168	161	75	128	103	152	121	120	108
Private	100	120	120	133	133	145	122	79	104	126	131	154	174	159
Agro-based														
Public	100	114	120	148	154	110	24	206	163	83	120	185	189	154
Private	100	103	139	151	148	149	123	137	148	163	132	177	184	179
Wood-based														
Public	100	64	71	62	89	117	107	83	77	17	-18	36	49	29
Private	100	124	140	114	120	71	75	83	79	102	106	135	109	113
Ceramics														
Public	100	166	164	170	165	117	96	128	100	50	83	-1801	-1753	2526
Private	100	50	107	116	99	111	128	116	86	94	138	133	157	159

Source: as in table 3.1.

To compare the performance of state public sector and private sector enterprises at a given point of time, the indices of productivity on an year to year basis are presented in Table 3.7. It is evident from the indices that productivity in state level enterprises is higher than the private enterprises in all years under consideration. We can observe the same pattern in the case of engineering, chemical and electrical industries. But the firms in electronics, agro-based industries, ceramics,and textile showed higher values of TFPG in the private sector for few years.

In the case of wood-based industry, private sector showed higher growth as compared to public in all years under consideration.

Contribution of Factors to Value-Added Growth.

In this section we draw attention to the relative contributions of labor, capital and TFPG to value-added growth in the state public sector and private sector as a whole and industry-wise. The decomposition of value-added in these sectors into sources for the period 1975-1988 is given in table 3.7.

The set of figures for the public and private enterprises indicate that there are basic differences between the underlying production structure of the two types of enterprises. In the public sector, we find that the contribution of labor productivity to output(income) growth was the least (3 per cent per year) during 1975-1988. Growth in capital productivity and TFPG recorded 60 per cent and 27 per cent respectively. On the other hand, contribution of capital productivity in the private sector registered 396 per cent whereas labor productivity was 66 per cent. The contribution of TFP to output growth in the private sector was negative (-362 per cent) during the period.

Coming to the industry-wise performance table 3.8 reveals that the contribution of TFPG had been higher in public sector as compared to private sector. Besides, we also observe that the contribution of capital is relatively lower in public sector. Similarly, the contribution of labor is also lower in public sector except in textiles and electronics

Table 3.8

Decomposition of Value Added in State Public Sector and Private Sector in Kerala

Group	Contribution of Labor		Contribution Of Capital		Contribution Of TFPG	
	Public	Private	Public	Private	Public	Private
Electronics	0.06	0.04	0.45	0.69	0.49	0.27
Engineering	0.09	1.98	0.18	2.24	0.73	-3.22
Chemicals	0.05	0.53	0.66	2.00	0.29	-1.53
Electrical	0.04	0.29	0.02	-0.17	0.94	0.88
Textiles	0.48	0.05	-0.10	0.52	0.62	0.43
Agro-based	-0.03	0.21	0.06	0.34	0.97	0.45
Wood-based	-0.76	0.01	0.45	0.58	0.69	0.41
Ceramics	-0.86	0.09	-0.03	0.24	1.89	0.67
Mfg.as as a whole	0.03	0.66	0.60	3.96	0.27	-3.62

Source: as in table 3.1.

As for the sources of contribution, TFPG carried less weightage than labor and capital for both state public and private sector. The same kind of pattern is observed in the case of Textiles, Chemical and Wood-based industry in private sector. Further, the contribution of capital is higher than labor for both state public sector and the private sector except in Electrical and Textiles industries in the state public sector.

In general, whatever little output(income) growth has been recorded during the period of the study, this has essentially been contributed more by a process of capital-rather

than labor absorption. The contribution of technological progress to output growth has also been negligible. In this behavioral pattern there has not been any significant difference as between the enterprises in state level public sector and the private sector.

Summary

To summarize the main findings, state public sector enterprises as a group showed relatively better performance trend in terms of growth of partial productivity though the level of productivity ratios are very low compared to their counterparts in the private sector. We observed the same kind of pattern for all industries. Interestingly, capital intensity (K/L) growth was not found associated with changes in labor productivity. The single common factor that explained variations in labor productivity in the state public sector and the private sector was the value-added. The gains in labor productivity with sluggish growth in employment both in the public sector and the private sector have dubious welfare implications. That state public sector was distinct from the private sector with respect to the role of wages in determining labor productivity appeared as yet another interesting feature.

In terms of the total factor productivity growth also we observed relatively better performance in state public sector as compared to the private sector. From the decomposition exercise we found that the contribution of capital to output growth was more than that of labor in state public sector and the

private sector except in few industries. The contribution of TFPG as compared to that of labor and capital was higher in state public sector except in chemical industry. In the private sector it was the capital which made relatively higher contribution with exceptions in three industries viz., electrical, agro-based, and ceramics.

On the whole, the contribution of labor to output growth was the least and it was a process of capital augmentation that largely contributed to whatever little growth was there in output (income) in both the state public sector and the private sector. The relatively higher contribution of TFPG in the state public sector enterprises nevertheless remained an encouraging trend.

Notes and References

1. Cowing and stevenson, 1981.

2. Diewert W.E,1976, provide a good summary of the literature and references. See also Gallop and Jorgenson, 1980

3.Dared W.E.(1976) Op.cit

4.Diewert W.E (1976) op.cit

5.Diewert W,E Op.cit

6. D.W. Jorgenson, F.M.Gallop and B. Fraumeni,1987.

7. Goldar (1986)

8. Hirschman, 1958

9. Melman, 1956.

Chapter 4

CAPACITY UTILISATION

The analysis of the previous chapter in terms of total factor productivity measured efficiency in the use of resources. But it did not capture the effect of degree of utilization of available resources. Productive efficiency may be rising, but if part of the output potential is lost by under -utilization, this is an offset which must be taken into account in any overall appraisal of economic efficiency. An attempt is made in this chapter to understand the relative efficiency of state public and private sector enterprises in terms of capacity utilization indices.

Before discussing the trends in capacity utilization, we will consider briefly what capacity means in theory. For sure "Capacity is not purely a proxy for the capital stock[1]". It is a cost concept relative to output, which can be produced at the minimum average total cost, given the existing physical plant and organization of production and the prevailing factor prices[2]" F.Dc.Leuwe[3], defines capacity in terms of the difference between marginal cost and average cost specifically, as the level of output at which short run marginal cost exceeds minimum short run average total cost. Clearly, capacity is a somewhat elusive concept and its measurement is a difficult task.

There are two possible definitions of capacity which are referred to as engineering capacity and economic capacity. The engineering capacity is defined as greatest output that can

be produced with factors which are fixed in the short-run when the degree of substitution between variable and fixed factors of production is very low, and where movements in production arise from shifts in demand rather than shifts in production possibilities. On the other hand, the economic capacity is the level of output so high enough that fixed factors are not idle, but not so high that variable factors are making the marginal cost curve very steep[4]. It can also be expressed that the capacity is the value of production associated with full competitive equilibrium, where MR=MC[5].

Chamberline is one of the few economic theorists who gave considerable attention to the capacity concept. In his view, monopolistic competition causes inefficiency in economic organization and thus gives rise to excess capacity[6]. He also defined capacity as the output that achieves the lowest average cost. Moreover, capacity is thought to be a general equilibrium concept, which should be altered in the light of bottlenecks whose effects can be traced through an input output analysis which is based on linear programming model[7].

Many Economists attempted to develop capacity utilization measures that are closely tied up to the theory of firm behaviour. Pioneering studies in this area include the work by Klien, (1960) Hickman (1964) and more recently by Morrison, (1985, 1986) and Berndt and Fuss (1986). All these studies have defined capacity utilization by using the concept of firms short run cost function where one or more input are treated as quasi fixed. Alternative approaches have been developed for the

measurement of capacity utlisations. Among these, the Wharton Index developed by Klein and Summers[8] (1966) is based on time series of output measured in physical units. The monthly value of industrial production is seasonally adjusted and then aggregated into quarterly indices in order to identify the peaks. Some of these peaks are identified as full capacity with the help of inspection. One can estimate capacity output between the peaks by fitting a trend line through these peaks. The difference between this curve and the actual production curves gives an estimate of unused capacity. Several problems do arise in this approach. These include, the choice of series, identification of peaks and piece wise linearisation[9].

The RBI method[10], as devised by Divatia and Varma, replaces the concept of capacity by that of potential production and the percentage of utilized capacity by the potential utilization ratio. The potential utilization ratio is defined as the ratio of average monthly production index of the potential production of the industry during the period of one year. But this measure shares some of the limitations of the Wharton method. A more important objection is that it does not deseasonalize the monthly output data as is done in Wharton measure.

The National Industrial Conference Board of the U.S. estimates capacity on the basis of minimum capital output ratios[11]. The underlying assumption of the capital output ratio method is that in the short run, fluctuations in capital productivity is solely due to changes in output. For this a time

series of capital output ratios at constant prices is first obtained. The lowest capital output ratio is considered as the capacity output. The estimate of capacity is obtained by dividing the real fixed capital stock by minimum capital output ratio.

The utilization rate is given by actual output as a proportion of the estimated capacity.

$$CU = O/C.$$

where, $C = (K/(K/O)min)*100$

CU = the rate of capacity utilization,

O = the real output,

C = the estimate of capacity,

K = the real fixed capital stock

(K/O)min = the minimum capital output ratio.

This ratio can reflect both qualitative and quantitative changes based on the relationship between capital and output. It can bring capital stock into consideration, the input which most business men tend to regard as the indicator of capacity. The present study follows the NICB method minimum capital output ratio, as this is a simpler method for the measurement of capacity utilization eventhough the reliability depends critically on the accuracy of the measurement of capital and output.

Trends in Capacity Utilization

The table 4.1 presents the details regarding the growth in capacity utilization for both public and private industries during the period 1975-88. This trend shows negative growth rate (-1.35) in public sector. Yet, the public sector record is relatively better than that of the private sector (-7.17). (see also graph 4.1 which shows the capacity utilization indices for both the sectors).

Table 4.1
Growth in Capacity Utilization for State Public Sector and Private Sector(Annual Average%)

Industry	Public	Private
Electronics	-0.11	16.90
Engineering	5.01	-7.99
Electrical	17.02	1.11
Chemical	-2.13	-8.21
Textiles	2.14	-6.86
Ceramics	-2.01	0.98
Agro-based	-0.11	9.00
Wood-based	-7.10	-7.00
Mfg.as a whole	-1.35	-7.17

Source: Calculation based on the combined balance sheet of the sample companies.

Coming to industry-wise details, a similar trend is seen in the Chemical industry. In the case of Electronics and Agro based industry private sector recorded a positive growth rate, whereas the public sector registered a negative growth. Engineering and Textiles industry in public sector show correspondingly 5.01 percent and 2.01 percent growth which is significantly higher than the negative growth of (-7.99) percent and (-6.86) percent respectively of private sector. Wood-based industry showed negative growth rate for both the sectors. On the

other hand, Ceramic industry showed a growth of 0.98 per cent in the private sector whereas, state public sector recorded a negative growth rate of (-2.01) percent. In Electrical industry public sector showed a significant growth rate of 17.02 per cent in capacity utilization against the private sector which showed a growth rate of 1.11 per cent.

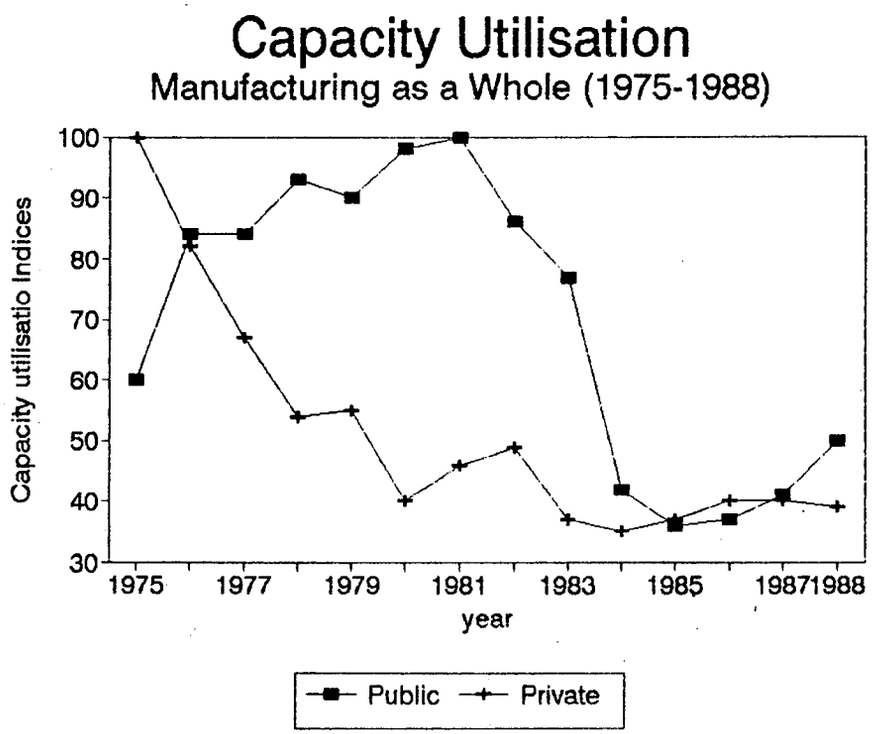
When we differentiate the trend into two time periods, it is seen that the capacity utilization of state public sector recorded better performance in the first phase (1975-1981). See table 4.2.

Table 4.2
Inter-temporal Variations of Capacity Utilization of State Public and Private Sectors
(Annual Average%)

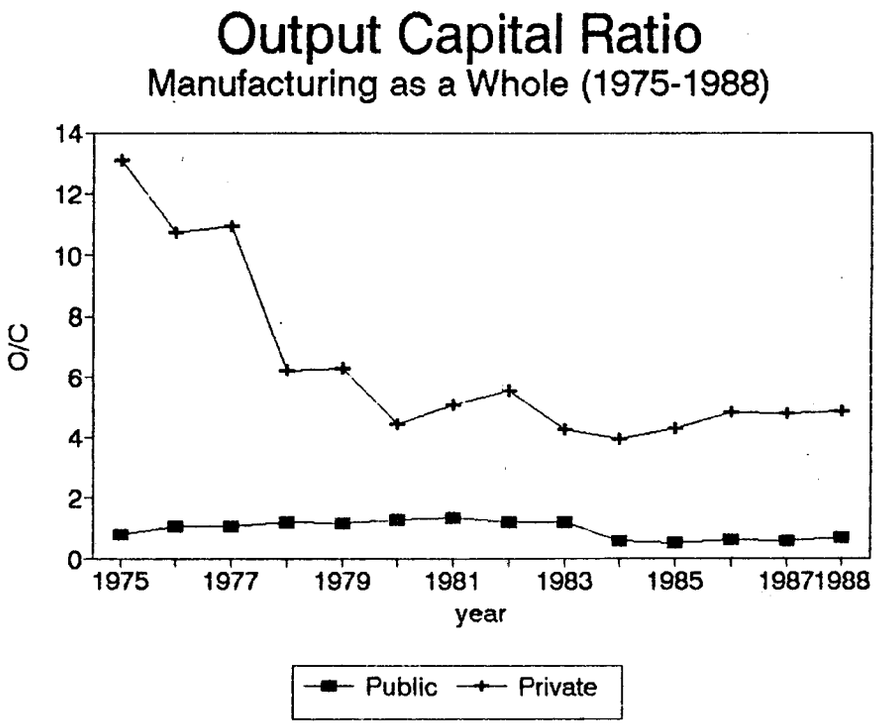
Industry	public		Private	
	Phase1	Phase 2	Phase 1	Phase 2
Electronics	-14.90	13.10	5.82	27.03
Engineering	10.00	2.10	6.90	-19.79
Electrical	42.87	-4.03	12.00	-8.10
Chemical	9.13	-11.00	-16.21	-2.14
Textiles	-3.00	5.10	-9.22	-5.30
Ceramics	2.12	-5.30	0.90	1.01
Agro-based	3.14	-1.20	16.03	2.00
Wood-based	-12.10	-3.02	-13.79	-1.01
Mfg.as as a whole	8.65	-9.93	-13.05	-2.14

Source: as in table 4.1.

Graph 4.1



Graph 4.2.a

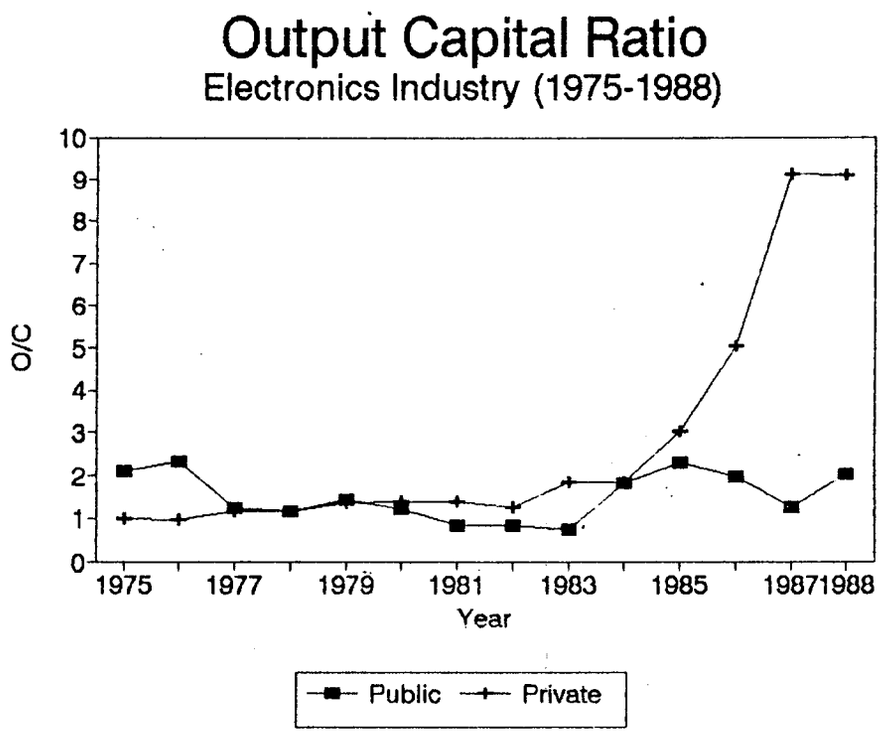


On the other hand though private sector recorded negative growth, it showed relatively better performance in the second phase. The same pattern got reflected in Chemical, and Ceramics industries. In the case of Engineering,Electrical Agro-based industries, both the sectors showed slower pace in the second period compared to the first period. In contrast, Electronics and Wood-based industries showed relatively better performance in the second phase as compared to the first.

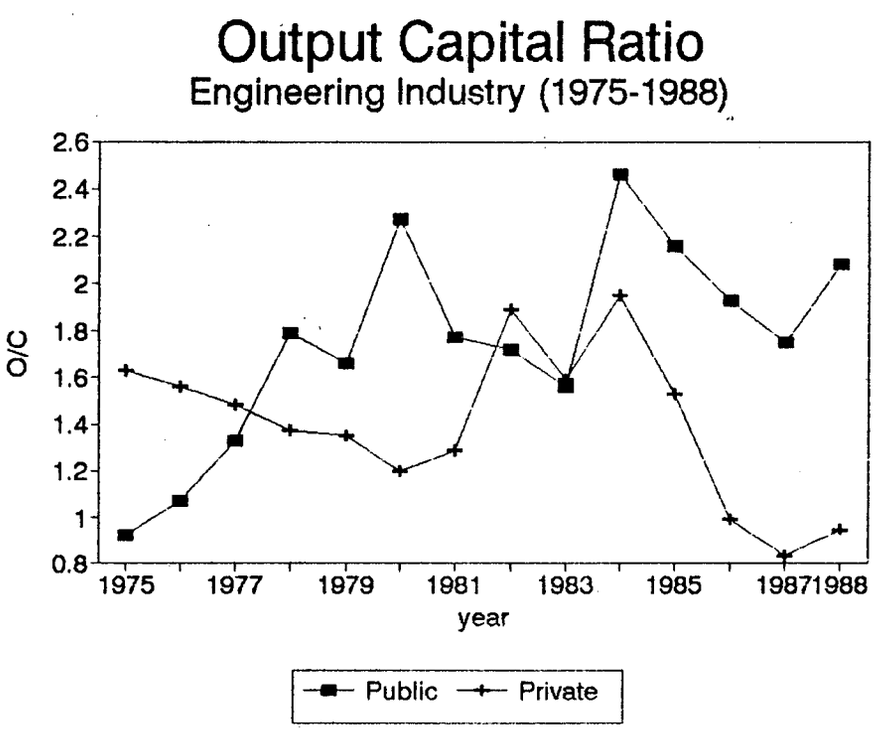
As mentioned earlier,the NICB, method has a major limitation in the sense that it does not capture the differences in the relative levels of operation. For example, the average output capital ratio for the manufacturing public sector was at a level (0.96) lower than that of private sector (6.4). This ratio was also found to be maximum (0.59) during the period 1981 for state public sector whereas private sector showed highest value during 1975 (see figure, 4.2.a).

Inspite of the wide divergence in the output-capital ratio, it is possible for both state public and private sectors to give very high capacity utilization levels. Hence a better understanding of their relative performance presupposes an examination of the levels of capacity output ratio for different industries (see table 4.3).

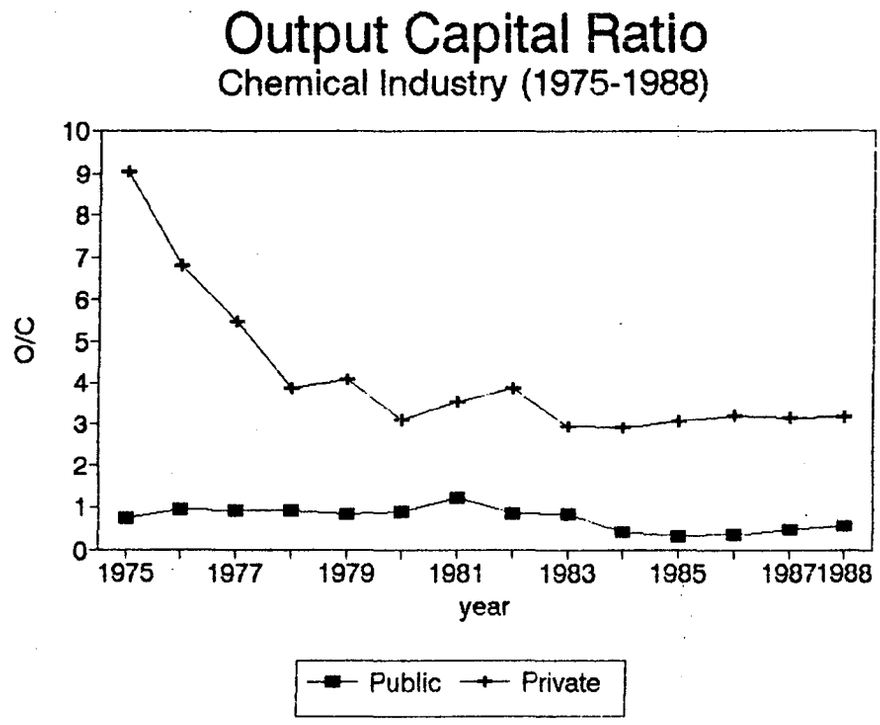
Graph 4.2.b



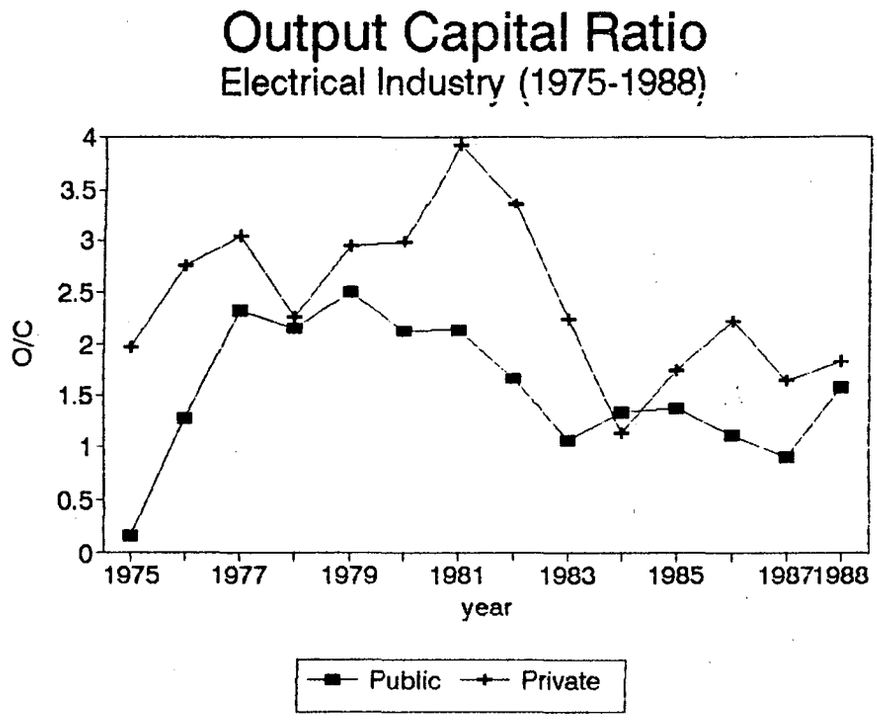
Graph 4.2.c



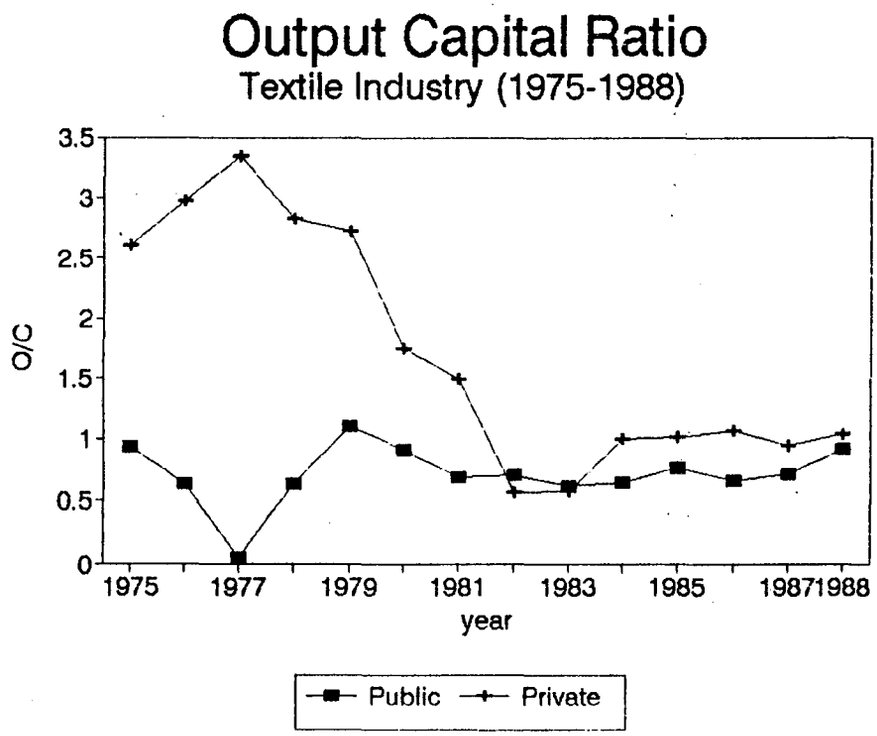
Graph 4.2.d



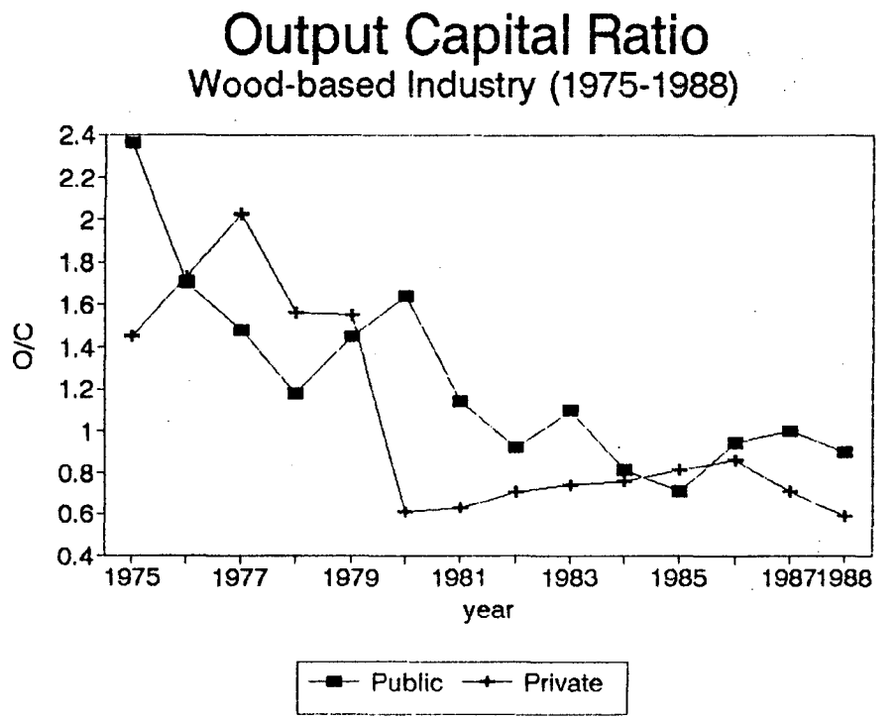
Graph 4.2.e



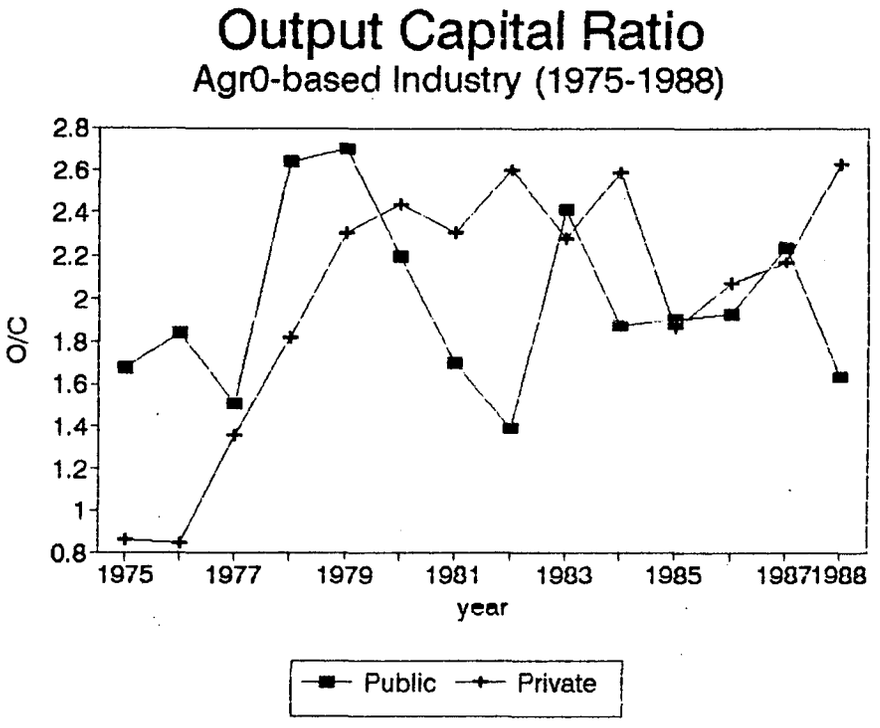
Graph 4.2.f



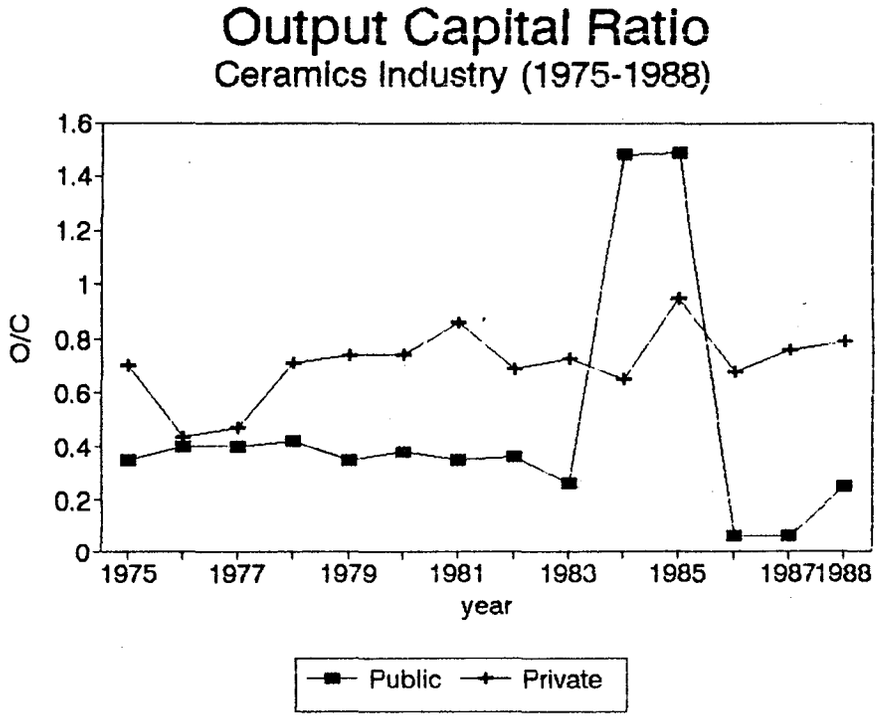
Graph 4.2.g



Graph 4.2.h



Graph 4.2.i



The industry-wise estimates of the average output-capital ratios over the entire fourteen year period revealed significant variations in the physical performance such that it reflected low ratios in public sector as compared to private sector except in Agro-based and wood-based industries. Chemical industry showed the same pattern in both the sectors. By observing the available information, we can explain the reason for sharp decline of output-capital ratio during the second period. This is partly due to the new arrival of large size firm and partly by new investment in the existing plant (see figure 4.2.d).

Table 4.3
Average Output Capital Ratio in the State Public and Private Sector Manufacturing Industries in Kerala

Industry	Public			Private		
	1975-88	Phase1	Phase2	1975-88	Phase1	Phase2
Electronics	1.52	1.48	1.57	2.83	1.20	4.50
Engineering	1.74	1.55	1.95	1.40	1.41	1.38
Electrical	1.66	2.08	1.29	2.43	2.84	2.03
Chemical	0.74	0.96	0.55	4.16	5.13	3.18
Textile	0.72	0.71	0.72	1.71	2.52	0.89
Ceramics	0.47	0.38	0.57	0.71	0.66	0.76
Wood-based	1.24	1.56	0.71	0.66	1.35	0.75
Agro-based	1.98	2.04	1.92	2.01	1.70	2.30
Mfg.as awhole	0.96	1.14	0.79	6.40	8.12	4.67

Source: as in table 4.1.

The average output-capital ratio of Engineering industry for the period as a whole showed relatively better performance (1.74) for public sector as compared to private sector (1.41). Also from figure (4.2.c) it is seen that this rate

has gone up marginally till 1984 and afterwards it started declining. In the case of Electronics industry, this ratio was 1.52 for state public whereas it was 2.83 for the private sector. But from figure 4.2.b it is clear that public sector performance is better than private till 1984. This ratio reached maximum in 1976 in public sector, whereas it was maximum during the year 1987 in the case of private sector. Coming to textile industry, the average ratio for state public sector was 0.72 whereas in the case of private it was 1.71. But the ratios which we have plotted in figure (4.2.f) showed a cyclical trend throughout the study period for state public sector whereas that for the private sector maintained an increasing trend only upto 1977.

We also observe (see figure 4.2.e) that the ratio for output capital of Electrical industry reached the peak level during 1979 for the state public sector and that for the private sector by 1981. This ratio in the case of Ceramic industry reached the maximum level by 1985 for both state public and private sectors (see figure 4.2.i). Wood-based industry showed better performance for state public sector as compared to private sector. This ratio started declining since 1975 onwards for state and 1977 for private sector (see figure 4.g).

There was hardly any difference in the trend in output capital ratio as between public and private sector in the case of Agro-based industry. The only difference between these two was that while the peak level for the public sector was reached by 1979, the same in the private sector was reached by 1987 (see figure 4.h).

Next, we look into the utilization indices so as to bring out the factors that differentiate state public from private sectors in general and industry-wise in particular. It can be seen that the average utilization rates estimated for the public sector (70 percent) was greater than that for the private sector (52 percent). Further, to make a comparison of utilization indices between these two sectors, we have measured coefficient of variation which can also be called as instability coefficient of these indices over the period of time (see table 4.4).

Table 4.4
Size Class Distribution of Industries in Terms of Mean and Coefficient of Variation

CV	<10	10-20	20-30	30-40	40-50	>50
Mean						
>80						
70-80		Ceramic2 Agro-based1	Engineering1&2 Agro-based2			
60-70			Electrical2	Textile1 Electronics1 Chemical1	Electrical1	
50-60				Wood-based1	Wood-based2	Textile2
40-50					Chemical2	
<40						Ceramics1 Electronics2

1 -represents private sector,
2 - represents state public sector,
C V = Coefficient of variation of index of capacity utliisation.
Mean =Average of capacity utilization indices for 14 years.

Source: as in table 4.1.

An analysis of these indicators has made it clear that public enterprises are more efficient than the private sector firms in utilizing their capacity.

A classification of industries on the basis of mean and coefficient of variation of capacity utilization are given in table (4.4). By referring to the instability coefficients across the industries, a diagonal spread of industries can be observed which can be interpreted to mean that those industries having higher degree of capacity utilization represents lower degree of coefficient of variation.

From the table 4.4, it is seen that Engineering in both the sectors and Agro-based industry in private sector showed an average capacity utilization between 70-80 percent along with 20-30 percent coefficient of variation. Electrical industry in private sector followed average capacity utilization between 60-70 per cent with 20-30 percent coefficient of variation. Textiles, Electronics and Chemical in the public sector comes under the same range but shows more temporal variations between 30-40 percentage coefficient of variation. Wood-based industries in both the sectors and textile industry in private sector followed average capacity utilization 50-60 with coefficient of variation between 30-50 percent respectively. Ceramics in state public sector and Electronics industry in private sector recorded very low capacity utilization range with very high coefficient of variation (around 90 per cent).

Table 4.5 gives a comparison of the average capacity utilization indices of all industries as between the two phases (1975-1981) and (1981-1988). The period of analysis revealed (4.5) that the capacity utilisation went down in the second phase for both the private and public sectors. We observe the same

Table 4.5

Capacity Utilization Indices in the State Public Sector and Private Sector (1975-1988)

Industry	Public		Private	
	Phase1	Phase2	Phase1	Phase 2
Electronics	64	67	13	19
Engineering	62	79	72	71
Electrical	72	51	70	61
Chemical	76	45	56	35
Textiles	60	67	75	26
Ceramics	25	40	83	70
Agro-based	75	71	64	88
Wood-based	66	38	67	36
Mfg.as a whole	86	53	63	39

Source: as in table 4.1.

pattern in the case of Chemical,Electrical and Wood-based industries. But in the case of Electronics and Engineering industries the second phase showed substantial growth in capacity utilization. Textiles, and Ceramics industry showed improvement in capacity utilisation in public sector whereas it came down during the second phase in the private sector.

Explanation For Capacity Utilization

We shall now try to explain the determinants of the capacity utilization in the manufacturing enterprises among state level public and private sector in Kerala. There are several

factors that determine capacity utilization. These can be grouped broadly into six categories[12]:

1. Technological Factors,
2. Supply Factors,
3. Demand Factors,
4. Economic Organization and Infrastructure,
5. Non Economic Factors,
6. Macro Economic Policies.

Technological characteristics of the production process influences the capacity utilization. But this kind of influence is not absolute. The concept of capacity utilization relates to the way in which the fixed capital is used together with other factors of production. A producer may decide to overbuild plant capacity because of economies of scale. The cost of a little idleness now will be more than compensated by fuller utilization and higher profits later. Indivisibilities in the factors of production also affect the extent to which fixed capital can be utilized. One kind of indivisibility in capital use relates to the under utilization of pieces of equipment. The indivisibility of entrepreneurship and management also creates particular problems in developing economies. In the present study we have used the ratio of fixed capital stock to labour as a proxy variable for technological factor.

Other factors which might affect capacity utilization are demand and supply. On the demand side, we expected possible

relationship between capacity utilization and finished goods inventory- sales ratio. When inventory sales ratio is low, capacity utilization will be high and vice versa. We have selected the ratio of the change in the inventory of finished products per unit of output as a proxy for the demand factor.

Thus, demand factor is measured as

$$\frac{\text{(Inventory of finished goods/output)}_t}{\text{(Inventory of finished goods/output)}_{t-1}}$$

The supply factor determinants such as availability of raw materials, power &fuel and working capital would affect utilization rates.Here we have used availability of working capital as a proxy for supply factor.

The relative availability of working capital is measured as the ratio of the working capital intensity (working capital per unit output) over successive years:

$$\text{Availability of working capital} = \frac{\text{(Working capital/output)}_t}{\text{(Working capital/output)}_{t-1}}$$

The wage rate prevailing in an industry also influence capacity utilisation. A higher wage rate is likely to motivate labor to work more efficiently resulting in better utilisation of capital stock. Wage rate can be measured by dividing total emoluments by number of employees. Gross value added also influences capacity utilisation. It infact indicates the ability to exploit economies of scale in technology and management and thus to operate at higher levels of utilisation.

There are organizational factors like size of the firm, influences capacity utilisation. Non-economic factors as social,cultural, and institutional factors and macro policy also can affect capital utilisation movements.

We have postulated a linear relation between capacity utilisation and the first four factors (as technology, demand, supply and organizational factors) discussed above with different proxies to represent each explanatory variable and fitted a multiple regression equation and the corresponding equation used in the study as of the following type.

$$CU_t = a_1 + b_1 I_t + b_2 S_t + b_3 D_t + b_4 V_t + B_5 W_t + V_t$$

where

I_t = Capital intensity,

s_t = Supply factor,

D_t =demand factor,

v_t =gross value added,

W_t =Wage rate, and

V_t =error term.

This equation is separately fitted both for state public sector and private sector by applying the OLS method. Regression estimates both for the public sector and private sector are given separately in table 4.6 It is seen from the regression estimates that there exists an inverse relationship between capacity utilisation and capital intensity for both public sector and

private sector enterprises. None of the other postulated relationships are found statistically significant, commonly for both the sectors. In the public sector alone, however the variation in wage rate is found capable of explaining to some extent the variation in capacity utilisation indices.

Table 4.6
Regression Estimates

Dependent variable:	Index of capacity utilisation	
Explanatory variables	Estimated coefficients	
	State public	Private
Constant	42.7658(1.9116)**	45.2286*
Capital-intensity	-0.0006(-6.1204)*	-0.0003*
Demand factors	16.0758(1.8654)**	0.2706
Supply factors	10.2664(0.5486)	-15.9312
Gross Value added	-5.6490(-0.0131)	1.4790*
Wage rate	6.1690(2.8462)*	-8.3250
$R\text{-}BAR^2$	0.8867	0.8574
F	19.7848	15.4296
Durbin-Watson stat	1.0997	1.9553

Notes:
* represents at 5 per cent level
** represents at 10 per cent level

Further we see a positive relationship between capacity utilisation and demand factor in the public sector. In the case of private sector, apart from the capital intensity, the only postulated relationship that is found statistically significant is the one between gross value added and capacity utilisation.

Summary

To summarise the main findings relating to the trends in capacity utilisation in the public sector as compared to the private sector, we have noted that the average ratio of capacity utilisation indices for fourteen years is found to be relatively higher for state public sector as a whole and in some industry-groups (viz. Electronics, Chemicals and Textiles) as compared to the private sector. Further, we have observed a cyclical pattern in the movement of capacity utilisation indices over time in the state public sector whereas, the private sector showed a declining trend throughout the period of study.

As for the determinants of the capacity utilisation we have observed an inverse relationship between capital-intensity and the utilisation indices both in the public sector and in the private sector. The observed positive relationship can probably be explained by the fact that after a certain point, the increase in capital-labour ratio simply cannot raise utilisation proportionately any further. The variation in capacity utilisation indices in the public sector alone to some extent is related to the wage rates and the demand factors; the situation has not been so with respect to the private sector. On the other hand, the multiple regression analysis incorporating supply factors proxied by working-capital has failed to derive any statistically significant inference regarding the relationship between supply factors and the capacity utilisation either in the public sector or in the private sector. If one tends to generalise the problem of capacity utilisation in the

manufacturing sector in Kerala is certainly related to the nature of technology (proxied by capital intensity) and is more demand-determined than constrained by the supply factors.

Notes and References

1. Klien and Long,1973, PP,743-756.

2.Bent G. Hickman,1964, PP,529-549.

3.Frank de Leeuw, 1962, PP,320-329.

4. Matthew D.Shapiro,1989, pp,181-241.

5.Matthew,1989, Opcit.

6. E.Chamberline 1938,

7. Malenbaum and Helen ,1969

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Chapter 5

FINANCIAL PERFORMANCE

Earlier chapters attempted to understand the physical performance of state public sector enterprises in a comparative framework with the private sector. This involved an examination of trends in such aspects of physical performance as growth in output, capital and labour factor productivity, and capacity utilisation of the enterprises.

Our analysis of the physical performance of the sample companies of the manufacturing sector in Kerala for the period 1975-1988 revealed that, first, in terms of overall performance as measured through growth in output and value-added, the state public sector fared better than the private sector as a whole. Individual industry-wise, this was true in the case of Chemical, Engineering, and Electrical industries -- the three major modern industries in Kerala. Second, it was seen that the state public sector demonstrated better productivity trends than the private sector. The total factor productivity growth as well as partial productivity trends hold the public sector in better light as against the private sector as a whole and in most industries. Third, it was observed that with respect to capacity utilisation, the state public sector enterprises outstripped the private sector in general though there were variations across industries.

A better growth performance in terms of factor productivities normally implies economies of scale, better

capacity utilisation, and lower cost per unit of output all of which in turn would mean larger margin of profits, ceteris paribus. Conversely, higher profits make for better growth. For, higher profits provide higher internal savings as well as facilitate greater access to the capital market. The association between growth and profitability, has been well established in theoretical literature and its empirical validity has been tested in the context of several countries including India[1].

The present study may now proceed to examine to what extent the relatively better physical performance of the state public sector gets reflected in its financial performance. In other words, does better growth performance of enterprises translate itself into higher profitability and better financial status in the state public sector as compared to private sector? Here, it is important to remind ourselves of an observation made earlier. While the state public sector shows relatively better growth performance as compared to the private sector, the absolute level of factor productivity of the former is still lower than the latter. Further, it is plausible that even the realized physical performance does not yield corresponding financial results. Such "erosion" of the gains of physical performance could occur on account of poor financial management, constraints of the markets, deficiencies in overall management and so on.

To elaborate the point, it is more generally accepted that often there is a conflict between the objectives of a public sector enterprises as an economic unit, and the political

considerations that enter into the decision-making processes within the firm that shape its management[2]. Employment, investment and pricing decisions in the private sector enterprises could be made without due consideration of their financial consequences. This could give rise to a situation where financial performance of a firm fail to reflect its attainments in physical performance. And also, this could mean the creation of a situation, wherein the long run physical performance, itself is ruined. However, it should be stated that the exact impact of a political environment on the financial performance of the state public sector as a whole as compared to the private sector is a complex one. Hence, we intend to confine ourselves only to an overall assessment of financial performance of the public sector vis-a-vis the private sector.

An exercise which forms an integral supplement to the above analysis, is the examination of industry-wise financial performance. For, it is quite possible that considerable variations exist between different industrial groups which may have got ironed out in the overall analysis. Industry wise supplement to the analysis of the State level public and private sector enterprises as a whole would have, of course, been ideal, since the economic behavior of each firm can vary greatly between individual industries.

The main measure used to evaluate financial performance is the profitability. Since any one ratio taken alone may cloak the strength or weakness of others, we have made use of two types

of profitability ratios. One is the return on total capital employed and the other is the return on the owners fund. The first one is the gross profit worked out as percent of total capital employed. Here the gross profit is estimated as the surplus before making provision of interest payment, depreciation and taxation. The second ratio is net profit worked out as percent of net-worth. Here, the net profit is the surplus net of all payments including the taxation. It is the surplus funds that accrues to the owners of the enterprises which in the case of the public sector is the government and in the case of private sector corporation the share-holders. Net-worth is the sum of paid-up capital and reserves.

Each of the ratio is estimated from the combined balance sheet of the sample companies for fourteen years between 1975-76 and 1988-89. Interpretation is based on the annual average ratio for the whole period. The ratios are weighted averages worked on the basis of methodology explained earlier in chapter2.

Among the two ratios under consideration, the ratio of gross profit to capital employed seems to be the key ratio for a public enterprises[3]. For, this ratio could more efficiently capture the productivity of the total capital (resources) employed in the manufacturing operation during a given period. This measure of profitability indicates the efficiency of activities of the enterprises in generating the total surpluses by using the total capital invested (working capital + total fixed capital). The significance of using capital employed in the

denominator emanates from the pattern in which capital is mobilized in the public enterprises. A smaller value of the ratio indicates a lower degree of efficiency in the utilization of total resources including the borrowed funds (credit capital) invested in the enterprise. In a sense, a higher value of this financial ratio reflects the higher physical efficiency (e.g, higher productivity growth) in the operation.

The second profitability-ratio i.e, the net profitability ratio measures the investor's rate of return in the form of dividends and profits retained in the business on owner's funds comprising of the paid-up capital and the accumulated profits/loss of the enterprise during past years. This is a key ratio to judge the overall financial performance of the private sector enterprises in asmuch as it represents the private rate of return to investment. In theory, the enterprise in the private sector seeks to maximize this rate of return. In the public sector, however, the motivation in theory need not confine itself to the maximization of the net profitability. Yet, as argued in an earlier chapter, it is necessary, that the state public sector enterprises perform financially well at least in manufacturing activities in order to ensure a smooth continuation of their operation, modernization, expansion of activities in which they are engaged in, and also ensure growth through diversification without being a drag on the state exchequer. In fact, the enterprises are expected to contribute to the general funds of the State exchequer, which made original investment in these enterprises.

The estimates of the weighted average profitability ratios as defined above for the public sector and the private sector as a whole and for each of the eight industry-groups are given in table 5.1.

Table 5.1

Profitability ratios of State Public Sector and Private Sector (weighted annual average (%) for the period 1975-1988)

Industry Groups	Gross Profit as % of Total Capital Employed		Net Profit as % of Net-wo th.	
	Public Sector	Private Sector	Public Sector	Private Sector
Electronics	6.97	31.65	-16.00	6.77
Engineering	10.32	24.50	-13.02	13.88
Chemicals	29.72	17.21	1.03	-36.00
Electrical	12.09	22.55	-13.21	-5.08
Textiles	-23.70	36.09	-23.00	32.10
Agro-based	9.61	27.21	2.05	8.59
Wood-based	32.72	42.94	-61.00	10.09
Ceramics	85.97	27.39	-40.00	11.41
Mfg.as a whole	28.75	12.75	-20.39	5.25

Source: Calculation based on the combined balance sheet of the sample companies.

The ratio of gross profits to total capital employed reflects relatively better financial performance of the State public sector as compared to private sector as a whole and also in some industries like Ceramics and Chemicals in the modern manufacturing activity in Kerala. However, the financial performance measured in terms of the ratio of net profit to net worth is relatively poor in the public sector as compared to the private sector. We are thus led to conclude that the public sector in Kerala is doing rather well in terms of physical

performance relative to the private sector but has not been able to translate the better physical performance into higher financial profits and positive contribution to the State exchequer. On the other hand, the relatively low net profits (mostly negative profits) make the state public enterprises to seek more often than not outside funds (credit capital) for modernization and expansion as compared to the private sector enterprises.

Overall, the analysis points out the unsatisfactory net financial performance of the public sector both in absolute sense and relative to the private sector. This may not be in any sense a new finding; earlier studies[4] have also underlined the poor financial performance of the State public sector in Kerala. What is striking from our analysis is the poor financial performance of the State public sector despite a better physical performance record as compared to the private sector. Our analysis thus underlines the "erosion" of the gains of physical performance in the State Public Sector.

How can this "erosion" be explained? To put in other words, how can the relatively poor financial performance in terms of net profit to net-worth of the state public sector be explained despite its better track record in the growth of physical performance indicators as compared to the private sector? As commented earlier, there are no easy answers. In the light of the earlier studies dwelling deep into the financial behavior of State public sector in Kerala, it is, however, plausible to hypothesize that the poor financial performance of

the state pubic sector may be due to some peculiar way of financing (strategies) of the operation.

In order to throw some light into this question of the pattern of finance we have looked into the capital structure of State public sector enterprises. We observe that in comparison with the private sector the gearing-ratio is rather high in the state public sector. Further, the negative net profitability of the state public sector enterprises in several industries is due to high debt element in the capital structure. An exercise in rank-correlation between net profitability and gearing ratio (the correlation coefficient being 0.62) reinforced the foregoing hunch about the debt-biased capital structure of state public sector.

Table 5.2

Share of Interest payments in the Total Expenditure.
(weighted annual average (%) for 1975-1988)

Industry group	Public Sector	Private Sector
Electronics	12.46	4.12
Engineering	4.69	9.83
Chemicals	9.44	3.24
Electrical	3.55	9.04
Textiles	5.67	4.97
Agro-based	0.92	3.41
Wood-based	5.18	4.97
Ceramics	13.35	4.36
Mfg.as a whole	8.5	3.21

Source: as in table 5.1

One of the consequences of the financing pattern which is marked by a high gearing ratio of state level public sector has been the sharp escalation of the interest obligations. This

leads to a situation where interest payments account for high share of the total cost in the public sector as compared to the private sector. The table 5.2, which shows the per centage share of interest in the total expenditure illustrates the point.

It appears that where the financing pattern is marked by high gearing ratio, a good part of the real surplus generated by an even "efficient" manufacturing operation may get eroded in meeting the interest obligations. Thus viewed, our somewhat apparently conflicting findings, rather dilemma that the gross profitability (i.e, gross profit before interest,depreciation and tax as per cent of total capital) was higher but the net profitability (i.e. net profit after interest,depreciation and taxation as per centage of net-worth) was lower in the state public sector as compared to the corresponding figures for the private sector stand to the logic of their differential financial management strategies/practices.

Overall, the analysis tends to suggest that the pattern of financing with relatively greater reliance on the loan capital (high capital gearing) is one among the complex set of factors responsible for the poor financial performance despite a better record of physical performance in the State public sector as compared to the private sector in the manufacturing sector of Kerala economy.

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Chapter 6

SUMMARY AND CONCLUSIONS

To conclude this study, which aimed at a performance evaluation of the state public sector relative to the private sector in Kerala on the basis of the comparative analysis of a representative sample of 14 public enterprises from the former and 21 from the later category for a period of 14 years from 1975-1988, we could piece together in this chapter the main findings concerning the physical performance in terms of growth-trends in output, capacity utilisation,productivity and factor use efficiency and the financial performance in terms of the profitability levels.

The popular notion of the poor performance of the state public sector in Kerala was found true in an absolute sense. Interestingly, however, our findings would lend empirical support for rejecting some other popular notions. Among these, the crucial one was the rejection of somewhat axiomatically assumed notion of the better performance of the private sector or inversely, the relatively poor performance of the public sector. Contrary to the notion, the analysis clearly showed that state level public sector enterprises as a whole put forth relatively better performance than the private sector with respect to several physical performance indicators. To recapitulate, the weighted annual average rates of growth of output and value added were comparatively higher in the public sector though the gross fixed capital and employment increased marginally at a higher rate in the private sector for the study period as a whole.

There were however inter-industry differences in the performance record. The public sector scored over the private sector in terms of the growth of the output, value added and fixed capital in Engineering, Chemical and Agro-based industries. The public sector also performed well in terms of the first two indicators (output and value added) in Ceramics and Electrical industries. In Electronics industry, the public sector exhibited better performance in terms of income generation (value-added) though the growth rate of output was rather low in Textiles. In Wood-based industries, the growth rates of private sector in output and value added moved in the same pattern but much better than the public sector.

Coming to the productivity trends the public sector units registered a better performance in terms of the growth of both partial and factor productivity. However the productivity ratio was very low in the public sector as compared to the private sector. Growth of capital intensity was not found to be associated with change in labour productivity. But both in the public and private sector the variation in labour productivity was explained by the difference in the value added. The decomposition exercise shows that the contribution of capital to output growth was more than that of labour in almost all industries in both sectors. The contribution of TFPG as compared to that of labour and capital was higher in state public sector except in the Chemical industry. In the private sector except in these industries viz Electrical, Agro-based, and Ceramics it was capital which made a relatively higher contribution. On the

whole, the contribution of labour to output growth was the least and it was basically capital augmentation that contributed to the growth though marginal of output and income in both public and private sector.

Overall, the public sector scored over the private sector in the physical performance when viewed in terms of capacity utilisation indices during the period of analysis. The analysis of the difference in the capacity utilisation and output capital ratio revealed that the average ratio of capacity utilisation was higher in the public sector than in the private sector as a whole. This was also true in certain industries viz,Electronics, Chemicals and Textiles. Although the capacity utilisation rate was higher in the public sector for the study period as a whole, the growth pattern was cyclical. In contrast, the private sector showed a declining trend throughout.

The analysis of output capital ratio revealed that it was lower in the public sector as a whole and in almost all industries (except wood-based and agro-based industries). A process of relatively higher capital deepening was thus found in the public sector. However, an inverse relation between capital intensity and capacity utilisation was observed both in the public and private sector as a whole and in almost all industries. This could mean that after a certain point, an increase in capital-labour ratio would not increase capacity utilisation any further.

All considered, the state public sector on whole

exhibited a relatively better physical performance relatively to the private sector. In other words, in terms of productive efficiency the public sector was found in better light than the private sector in Kerala. Did the public sector but transform the gains in the physical performance in to higher profits and better financial status? The analysis of financial performance in terms of profitability ratios presented a confusing and dismal picture. The public sector as a whole presented a better record with a higher weighted average ratio of gross profit to total capital employed. Here, the gross profit included funds for interest payments, depreciation,and tax provision. In other words, our analysis found the public sector generating much higher surplus from the manufacturing operation compared to the private sector, but much of it went to meet the obligations on account of interest payments etc, with the result that the net return to the owners (i.e,State) as reflected in the ratio of net profit to net-worth was more often than not negative and lower than the private sector. The analysis clearly showed the "erosion" of the gains of the public sector from the better physical performance. This erosion, the study, attributed to the typical pattern of debt-biased financing and the poor financial management of the state level public sector enterprises.

To recapitulate, the structure of the public sector units demonstrated a high gearing ratio and correspondingly a high interest burden which in turn rendered the net return low and in some cases even negative. This led to a vicious circle that further eroded the profitability resulting further net

losses and accumulating negative net-worth and so-on.

In short, inspite of the several limitations in the structure and organisation of state public enterprises it could stand up on firmer grounds compared to private sector .
To illustrate some crucial aspects of performance such as productivities, gross value added, capacity utilisation, gross surplus generation State sector's record has not been in any way poorer compared to private sector producing similar product mix. Therefor, it can safely be concluded that privatisation is not a viable alternative for the poor financial performance of state sector enterprises.

The above conclusion is derived from a sample study of state sector enterprises. Needless to say due to temporal and spatial limitations we could not fully capture the inherent structural and organisational impediments constraining still better performance of this sector. As stated in the first chapter, many enterprises continue to incur heavy losses, which is only illustrative of the chaotic managerial style of the state sector enterprises. Government, in its anxiety to develop an industrial base of the state, has taken up so many projects, without looking into the financial capabilities and spread its available limited resources so thinly across so many undertakings. The weak capital structure titled towards debt is unable to sustain modernisation and growth culminating in a vicious circle of enhanced interest burden and losses. The study therefore underlines the urgent need for restructuring the financial pattern of state enterprises. In particular, it

can be suggested that government may consider converting a part of government loans into equity in the loss making enterprises so that the higher equity base can be used by these enterprises to obtain additional funds for well formulated programmes of modernisatiion and diversification aimed at turning around the individual enterprises.

Restructuring the pattern of financing can be considered as one of the measures in the total package of approach necessary for the revitalisatiion of the state sector enterprises. It is therefore of utmost importance to address to the questions of streamlining and simplifying the interface between government and enterprise and ensuring effective monitoring of the enterprises by the government. As emphasised by several experts time and again, it is essential to replace the political bureaucratic culture for decision making structure and processes with a management culture. To illustrate, in Kerala's state level enterprises, the interaction between government and the enterprise is through a board of directors on which sit the government representatives often the department secretary is the chairman with senior bureaucrats and politicians as board of directors. Till today the situation did not undergo any change. Therefore, the interface between government and the enterprise is caught in a classical conflict of autonomy and accountability and the system is perpetuated by other in-built disadvantages arising from the lack of professionalisation, discontinuity of leadership etc.

This is not to deny a few initiatives undertaken by government of Kerala to strengthen the organisational aspects of enterprises such as establishment of public Enterprise Board in 1979 and Bureau of Public Enterprises in 1982 with the objective of evaluation, monitoring and co-ordinatiion of enterprise activities. But it produced only limited results because these nodal agencies possessed neither adequate experience nor technically qualified personnel. Moreover, decision making regarding the new projects etc has mostly been influenced by political considerations and economic rationale in such situations took a back seat. The recent initiatives to introduce organisational innovations like enterprise group (bringing together enterprises in the same sector under the common chairmanship, a substitute for holding companies) may also to be mentioned in this context. There are also initiates to introduce professionalism in management, widening the scope of labour participation in management etc. Some steps are under way is introducing the memorandum of understanding (MOU) in line with the steps undertaken by central government controlled enterprises. Needless to say, unless the range of political bureaucratic influence on the enterprise decision making is delimited, such initiatives may not kindle the necessary growth stimuli and improve productive efficiency of manufacturing activity as well as climate for long-term industrial investment.

Management sensitivity and responsiveness may provide necessary interaction between the structural and organisational aspects of state sector manufacturing enterprises in Kerala. However, as is obvious from the analysis, to the extent that both

state and private sectors were found wanting in performance it tells upon the inefficiency of manufacturing operations in Kerala. The responsibility of the government is greater today in assuring productive efficiency of manufacturing industry. As already mentioned in the introductory chapter, the major effort by the state to accelerate industrialisation with a diversified structure so as to improve the regional industrial efficiency is necessary and a very important condition of economic growth of the region. How far this should be carried out and what strategy is to be followed for diversifying the industrial structure are the major planning and policy issues now. May be, the efforts of the government should primarily be directed towards ensuring inter-industry linkages, agglomeration economics, technological modernisation etc. that will improve the region's cost effectiveness in the manufacturing industry. This study in particular underlines the case for a vigorous state initiative in the above direction.

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