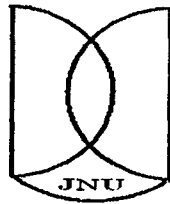


**REGISTERED MANUFACTURING SECTOR IN INDIA:  
AN ANALYSIS OF GROWTH, PROFITABILITY AND  
INVESTMENT**

Dissertation submitted to the Jawaharlal Nehru University in partial fulfillment of the requirements for the award of the degree of

**MASTER OF PHILOSOPHY**

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## 2-Digit Industry Code

- 20- Manufacture of food products
- 21- Manufacture of other food products
- 22- Manufacture of beverages, tobacco, and related products
- 23- Manufacture of cotton textiles
- 24- Manufacture of wool, silk, and man-made fiber textiles
- 25- Manufacture of jute and other vegetable fiber textiles (except cotton)
- 26- Manufacture of textile products (including wearing apparel)
- 27- Manufacture of wood and wood products: furniture and fixtures
- 28- Manufacture of paper and paper products and printing, publishing and allied industries.
- 29- Manufacture of leather and leather products, fur and leather substitutes
- 30- Manufacture of basic chemicals and chemical products (except products of petroleum and coal)
- 31- Manufacture of rubber, plastic, petroleum and coal products, processing of nuclear fuels.
- 32- Manufacture of non-metallic mineral products
- 33- Basic metal and alloys industries
- 34- Manufacture of metal products and parts, except machinery and equipments
- 35- Manufacture of machinery and equipment other than transfer equipment (and excluding manufacture of scientific equipment, photographic / cinematographic equipment and watches and clocks)
- 36- Manufacture of machinery and equipment other than transfer equipment (and excluding manufacture of scientific equipment, photographic / cinematographic equipment and watches and clocks)
- 37- Manufacture of transport equipment and parts
- 38- Other manufacturing industries (including manufacture of scientific equipment, photographic / cinematographic equipment and watches and clocks)

Chapter-1

***Introduction***

## INTRODUCTION

In a developing country like India, the manufacturing sector plays an important role in the over all economic development. Many countries have experienced rapid economic growth over last two hundred years or so, due to rapid industrialization. So industrialization in one sense a process, which has invariably, been the outcome or, accompaniment of economic development. In other words, industrialization denotes a set of policies, seen as a means towards economic development. The contribution of manufacturing sector to GDP in economically developed countries has been much higher than primary sector. In case of India also it is true. The contribution of manufacturing sector to GDP has increased over years.

The process of industrialization has been a striking feature of the Indian economic development. In order to become an economic superpower, India needs to accelerate its growth rate continuously for the next decade or so. For such a high level of sustained growth, the manufacturing sector has to contribute a lot. The success stories of the economies of Asian countries like Korea, Malaysia, Thailand, Taiwan and China<sup>1</sup> show that it is the manufacturing sector that is responsible for higher economic growth. It not only creates wealth but also absorbs and retains the same within the economy.

The world experience so far shows; growth and development has received a big boost, where development of industrial sector has followed a rational, well-coordinated harmonized path and policies. Better management of industrial growth has a positive effect on the economy. Generally it has been seen that, countries having higher per capita

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<sup>1</sup> Share of the manufacturing sector in India's GDP is around 17% while in case of China it is around 35% of the GDP and in the case of Korea it is 31% (FICCI, 2005).

income are industrially more advanced and countries those falls in low per capita category are predominantly confined to agriculture.

From the above discussion it is evident that, manufacturing sector plays a very crucial role in the over all growth process. This is true in case of India as well. In recent past its contribution to the over all GDP growth is quiet substantial. Being the second largest sector in terms of its contribution to GDP, it also provides a sizeable employment and has been a major source of revenue collection for the government. So with this brief background it becomes interesting and important to study the Indian manufacturing sector. Our study mainly focuses on two broad issues like, growth and profitability relationship and the pattern and the determinants of investment in the Indian registered manufacturing sector.

Profit plays a very important role in the over all growth of the manufacturing sector. Profit generally refers to the difference between the total revenue occurring from the sale of a commodity and the total cost in producing it. It is taken as a measure of performance of an industry or sector. The importance of profitability (rate of profit) becomes very visible as the as the retained earning (profit) remains a major source of investible fund (Balkrishnan, 2003), which in turn leads to the growth of the industry.

Investment is another important component of rapid economic growth. The investment in manufacturing sector determines several key factors like productivity, wage rate, profit and employment and also the over all growth. In a highly globalised world where markets are well connected; investment becomes a crucial instrument in making the manufacturing sector globally competitive. In case of the Indian manufacturing sector, investment has a huge role to play so far as its growth and global acceptance is concerned. So it becomes extremely important to look at the investment behavior in the Indian manufacturing sector.



## **1.1 Development Policies and India's Industrial Development**

After independence, Indian followed centralized planning system for rapid industrial development. The most important features the development policies, which came out in the initial periods of independence, regulation and control of private enterprises, state ownership, trade protection etc. Industrial development under the centralized planning during the post independence can be broadly divided in to four phases.

*Phase-I* covers the period from 1951 to 1965 (first three plans), laid emphasis on establishment of heavy and strategic industries. The second plan based on 'Moholanabis Model' emphasized on heavy industries. So during that period huge investments were made in iron, steel, engineering and machine building industries.

It is during this time, industrial policy resolution 1956 was passed. The main features of the 1956 industrial policy resolution are; (i) new classification of industries. According to the new classification, schedule-A reserves seventeen strategic industries in the domain of the state. Schedule-B includes twelve industries that progressively state owned and schedule-C includes the rest of the industries for private initiative and enterprise. (ii) Non-discriminatory treatment for the private sector. (iii) Encouragement of small-scale enterprises. (iv) The resolution recognized the need for foreign capital and enterprise to attain rapid industrial development.

*Phase-II* covers the period from 1965 to 1980. This period happens to be a most difficult time in the history of Indian industrialization process. It marked a period of stagnation in the industrial growth. There was a sharp decline in the manufacturing growth rate. In 1977, a new industrial policy resolution was announced in order to put the industrial sector back on the track for higher growth. The main features of the policy were; (i) the policy emphasized for the promotion of the cottage and small scale industries. (ii) the policy envisaged to curb the big industrial houses and on the concentration of economic power and (iii) entry of foreign technology was allowed.

*Phase-III*, covers period from 1980 to 1991. This happens to be the recover period of the Indian industry. During sixth plan (1980-85), the industrial growth increased to 6.4 percent per annum. During the seventh plan (1985-90) it increased to 8.5 percent. Certain factors are responsible for the recovery in the late eighties. According to Ahluwalia (1991), " it is because of better technology and intermediate material imports as well as more flexible in the use of installed capacity with a view to enabling easier supply response to changing demand conditions and reducing the domestic barriers to entry and expansion to inject a major of competition in domestic industries". Another reason would be the increase in the prosperity of the labor leading to increasing demand for industrial products and finally it is due to increased government expenditure in all services in eighties.

Until the early 1980s India followed a path emphasized more on inward economic policies. The moment the steps were taken to liberalize the economy, it faced the balance of payment crisis situation. In order to over this problem introduced a structural reform programme, aimed at stabilizing the economy and promoting reliance on market mechanism known as "*Economic Reforms*". The main components of the economic reforms were exchange and trade liberalization, financial sector reforms etc.

Introduction of economic reforms in 1991 was not something new for India. Before that, reform process was initiated in nineteen seventies and in late eighties. But they were essentially crisis driven. The momentum disappeared as the immediate crisis was over. In a sense the reform process initiated in 1991 had underpinnings of the above-mentioned motivations. Some of the important developments after the introduction of the economic reforms in 1991 have been discussed in the followings. On industrial policy the statement issued by the govt. of India on 24<sup>th</sup> July 1991 emphasizes more to make the Indian industries more competitive in the changing global scenario<sup>2</sup>. Changes in industrial policy resulted in the introduction of changes in the policy relating to industrial licensing,

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<sup>3</sup> Govt statement (1991)" the attainment of technological dynamism and international competitiveness requires that enterprises must be enabled to swiftly respond to fast changing external conditions that have become characteristics of today's industrial world. Govt

foreign investment, technology import, ownership and special control over very large private enterprises.

- On licensing policies; the industrial policy abolished licensing in all industries except 18 industries those are matter of high concern. But subsequently they have been delicensed. Industries in which licensing continues to prevail are alcohol, tobacco product, defense equipments, industry explosives and hazardous chemicals.
- On public sector policy; govt abolished the monopoly of the public sector industries except those where security and strategic concern still dominates.
- On financial investment, the NIP1991 allows FDI to come and invest. No approval is required and FDI inflow up to 14 percent of the equity in any Indian firm. In some sectors the FDI cap limits have been raised to 51 and 74 percent.
- Changes have been made in the import licensing policy.
- On tariffs, import tariffs have been reduced following the Chelleiah committee (1992) recommendations.

On public sector policy steps have been taken for privatization of the public sector units for better management.

Phase-IV covers the time period from 1991 onwards. After the introduction of economic reforms, the manufacturing sector witnessed a declining trend in its growth rate. In the mid nineties, the manufacturing sector experienced a slowdown. But again after 1996-97, industrial sector started recovering.

### **1.2 Explanation: 1970's, 1980's and 1990's Scenario**

Shortage of sufficient food and foreign exchange has been widely regarded as the long-term constraints on India's economic growth. In late 1970's India could able to have surplus food and foreign exchange stocks for few years. In 1980's there was considerable gloom about the immediate prospects for industrial growth; in spite of surplus food and

foreign exchange stock. According to Nagraj (2003), a variety of reasons like lack of industrial demand for industrial goods was accepted to be the principal reason for the relative stagnation since the mid-1960's.<sup>3</sup>

Ahuwalia (1985) and Rangarajan (1982, as cited in Nagraj, 2003); due to inefficient use of resources there was lower total factor productivity growth during the 1970's. The other factors those perhaps attributed for gloom prospect of industrial growth were the oil price and the agricultural price shocks during the late 1970's.

However from 1980 onwards the industrial policy witnessed greater pragmatism with a gradual loosening of government control. The striking feature those government included in the policy changes include import of technology and foreign private capital to modernize the manufacturing sector. On the other side the government also speeded up the infrastructural development projects through rural development programmes.

During 1980's many branches of manufacturing like cement industry, cotton, food processing etc. witnessed modernizations and expansion of scales of production. Manufacturing export growth also improved in the second half of the 1980's.

According to Bhagavati (1993, as cited in Nagraj, 2003) three main elements of India's policy framework that stifled growth and efficiency were, (i) extensive bureaucratic control over production, investment, and trade; (ii) inward looking trade and foreign investment policies and, (iii) a substantial presence of public sector confines of public utilities and infrastructure. Joshi and Little (1994) contended that, India's control system was not only micro economically inefficient but macro-economically perverse; implying that the industrial policy was responsible for persistent fiscal deficits and periodic balance of payments crises. Srinivasan (1993, as cited in Nagraj, 2003) argued that "the reforms were solidly based on an understanding of what went wrong with Indian development

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<sup>3</sup> However some argue the control on output, investment and trade – popularly called as 'Permit license Raj' were responsible by stifling private initiative and wasting public resources.

strategy since 1950's, which delivered neither rapid growth nor appreciably greater equity.

### **1.3 Review of Literature:**

#### **1.3.1 Exploring Growth Profitability Relationship**

Rate of investment is the most important factor affecting the business activity in any economy. Capital accumulation is considered to be a determinant factor in the growth process of the economy. So rate of investment is considered as an important factor influencing economic growth. However, the rate of investment is governed by the rate of profit prevailing in the concerned industries. This implies that there exist some relationship between profitability and growth.

The growth of firm can best be explained if we assume that investment decisions are guided by opportunities to make money; in other words "firms are in search of profits (Frank, 1991). Hence profitability of a concern is considered as a fulcrum ahead, which the entire business activity rotates. It is observed that; a high rate of profit in a particular branch of economic activity attracts new investment. Thus profitability plays a dual role in investment process. In one hand it works as incentive for investment and on the other hand provides a source of investment through internal funds (that is profits). So in this way profitability plays a pivotal role in the growth of the firm, the industry and the economy.

As far the theoretical view is concerned; the traditional classical theory and neo-classical theory are not very much helpful in this respect. The traditional classical theory of the firm with its assumption of perfect competition and *ceteris paribus* tells "there is no relationship between profitability and growth when all the firms in equilibrium and are operating at their maximum size". There may emerge a relationship between profitability and growth in the short run when some or, all firms are not in equilibrium.

The neo-classical theory under its usual assumption of perfect competition gives the same argument. According to the theory “if for some reason some or, all firms are not in equilibrium at any movement of time and are assumed to be moving towards equilibrium, there may well emerge some relationship between profitability. However, the character, strength, and nature of this relationship are in general indeterminate depending as it does on the causes of disequilibria and the speed of adjustment (Kaur, 1996).

But in the recent discussions on the theory of firm<sup>4</sup> have altered the view. The firm is viewed not merely a profit maximizing abstraction but as a unique administrative and social organization, possessing the capacity for initiating its own biological growth (Subramaniam & Papola, 1972).

At present the chief object of a typical firm is to increase its sales. This makes the expansion of the firm’s productive capacity inevitable. However the level of investment depends on two basic factors; the ability of the firm to grow and its willingness to grow. The ability to grow reflects firm’s ability to provide and acquire finance. The provision of finance can be made through internal as well as external sources. The internal source of finance depends on the amount of retained profit and it is the preferred source of finance.

In a growing economy like India’s, high and positive correlation between growth of a firm and its profitability may be expected. Generally in a mixed economy like India; the growth and profitability of industries is affected by government policies. These policies are framed in such a way that profitability is treated as an indicator of financial performance. Hence we can expect there exist some relationship between profitability and growth of an industry in a developing country like India.

There are many studies which link growth of the firm to its profitability. The studies of Doeine (1958), Penore (1954), Marriss (1964) and Baumol (1962) have called attention to other aspects of relationship between growth and profitability; not only does growth depend on profitability, but profitability itself is a function of growth.

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<sup>4</sup> The growth of the firm and the profit in theory has been reviewed in detail in chapter-III.

Empirical studies by Geroski (1997), Goddard, Tavakoli & Jhon O S (2004), Rede (1983), Kaur (1996), Subramaniam & Papola (1975) and Agrawala (1991) conclude a positive relationship between growth and profitability. In some cases the relationship is not significantly positive (weak but positive relationship). Where as studies by Kumar (1985) and Sinha, Varghese and Mishra (2004) conclude there exist a weak correlation between growth and profitability. The above-discussed studies have been reviewed in detail.

According to Mariss (1964), the demand growth curve shows that as the firm attempts to increase the rate of growth of demand for its product; initially it will obtain a higher rate of profit, but eventually profit margin squeezes. The theory therefore says, "In initial stage of growth, growth explains profit".

Brozens's (1970) dis-equilibrium hypothesis says, that profit increases not only from monopoly power but also from adjustment in capacity lagging behind changes in demand.

Geroski. (1997), tested for an empirical relationship between growth and profit directly found that growth equation yield no evidence of an inverse growth profit relationship. A set of panel data was used to estimate it.

Goddard J, Tavakoli & Jhon O S (2004), using recent European manufacturing data set it reports panel estimation of a two equation model for firm growth and profit, which attempts to capture two way causality between growth and profit. The study found that in one hand, current profit is an important pre-requisite for future growth. The data for the study was obtained from Amadeus, a pan European company accounts database. The study was limited to five countries. These are Belgium, France, Italy, Spain and the UK.

Rede (1983); Using RBI data published in "Financial Statistics Of Joint Stock Companies in India" for 23 years, the study found that there exist a positive correlation between

growth and profitability at all India level over the period from 1961-62 to 1973-74. The number of companies included in the 21 Industries were 419 in 1950-51 and 1068 in 1973-74. The study period was from 1950-51 to 1973-74. The study also found that, the industries enjoying high profitability foster growth better than those having low profitability.

Kur (1996); Using time series data for two decades from 1970-71 to 1989-90, the study found that there is a tendency of positive though weak relationship between profitability and growth. Data used for this study was taken from "Bombay Stock Exchange Directory".

Subramanian and Papola (1971); in their study on the Indian chemical industries during 1960-69, found that there exist strong positive relationship between growth and profitability. Assuming a linear dependence of profitability of growth, almost the entire variations among the rates of growth of firms were explained by profitability.

Agrawal (1991); in his study covering the Indian automobile industry for the period from 1966- to 1986-87 found that, there exists a positive relationship between growth and profitability. The study also found that, industry characteristics such as diversification, vertical integration and age of the firm have been important determinants of profitability. The important determinants of growth are found to be product diversification, capacity expansion and gross retained profit. The older firms need to be encouraged to diversify in to other product lines and to internalize production process through vertical integration to improve profitability and growth of the firms in the industry.

Sinha, Varghese & Mishra (2004); found that growth and profitability across industries have a weak co-relation. A firm that has already achieved economies of scale should not expand further to increase profitability but should look at other avenues of growth. If the firm is in a highly concentrated market, then expanding the capacity would help the firm in getting increasing profitability.



Kumar (1985); found profitability explains every small part of growth of the firms in the Indian corporate sector and the sinews of growth seem to have come from other sources. He concluded it on the basis of his empirical study, using Bombay Stock Exchange Directory data for the period from 1969-70 to 1978-79. It seems that the commitment to growth and the ability to perceive growth opportunities and exploit them fully exert an important influence on the growth performance of the firms.

### **1.3.2 Review of Literature: Investment**

The present study focuses on the investment at two digit manufacturing sector in India and across major Indian states. There are several factors those influence the investment decision in manufacturing sector. These are the rate of profit, the rate of interest, availability of internal fund, etc. But so far as the investment in manufacturing sectors of the differential states are concerned certain important factors like location, capital intensity, political climate and infrastructure facilities influence the investment behavior and pattern.

#### **(a) Theories of Investment**

##### **1) New Classical Theory Of Capital Accumulation**

Jorgenson and others propounded this theory. According to the new classical theory the demand for factors of production is responsive to changes in relative factor prices to the price of output (Jorgenson in Tanwar 1978). In other words, the cost of capital induce changes in the investment behavior by changing the implicit rental price of capital services and further the changes in the rental price of capital services lead to changes in the desired stock of capital (Tanawar 1978).

## 2) **The Profit Theory Of Investment**

The central theme of the Profit Theory Of Investment is, “greater the gross profits, greater will be the availability of internal funds for investment”. Some empirical studies have found significant correlation between investment and profit. Eisner found significant correlation between profit and investment.

## 3) **Liquidity Theory Of Investment**

The Liquidity Theory Of Investment says, “desired capital is proportional to liquidity” (Tanawar 1978).

Writing in equation form

$$Kt^* = \alpha Lt$$

Where  $Kt^*$  is the desired capital investment at time ‘t’.

$\alpha$  is the desired rate of capital to the flow of the availability of the internal fund for investment at time ‘Lt.’

Empirical study by Tanwar (1978) found that, the flow of internal fund<sup>5</sup> is significant in affecting the investment in the Indian context.

## 4) **Acceleration Principle Of Investment**

J.M. Clark for the first time propounded the Theory Of Acceleration. According to the Acceleration Principle there exist a direct positive relationship between the rate of change in the flow of output and addition to the stock of capital. Latter on H.B. Chenery

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<sup>5</sup> As mentioned earlier, the availability of internal fund is the net profit.

modified it (as cited in Tanwar, 1978). He considered the level of output instead of the rate of change of output. So the modified acceleration principle assumes a relation between output and capital stock.

The Principle of Acceleration has been examined in various studies. Studies by Krishnamurthy and Shastry (1972) and Tanawar (1978) found that acceleration hypothesis has some validity and is an important determinant of investment in Indian context.

The accumulation of real physical capital stock has long been regarded as one of the major factors of economic development (Wai and Wong, 1982.)The strong relationship between fixed capital formation and GDP growth has been established by many writes. Studies by De Long and Summers Lipsey and Kravis by (as cited in Glomstrom, Lipsey and Zejan, 1996).

So investment plays a significant role in the general functioning of an economy. Wai and Wong, (1982) in their study examined the modified version of the flexible accelerator theory of investment with reference to five then developing countries (Greece, Korea, Malaysia, Mexico and Thailand) for the period from 1960 to 74. They found that government investment; changes in bank credit to the private sector are crucial determinants of private investment in developing countries.

In recent years the share of public investment has declined, whereas the share of private investment has increased. In number studies by Khan and Reinhart (1990), Coueinho and Gallo, (1991) and Sereen and Solimano (1990), (as cited in Khan and Kumar 1997) have concluded that private investment has a larger positive impact on growth then public investment.

But the above studies are small sample studies. A large sample study in this regard has been conducted by Kahn and Kumar (1997). The study based on a sample of 95 developing countries for the period of 1970 to 1990, which accounts for 90 percent of the GDP of developing countries during the late 1980s. The study concluded that, the private investment has a much larger impact than public investment. Delas and Kousi (2001) in their study found that, it's the equity investment rather than the general investment that seems to be in more significant contributor to growth.

### **(b) Determinants**

The majority of the studies shows the validity of acceleration principle and identifies some important determinant of investment. They are capital, profit, rate of interest, size of the market etc (Suresh, 1997).

Keynes (1936) in his book "The General Theory of Employment, Interest & Money" has discussed the role of rate of interest, as a determinant of investment. According to Keynes a rise in the rate of interest discourages the investment activity. This has been empirically tested by Anderson (1934), Resek (1966), Jameson (1975, as cited in Suresh, 1997), and Krishnamurthy (1964, as cited in Suresh, 1997).

The role of profit as a determinant of investment has been widely accepted and confirmed in several studies by Roos (1948), Klein (1951) and Grunfeld (1960, as cited in Suresh, 1997) and Tinbergen (1938). Studies by Hoshae (1991), Band and Meghil (1994) and Tibout (1983, as cited in Suresh, 1997) conclude profit as a major determinant of investment. They found there exist a positive relationship between profitability and investment. Among the Indian studies, Bagchi (1962), Krishnamurthy & Shastry (1975), Sarkar (1970), Siddarthan (1976) and Somayajulu (1977).

In Indian context, using RBI data for the period of 1965-66 to 1986-87; Suresh (1997) found external finance is the most important determinant of fixed investment. He used

Chenery and Poyak accelerated model in his study. Sharma and Salma (2003) using census information for 180 countries in the World Investment Report 2003, UNCTAD conclude that the flow of external finance (FDI) emerges as a function of development, measured by GDP.

The value of farm securities comes out to be the most important determinant of investment Grunfeld's (1960) study.

Sastry (1966); Using RBI data on Public Limited Companies, found fixed investment to be a function of profit, dividend liquid assets, debt equity, the flow of external finance and depreciation reserves. Profitability and the flow of external finance were found to have significant impact on the level of investment.

An empirical study by Krishnamurthy and Sastry (1975) concluded that the financial variables an important role in determining the level of investment. Using data published in RBI bulletin and Bombay Stock Exchange Directory they tried to explain the investment structure of seven important industries like cotton, textile, and jute, chemicals, engineering papers, sugar and cement.

Bagchi (1963); in his study has tried to study the determinants of industrial investment from 1951 to 59. Using RBI data on public stock companies for 27 sets of industries, the study found that;

- The correlation between gross investment and profit variables are found to be greater than between corresponding income change variables and gross investment with single exception of the year 1957 and
- The correlation between gross investment and profit after tax of the year is greater than that between gross investment and profit after tax of the current year.

Using RBI data published in Report on Currency and Finance for 15 years (1950-65) across five industries, Sarkar (1970) found that; the profit-investment relationship was more pronounced than the sales-investment relationship. The rate of interest was found to be another important determinant of investment.

Chakarvarty (2003) using CSO data (ASI) for pre –reform and CMIE data for post reform period conclude that, in case of regional location of new investment the crucial determining factors are, *Continuity* – evidence of a historical process of investment location and clustering- evidence of the role of geography in guiding investment decision. The fundamental questions examined in the study are, where do new industrial investment locate, and what force or factors derive the location decision? Do these investments follow the model of divergence followed by convergence as suggested by Hirschman (1988) and Myrdal (1957) approach of ‘cumulative causation’<sup>6</sup>; Richardson (1973) and Henderson (1988) framework of ‘agglomeration economy’,<sup>7</sup> and Fujita, Krugman and Venables (1999) ‘transport cost approach’<sup>8</sup>? (as cited in Chakravarty, 2003).

From the above analysis it is evident that there exist some kind of relationship between the growth and profitability. It may be positive or negative, weak or strong. As discussed earlier empirical studies conclude different views. Some found positive strong relationship, where as some found weak positive relationship and also some study shows no meaningful relationship between the above two variables. In our study we will empirically study:

- (1) Whether there exists any linear relationship between growth and profitability in the Indian registered manufacturing sector?

In case of investment, maximum studies conclude that, the internal source of finance (profit) plays a major role, which determines the level of investment. Other important factors those influence the investment decision include the flow of external finance, the rate of interest, market structure, govt. policies etc. In our study we will try to find out:

- (2) What are the major factors (determinants) those influence the investment behavior in the Indian registered manufacturing sector?

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<sup>6</sup> The inter- regional inequality ( in terms of regional income or output ) increases during the early years of industrial development, being concentrated in metropolitan areas and begin to decline at some latter immediate point ( Chakraverty,2003)

<sup>7</sup> The tension between agglomeration economies and diseconomies govern urban / metropolitan size and less directly the location of the industry.

<sup>8</sup> A series of ‘increasing return’s model of cities, regions, and industries, where self-perpetuating forces of geographic concentration are supported by and later off-set by declining transport cost.

- (3) At the same time it also tries to find out what is the impact of economic reform in the pattern of investment in the Indian registered manufacturing sector.

At the same time it also tries to find out, the impact of economic reform on the growth and structure of the Indian registered manufacturing sector.

#### **1.4 Objectives**

Mainly the present study investigates the behavior of profitability and the investment in the two digit registered manufacturing sectors across the major Indian states. Particularly it tries to investigate the nature of relationship between growth and profitability in Indian manufacturing sector. It also attempts to study the nature of growth of Indian manufacturing sector at 2-digit level from 1980 onwards. The study has been conducted in both pre and post-economic reform periods. The time period has been divided as 1980-81 to 1990-91 and 1991-92 to 2000-01. The broad objectives of the study are the followings;

- (1) To study the pattern of growth and structure in Indian registered manufacturing sector at 2-digit level from 1980 onwards.
- (2) To study the nature of relationship between growth and profitability in Indian registered manufacturing sector.
- (3) To study the nature of relationship between the factor intensity and profit in Indian registered manufacturing sector.
- (4) To study the growth and patterns of investment in registered manufacturing at 2-digit level industries in India and 15 major states.
- (5) To study the determinants of investment in the Indian registered manufacturing sector.

## 1.5 Methodology

The following statistical tools would be used for the above-mentioned objectives.

In order to calculate the trend growth rate, the following semi log linear model would be used.

$$\text{Log } Y_t = \alpha + \beta_t + U_t$$

Where, Y is the value of the variable to be calculated.

In order to get the desired result, we have to regress the log value of the variable on time.

Then to get the actual growth rate, we have to take the antilog of the  $\beta$  value.

To study the trend of growth in both pre and post liberalization period, dummy variable model can be used in a semi log linear model.

$$\text{Log } Y_t = \alpha + \alpha_1 D_i + \beta_1 (t) + \beta_2 (D_i * t_i) + U_t$$

To calculate the rate of profit, we have to take the ratio of profit to fixed capital.

$$\text{Profit Rate} = \text{Profit} / \text{Fixed Capital}$$

To examine the nature of relationship between growth and profitability, the following linear regression model can be used.

$$G_t = \alpha + \beta P_t + e_t$$

Where, G: growth rate

$\alpha$  &  $\beta$ : are parameters

e: error term



Retained earnings (profit) of the current year are normally utilized as internal source of finance next year. Thus past profitability plays dual role in investment process. So the model can be like the following;

$$G_t = \alpha + \beta P_{t-1} + \epsilon_t$$

Where,  $P_{t-1}$ : profit rate in the past period that is t-1.

Basically the above equation tests that, the current rate of growth depends upon the rate of profit with one period time lag.

To show a given change in profitability is associated with a constant proportionate change in growth rate, the following model would be used.

$$\text{Log } G_t = \alpha + \beta \log P_t + \epsilon_t$$

In order to study the factor intensity and profit relationship, the following model can be used.

$$\text{Log } (K/L)_t = \log \alpha + \beta \log P_t + U_t$$

Where,  $\beta = d(K/L)/dP \cdot P/(K/L)$ <sup>9</sup>

$(K/L)_t$  = Capital Intensity

K = capital, L = labor

$\beta$  = Parameter to be estimated

$$\text{Log } (L/K)_t = \log \alpha + \beta \log P_t + U_t$$

L/K = labor intensity.

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<sup>9</sup> Elasticity in the form of,  $dY/dX \cdot X/Y$   
Slope in the form of,  $=\beta (Y/X)$

To estimate the factors those influence the investment in Indian registered manufacturing sector, the following model can be used.

$$GFCF_t = \alpha + \beta_{1t} VA_{t-1} + \beta_{2t} P_{t-1} + \beta_{3t} I_t + U_t$$

Where, P: the rate of profit<sup>10</sup>

VA: the rate of value added<sup>11</sup>

I: the rate of interest<sup>12</sup>

In explaining the variations in terms of investment growth and share across states, relative income index and composite infrastructure index has been used. The relative income index involves the following steps.

- First, the average of Per Capita Net State Domestic Product (PCNSDP) of all the fifteen states has been computed and the value has been assigned to 100 as the base.
- Second, on the basis of this indexation, PCNSDP of all 15 states have been rescaled and it is called 'Relative Income Index'.

The composite index for infrastructure has been made according to the followings.

- Division by respective mean of the number of observations.
- Multiplying each scale free variable by the inverse of the number of variables such that sum of weightages is equal to one.

## 1.6 Data Source and Coverage

The study mainly relies upon the Annual Survey of Industries (ASI) data, published by Central Statistical Organization (CSO). The study intends to examine the above-mentioned objectives at 2-digit level of Industry classification. The period of study would

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<sup>10</sup> Rate of profit= Profit/Fixed Capital

<sup>11</sup> Rate of value added= Value added/ the value of the output

<sup>12</sup> Rate of interest= Interest Payment/ Gross Income

be from 1980-81 to 2001-02. The study will cover manufacturing industries at all India level and also at state level. Till the year 1997-98 the ASI data is available in two-digit form. The data from 1998-99 onwards has been collected from ASI- Factory level summary sectors, which is available in three-digit form. These three-digit data have been transformed in to two-digit with the help of appropriate concordance. The other major sources of data are, 'The Statistical Abstract of India', 'National Accounts Statistics', 'The Economic Survey, Govt. of India', 'The Hand Book of Statistics on Indian Economy, RBI' and 'The Basic Road Statistics, Ministry of Surface Transport, Govt. of India'.

### 1.7 Layout of the Study

According to the objective, the study spreads over five major chapters. The first chapter provides introductory idea about the study. Chapter two, focuses on the growth and structure of the Indian registered manufacturing sector both in pre and post reform period. The chapter three investigates the nature of relationship between growth and profitability. At the same time it also explores the nature of relationship between factor intensity and profit. Its appendix provides a handful discussion on firm size and growth and firm size and profitability relationship. Chapter four studies the pattern of investment in Indian registered manufacturing sector and also focuses the variation across states. It also explores the major factor those influence the investment in Indian manufacturing sector and also across states. Finally the chapter five provides brief findings of the study.



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Chapter-2

***Indian Registered Manufacturing Sector:  
Growth and Structure***

## **INDIAN REGISTERED MANUFACTURING SECTOR: GROWTH AND STRUCTURE**

Indian economy has been on a high growth path right from the 1990s. The main propellant for this growth has been the software and services sector in India. However, after the initial surge, the growth has tapered off in recent years. This is because the Indian manufacturing sector, a key component of the overall economy, having been a major driver of higher economic growth in the mid - 1990s, is now reviving again after a sharp decline in performance. Over the past half century, this sector has been growing 6 percent per year on an average. At present India's manufacturing sector accounts for about 16 percent real GDP 12 percent of total work force and around 80 percent of merchandise exports (Nagaraj, 2003).

In order to become an economic superpower, India needs to clock an annual growth rate of 10-15% continuously for the next decade or so. Such a high level of sustained growth cannot be achieved solely on the basis of the services industry. It is here that the manufacturing sector has a crucial role to play. Its growth will provide the thrust needed to take the economy forward to the next higher level and create employment opportunities for the people. It is the manufacturing industry that holds the promise of creating jobs for the millions and meeting the needs of a developing country like India.

It is difficult to assess the performance of manufacturing sector with respect to broad objective of industrialization over past five decades. There are some dimensions with significant achievements. The two important dimensions that have come out in the process are, (i) widening of the industrial base and consequent ability to produce a very broad range of Industrial products and (ii) the fostering of entrepreneurship and the development of technological capabilities and skills in the economy (Ahluwalia, 1985).

On institutional plane also there have been major successes such as the development of a public sector, which can claim to occupy the commanding heights of the economy. However these achievements cannot deny the fact that, the potential has been far from fully exploited and the performance with respect to the core indicator (rate of manufacturing growth) has not been sound indeed.

So far as the performance of the Indian manufacturing sector is concerned, it underwent a fundamental change in the mid-1980s with the first round of liberalization. The new economic policy introduced in 1991 is expected to provide a further boost to the industrial sector in general and manufacturing in particular. After 1991, industrial licensing has been abolished, the list of industries reserved for private sector has been reduced, equity in public enterprises is being divested; access to foreign capital and technology has been made freer; quantities restrictions on import have been virtually abolished and import duties have also been significantly reduced (Chaudhuri, 2002). The basic idea behind such reform was to usher a more competitive environment, improve efficiency and growth. So with these fundamental changes it is expected, that the industrial sector in general and the manufacturing sector in particular would perform better. In this chapter an over all perspective is provided by highlighting certain aspects of manufacturing growth and the change in its structure at 2-digit level of industrial classification.

**Table: 2.1: Annual Growth Rate of Industrial Production in Major Sectors of Industry**

(Based on the Index of Industrial Production) Base: 1993-94=100

(Percent)

Period	Mining & Quarrying	Manufacturing	Electricity	Overall
1995-96	9.7	14.1	8.1	13.0
1996-97	-1.9	7.3	4.0	6.1
1997-98	6.9	6.7	6.6	6.7
1998-99	-0.8	4.4	6.5	4.1
1999-00	1.0	7.1	7.3	6.7
2000-01	2.8	5.3	4.0	5.0
2001-02	1.2	2.9	3.1	2.7
2002-03	5.8	6.0	3.2	5.7
2003-04	5.2	7.4	5.1	7.0
2004-05	4.4	9.2	5.2	8.4

Source: Economic Survey, 2005-06; Government of India.

The growth rate of industrial sector as measured in terms of Index of Industrial Production (IIP) during 2004-05 was 8.4 percent compared to a growth of 7.0 percent in 2003-04. The above table shows the impressive performance of the manufacturing sector, which grew at 9.2 percent during that period, largely contributed to this performance. For a decade it has been growing around 7.0 percent per year on an average. During 2000-01 and 2001-02, there was a slow down. In 2001-02, manufacturing sector performed very badly with 2.9 percent growth rate against previous year.

### 2.1 Growth of Manufacturing Output

Output growth is considered as an important indicator of manufacturing growth. The following table shows the trend growth of output both in pre and post reform period.

**Table: 2.2: All India Trend Growth Rate of Output in the Registered Manufacturing Sector from 1980-81 to 2000-2001.**

(Percent)

Industry Group	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20+21	8.25	8.05	8.41
22	8.47	8.31	9.1
23+24+25	5.72	4.34	5.20
26	13.15	9.72	13.87
27	5.82	4.24	12.7
28	7.64	7.7	6.98
29	9.63	10.81	7.6
30	8.81	7.20	10.80
31	6.76	7.88	9.93
32	8.11	9.81	6.32
33	6.93	8.05	5.31
34+35+36	7.76	7.95	6.93
37	9.24	8.40	10.7
38	13.81	9.63	15.9
Total	7.87	9.3	8.38

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The growth rate of output of the over all manufacturing sector during the post liberalization period has marginally declined (Table: 2.2). The trend shows, the growth of total manufacturing output was 9.3 percent in the pre liberalization period, which declined to 8.38 percent in the post liberalization period. Industry wise analysis shows, industries those have higher output growth rate in eighties includes food products (20-21), beverages tobacco (22), textile products including wearing apparel (26), leather & leather products (29), non-metallic mineral products (32) and photographic



cinematography, watches, clocks etc (38). Textile product (23+24+25) industry shows the lowest growth of output in the eighties.

In nineties industries like beverages tobacco (22), textile products including wearing apparel (26), wood and wood products (27), basic chemicals & chemical products (30), manufacturers of rubber, plastic, petroleum, coal products, processing of nuclear fuels etc (31), transport equipment (37) and photographic cinematography, watches, clocks etc (38) demonstrate higher growth rate. The growth of output is highest in case of photographic cinematography, watches, clocks etc (38), which is 15.9 percent. Industries those registered declining output growth in post reform period includes paper products (28), leather & leather products (29), non-metallic mineral products (32), basic metal & alloys (33) and machinery & equipments (34+35+36). The over all growth of manufacturing output is 7.87 percent.

A similar trend has been found by Nagaraj (2003). In his study he found that the growth rate of output is lower in the 1990s in comparison to the previous decade.

## **2.2 Growth of Manufacturing Employment**

The registered manufacturing sector constitutes the 1/5<sup>th</sup> of the employment (Nagraj, 2003). The following table demonstrates the trend growth of employment in the registered manufacturing sector from 1980-81 to 2000-01.

**Table: 2.3: All India Trend Growth Rate of Employment in the Registered Manufacturing Sector from 1980-81 to 2000-2001.**

Industry Group	(Percent)		
	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20+21	0.84	-2.07	1.36
22	2.22	1.62	0.66
23+24+25	-1.11	-1.96	-1.37
26	9.47	5.51	10.99
27	-0.2	-1.55	1.43
28	0.57	-0.43	-0.11
29	4.87	6.15	1.79
30	2.93	1.66	3.75
31	4.79	3.39	4.91
32	0.9	1.76	-0.26
33	0.03	0.31	-4.47
34+35+36	1.59	1.38	0.9
37	0.82	-0.4	0.76
38	5.37	3.13	6.42
Total	1.28	0.27	1.1

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

So far as growth rate of employment is concerned, it is clear from the above table that the growth rate during eighties is stagnant. The trend growth of employment for the period was 0.27 percent, which increased to 1.1 percent in the nineties. The trend growth shows there is a huge gap between eighties and nineties. Industry wise analysis shows agricultural related industries have negative growth rate in eighties. Food products (20-21), textile products (23+24+25), wood & wood products (27) and paper products (28) have negative employment growth rates in pre reform periods. Transport equipment (37)

also has negative growth in eighties. The industries those show negative growth rate in eighties, share almost 35 percent of employment in the manufacturing sector.

The trend growth of employment in nineties shows a major increase. The industries those show an increase in employment includes textile products including wearing apparel (26), manufacturing of scientific equipments, photographic cinematography, watches, clocks etc (38) and manufacturers of rubber, plastic, petroleum, coal products, processing of nuclear fuels etc (31). Industries those have negative employment growth in eighties show positive growth in nineties. It includes agricultural related industries like Food products (20-21) & wood & wood products (27). This shows a positive effect of economic reforms on these industries.

The over all trend of employment growth is quiet impressing (1980-81 to 2000-01). But textile product (23+24+25) shows a negative growth of employment in during the whole study period. Other industries those have negative growth for whole study period include wood and wood products (27). The pre and post reform analysis shows, textile products have negative growth in both the periods; where as in case of wood and wood products had negative growth in pre reform period.

Studies by Chaudhury (2002), Nagaraj (2003) and Balkrishna & Babu (2003) show the same trend. Chaudhury found the employment of workers has increased between 1990-91 and 1998-99. But the increase has been only at a compound annual rate of growth of 1.59 percent. Important point to be noted is that the annual growth has been negative in five out of the nine years. Nagaraj in his study from 1974 to 1998 found, there is a steady growth in employment in the nineties. Balkrishna & Babu also found an increase in the growth of employment in the post reform period. His study covers 1973-74 to 1990-91 as pre reform period and 1991-92 to 2000 as post reform period.

### 2.3 Growth of Capital

Particularly after the introduction of economic reforms, the role of capital has become significantly important in the over all manufacturing activity. As we know capital plays a crucial role in the over all production process. The following table demonstrates the behavior of fixed capital in the Indian registered manufacturing sector.

**Table: 2.4: All India Trend Growth Rate of Fixed Capital in the Registered Manufacturing Sector from 1980-81 to 2000-2001.**

(Percent)

Industry Group	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20+21	11.75	7.24	12.33
22	14.25	12.79	17.53
23+24+25	10.4	5.69	14.21
26	18.88	13.04	23.01
27	8.99	5.04	16.28
28	8.31	4.40	13.21
29	12.24	8.06	13.18
30	11.11	6.90	14.24
31	13.89	12.74	18.19
32	12.73	15.14	15.46
33	9.20	15.52	17.19
34+35+36	9.95	8.03	11.41
37	9.19	4.23	18.03
38	12.6	10.95	11.09
Total	10.6	7.33	12.95

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The trend shows so far as the trend growth of fixed capital in total manufacturing is concerned, it has increased in post reform period. Before reforms it was 7.33 percent, which increased to 12.95 percent in post reform period. But the over all trend (taking both pre & post reform period) shows, the growth rate of capital has been more or less stagnant. One important analysis comes out is, certainly the agricultural related industries have performed well compared to non-agricultural related industries. In case of agricultural related industries, the trend shows there has been a significant increase in capital growth in post liberalization period. Industry wise analysis shows, most of the industries experienced an increase in the capital growth in post reform periods. The trend growth of fixed capital for food products (20-21) was 7.24 percent in pre reform periods, which increased to 12.33 percent in post reform periods. Like wise, the trend growth of fixed capital for Beverages Tobacco (22) increased from 12.79 per cent to 17.53 percent, Textile products (23+24+25) from 5.69 percent to 14.21 percent, Textile Product including wearing apparel (26) 13.04 to 23.01 percent, wood & wood products (27) 5.04 percent to 16.28 percent, paper products (28) 4.4 percent to 13.21 percent, leather & Lather Products (29) 8.06 percent to 13.18 percent, basic chemicals & chemical products (30) 6.9 percent to 14.24 percent, Petroleum & Coal product (31) 12.74 percent to 18.19 percent, Non-metallic Mineral products (32) 15.14 per cent to 15.46 per cent, basic metal & alloys (33) 15.02 percent to 17.09 percent, Machinery & Equipments (34+35+36) 8.03 per cent to 11.41 percent, Transport Equipment products (37) 4.23 to 18.03 percent & Scientific Equipments, Watches, Clocks etc (38) 10.95 percent to 11.09 percent. Some industries experienced significant capital growth in post reform period.

#### **2.4 Growth of Manufacturing Value Added**

Generally Gross Value Added (GVA) is considered as a good indicator of market conditions. The rapid growth of GVA attracts more and more investment, which leads to higher industrial growth.

**Table: 2.5: All India Trend Growth Rate of Gross Value Added in the Registered Manufacturing Sector from 1980-81 to 2000-2001.**

(Percent)

Industry Group	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	8.61	9.03	9.70
22	9.73	10.23	10.5
23+24+25	4.17	3.54	3.67
26	15.36	13.28	11.85
27	5.54	3.33	10.98
28	6.85	6.72	5.58
29	10.77	11.45	5.76
30	10.08	7.38	11.13
31	9.76	14.72	7.12
32	7.98	9.91	6.30
33	7.62	7.28	8.49
34+35+36	6.88	7.08	5.52
37	7.08	5.69	8.13
38	11.23	7.62	12.69
Total	7.8	6.64	8.22

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The above table shows the growth rate of GVA in the Indian manufacturing sector from 1980-81 to 2000-01. All industries have positive growth in both eighties and nineties. During the pre reform period (1980-81 to 1990-91) industries those show high GVA growth includes textile product including wearing apparel (26), leather & lather products (29), petroleum & coal product (31) and beverages tobacco (22). In post reform periods, industries those have higher growth include beverages tobacco (22), textile product including wearing apparel (26) 13.04 to 23.01 percent, wood & wood products (27), basic

chemicals & chemical products (30) and scientific equipments, watches, clocks etc (38). Some industries show decline in the growth rate of GVA in the post reform period in comparison to the pre reform period. Those include textile product including wearing apparel (26), paper products (28), leather & leather products (29), petroleum & coal product (31), non-metallic mineral products (32) and machinery & equipments (34+35+36). However in case of wood & wood products (27), basic chemicals & chemical products (30) and scientific equipments, watches, clocks etc (38); the change is significant in the post reform period in comparison to the pre reform period. Over all total manufacturing shows an increase in the growth of GVA in post reform period. The GVA growth for the whole study period is 7.8 percent and in the post reform period it is 8.22 percent.

## 2.5 Investment Ratio

**Table: 2.6: All India Investment Ratios in the Registered Manufacturing Sector from 1980-81 to 2000-2001.**

(Annual Average Ratio)

Industry Group	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	0.03	0.03	0.03
22	0.05	0.04	0.06
23+24+25	0.07	0.06	0.09
26	0.04	0.03	0.06
27	0.06	0.06	0.07
28	0.13	0.12	0.14
29	0.04	0.03	0.04
30	0.09	0.08	0.09
31	0.06	0.04	0.09
32	0.13	0.13	0.13
33	0.13	0.12	0.14
34+35+36	0.06	0.06	0.06
37	0.08	0.07	0.09
38	0.06	0.07	0.06
Total	0.08	0.07	0.08

Source: Has been calculated from the Annual Survey of Industries, Summary Result of Factory Sector, Various Issues.

The above table presents the investment ratio of the Indian manufacturing sector.<sup>1</sup> That is the share of investment to real output. The rise in the share of investment is an indicator

<sup>1</sup> After economic reforms the investment has risen pretty much across the board with in manufacturing. In the aggregate the increase is over 75 percent; for some groups it exceeds 100 percent (Balkrishan & Babu, 2003)



of the supply response of firms to economic reforms, reflecting a certain confidence on their part in the future of manufacturing in India.

The annual average ratio of investment shows, it has increased in the post reform period in comparison to the pre reform period. In the pre reform period some industries have high investment ratio, these are paper products (28), basic chemicals & chemical products (30), non-metallic mineral products (32) and basic metal & alloys (33). In the post reform period some industries like paper products (28), non-metallic mineral products (32) and basic metal & alloys (33) have high investment ratio. Industry wise analysis shows, all industries reported to have higher annual average investment ratio in post reform period in comparison to the pre reform period. Industries those have higher investment ratio during the whole study period are paper products (28), non-metallic mineral products (32) and basic metal & alloys (33).

Study by Balkrishna & Babu (2003) shows the same trend. They found an increase in the investment ratio in the post reform period (1991-92 to 1999-2000) in comparison to the pre-reform period (1973-74 to 1990-91).

## 2.6 Rate of Profit

**Table: 2.7: Annual Average Profit Rate in the Registered 2-digit Manufacturing Sector from 1980-81 to 2000-01.**

(Percent)

Industry Group	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	18.44	21.52	15.05
22	60.00	62.93	56.78
23+24+25	1.90	3.32	-1.05
26	51.44	48.14	55.06
27	19.10	20.16	17.92
28	6.92	4.57	4.53
29	21.97	14.05	30.69
30	14.02	12.21	16.02
31	28.62	33.84	22.88
32	9.76	11.33	8.04
33	4.87	5.07	4.67
34+35+36	24.29	26.96	21.38
37	15.57	11.8	20.36
38	64.46	35.68	31.66
M Total	12.63	12.97	12.25

*Note: Profit Rate = Net Profit/Fixed Capital*

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The above table shows in case of most of the industries the rate of profit had declined in post reform period in comparison to pre reform period. The annual average rate of profit shows, the rate of profit has declined marginally in the post reform period. But the industry wise analysis shows, most of the industries experienced declined rate of profit in post reform period. The profit rate shows industries like, beverages, tobacco (22), textile products, including wearing apparel (26), leather & leather products (29), petroleum &

coal product (31), equipments & machineries (34+35+36) & scientific equipments, and photographic cinematography, watches, clock etc (38) have been more profitable in comparison to the rest of the industries. Figures show the rate of profit is very high in the following industries. The rate of profit for Beverages, tobacco (22), textile products, including wearing apparel (26), scientific equipments, and photographic cinematography, watches, clock etc (38) are 60 percent, 51 percent and 64 percent respectively.

## 2.7 Share of wages in the Registered Manufacturing Sector

**Table: 2.8: All India Share of Wages in the Registered Manufacturing Sector from 1980-81 to 2000-2001.**

Industry Group	(Annual Average Share) (Percent)		
	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	21.04	23.19	18.68
22	24.24	29.25	19.16
23+24+25	39.42	46.04	32.14
26	13.00	24.82	17.20
27	27.52	30.10	24.68
28	25.32	29.37	20.86
29	27.32	33.56	20.45
30	12.07	15.01	8.83
31	12.62	12.81	12.41
32	19.18	22.65	15.36
33	21.16	25.75	16.92
34+35+36	19.88	22.57	16.92
37	28.16	33.35	22.45
38	20.73	24.23	16.88
Total	20.91	25.63	17.81

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The above table presents the annual average share of wages<sup>2</sup> in the registered manufacturing sector. It shows a decline in the share of wages across the entire manufacturing sector at the two-digit level. It also shows a relative shift of the income away from the workers. In the eighties the industries those reported to have higher annual average wage share include textile product (23+24+25), wood and wood products (27), paper products (28), leather & leather products (29) and transport equipment (37). The annual average share of wage is higher in case of textile product (23+24+25) for both pre and post reform periods and also for the whole study period.

## **2.8 Growth of capital Intensity**

Capital intensity means, the cost of creating one job. In other words, it is the capital per employee. The following table demonstrates the growth of capital intensity in the Indian registered manufacturing sector.

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<sup>2</sup> Share of wages as percentage of Gross Value Added

**Table: 2.9: All India Trend Growth of Capital Intensity in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

Industry Group	(Percent)		
	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	9.11	10.58	8.70
22	11.26	12.11	15.37
23+24+25	11.10	8.87	13.80
26	8.06	8.15	9.60
27	8.66	7.69	12.69
28	7.18	5.90	11.35
29	6.47	2.83	9.20
30	7.42	6.19	8.23
31	8.26	10.12	10.86
32	11.20	14.27	13.37
33	8.32	6.50	5.78
34+35+36	7.71	7.61	8.30
37	7.81	5.67	15.22
38	6.36	8.59	2.15
<b>TOTAL</b>	<b>8.67</b>	<b>8.35</b>	<b>9.45</b>

*Note: Has been calculated as the Ratio of Fixed Capital to Employee*

Source: Has been calculated from the Annual Survey of Industries, Summary Result of Factory Sector, Various Issues.

The table shows the cost of creating one job has increased from 8.35 percent in pre reform period to 9.45 percent in the post reform period. In other words, the capital intensity has increased in the post reform period in comparison to the pre reform period. Trend shows in eighties agricultural related industries show higher increase than the non-agricultural related industries. But in the nineties the story is just the reverse. In pre reform period industries those show high capital intensity growth include food products (20-21), beverages tobacco (22), manufacturers of rubber, plastic, petroleum, coal products, processing of nuclear fuels etc (31) and non-metallic mineral products (32). Non-metallic mineral products (32) show the highest increase of 14.27 percent per

annum. In the post reform period, manufacturer of beverages tobacco (22) shows the highest increase of 15.37 percent followed by 15.22 percent in the transport equipment (37) industry. The industries those show higher capital intensity growth include beverages tobacco (22), textile product (23+24+25), wood and wood products (27), paper products (28), manufacturers of rubber, plastic, petroleum, coal products, processing of nuclear fuels etc (31) and non-metallic mineral products (32) and transport equipment (37). Industries those registered a decrease in the capital intensity growth are food products (20-21), basic metal & alloys (33) and photographic cinematography, watches, clocks etc (38). However the fall in the capital intensity growth is significant in case of photographic cinematography, watches, clocks etc (38). In pre reform period it was 8.59 percent and declined to 2.15 percent in the post reform period. The growth of capital intensity is more in agricultural related industries during the whole study period.

## 2.9 Growth of Labor Productivity

**Table: 2.10: All India Trend Growth of Labor Productivity in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

(Percent)

Industry Group	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	7.76	11.33	8.22
22	8.08	8.48	8.48
23+24+25	5.44	4.70	6.32
26	5.49	6.38	1.96
27	5.86	3.97	10.69
28	6.34	6.26	6.77
29	5.69	4.10	5.11
30	7.04	4.71	8.37
31	4.96	9.99	3.37
32	7.16	7.06	7.83
33	7.40	6.00	10.30
34+35+36	5.33	4.70	5.79
37	6.39	5.18	8.59
38	5.61	3.39	7.11
<b>TOTAL</b>	<b>6.29</b>	<b>6.62</b>	<b>6.13</b>

*Note: Has been calculated as the Ratio of GVA to Employee*

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The above table shows the growth of labor productivity in pre and post reform periods. During eighties the agricultural related industries demonstrate higher labor productivity. The industries those show higher labor productivity in eighties include food products (20-21), beverages tobacco (22), processing of nuclear fuels etc (31) and non-metallic mineral products (32). The industries those show lower labor productivity are textile product (23+24+25), wood and wood products (27), leather & leather products (29), basic chemicals & chemical products (30), machinery & equipments (34+35+36) and photographic cinematography, watches, clocks etc (38) industries. The labor productivity

is lowest in the manufacture of photographic cinematography, watches, clocks etc (38). Where as it is highest in food products (20-21) industry.

In nineties industries those have higher labor productivity are food products (20-21), beverages tobacco (22), wood and wood products (27), basic chemicals & chemical products (30), basic metal & alloys (33) and transport equipment (37). It shows the productivity of labor has increased in non-agriculture related industries. In nineties the rise in labor productivity is highest in the manufacture of wood and wood products (27). The industries those demonstrate a fall in the labor productivity include food products (20-21), textile products including wearing apparel (26) and processing of nuclear fuels etc (31). However the fall of labor productivity in manufactures of textile products including wearing apparel (26) is significant. The over all manufacturing show in post reform period labor productivity has declined from 6.62 percent to 6.13 percent.



## 2.10 Growth of Capital Productivity

**Table: 2.11: All India Trend Growth of Capital Productivity in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

Industry Group	(Percent)		
	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	-1.79	1.66	-2.68
22	-3.39	-2.50	-5.81
23+24+25	-5.62	-2.88	-8.59
26	-2.93	-0.07	-8.97
27	-3.11	-2.50	-3.91
28	-1.31	1.32	-6.11
29	-1.28	2.23	-5.83
30	-0.91	-0.43	-2.03
31	-3.59	0.86	-8.80
32	-4.17	-5.40	-6.93
33	-1.39	0.50	2.02
34+35+36	-2.75	-1.75	-4.41
37	-1.86	0.51	-7.79
38	-1.25	-3.86	2.60
TOTAL	-2.55	-0.64	-4.52

*Note: calculated as the ratio of GVA to Fixed capital*

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The above table shows the trend growth of capital productivity in pre and post reform periods. In both the periods the manufacturing sector experienced a negative growth in the capital productivity. In eighties the fall in capital productivity is pronounced mainly in agricultural related industries. The industries except manufacture of food products (20-21), paper products (28), leather & leather products (29), processing of nuclear fuels etc (31), basic metal & alloys (33) and transport equipment (37), demonstrate a fall in capital productivity. The fall is highest in case of manufacturer of non-metallic mineral products (32). In nineties the fall is more pronounced in all other industries except basic metal & alloys (33) and in the manufacture of photographic cinematography, watches, clocks etc

(38). The highest fall has been registered in the manufacture of textile products including wearing apparel (26). In most cases the fall of capital productivity in nineties is significant in comparison to earlier time period. Over all the manufacturing sector experienced a negative growth of capital productivity during the whole study period (1980-81 to 2000-01). The fall in capital productivity may be because of rising capital intensity in the manufacturing sector.

## 2.11 Growth of Value Added Per Unit of Output

**Table: 2.12: All India Trend Growth of Value Added per unit of Output in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

Industry Group	(Percent)		
	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	0.32	0.90	0.99
22	1.81	1.76	2.47
23+24+25	-1.44	-1.63	-0.33
26	2.03	2.33	-0.06
27	-0.21	-1.76	-0.37
28	-0.72	-1.78	-0.30
29	-1.07	-0.30	-0.56
30	1.20	-0.71	1.47
31	2.92	5.41	-1.37
32	-0.07	-0.80	1.13
33	0.68	-1.59	3.45
34+35+36	-0.78	-1.68	-0.18
37	-1.87	-3.35	-1.18
38	-2.30	-2.70	-1.63
TOTAL	-0.09	-0.86	-0.14

*Note: calculated as the ratio of GVA to value of Output*

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The above table shows the growth of value added per unit of output<sup>3</sup>. In eighties the value added per unit of output is falling faster in non-agricultural related industries. Industries those have falling rate of value added per output growth include textile product (23+24+25), wood and wood products (27), paper products (28), leather & leather products (29), basic chemicals & chemical products (30), non-metallic mineral products (32), basic metal & alloys (33), machinery & equipments (34+35+36), transport equipment (37) and the manufacture of photographic cinematography, watches, clocks etc (38). The manufacture of processing of nuclear fuels etc (31) has the highest growth of value added per unit of output.

In nineties, it has improved. But still it shows a negative growth rate. The industries those show higher value added per output growth include manufacture of food products (20-21), beverages tobacco (22), basic chemicals & chemical products (30), non-metallic mineral products (32) and basic metal & alloys (33). The highest value added per output is reported in the manufacture of beverages tobacco (22). Industries those demonstrate higher growth in comparison to pre reform period include manufacture of food products (20-21), beverages tobacco (22), basic chemicals & chemical products (30), non-metallic mineral products (32) and basic metal & alloys (33). Other than these above-mentioned industries the rest of the industries demonstrate an improvement in the growth but it is still negative. Over all the whole study period shows agriculture related and chemical industries experienced higher value added per output growth.

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<sup>3</sup> Value added generated by every unit of output.

## 2.12 Growth of Capital Output Ratio

**Table: 2.13: All India Trend Growth of Capital Output Ratio in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

Industry Group	(Percent)		
	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	2.14	-0.75	3.76
22	5.39	4.15	8.62
23+24+25	4.43	1.29	9.03
26	5.10	3.03	9.16
27	3.00	0.77	3.69
28	0.60	-3.06	6.20
29	2.38	-2.48	6.24
30	2.13	-0.28	3.56
31	6.75	4.51	8.14
32	4.27	4.87	8.67
33	2.10	-2.08	2.14
34+35+36	2.03	0.08	4.44
37	-0.01	-3.84	7.16
38	-1.06	1.20	-4.13
<b>TOTAL</b>	<b>2.53</b>	<b>-0.22</b>	<b>4.58</b>

*Note: calculated as the ratio of Fixed Capital to value of Output*

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

It is observed, in eighties some industries demonstrate an increase in the capital output ratio, these are the manufacture of beverages tobacco (22), textile product (23+24+25), textile products including wearing apparel (26), wood and wood products (27), processing of nuclear fuels etc (31), non-metallic mineral products (32), machinery & equipments (34+35+36) and the manufacture of photographic cinematography, watches, clocks etc (38). In eighties the growth of capital output ratio is highest in case of the manufacture of non-metallic mineral products (32). Other than the above-mentioned industries, the rest of the industries registered a decline in capital output ratio. The increase in the growth of capital output ratio is substantial in the nineties. Except the manufacture of photographic cinematography, watches, clocks etc (38), the rest of the industries demonstrate increasing capital output growth. The increase in capital output

growth is highest in case of the manufacture of textile products including wearing apparel (26). The over all trend shows the increase in the capital output ratio in post reform period is significant in comparison to the pre reform period. This means that every unit of output is produced with more and more of capital. This increase is faster in both agricultural and non-agricultural industries. The capital output ratio is substantial in the manufacture of beverages tobacco (22), textile product (23+24+25), textile products including wearing apparel (26), paper products (28), leather & leather products (29) and transport equipment (37). One exception is that in the nineties the manufacture of photographic cinematography, watches, clocks etc (38) demonstrate falling capital output ratio, which was positive in the pre reform period. During the whole study period, the manufacture of processing of nuclear fuels etc (31) experienced highest increment in capital output ratio.

## 2.13 Growth of Labor Cost

**Table: 2.14: All India Trend Growth of Labor Cost per unit of Output in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

Industry Group	(Percent)		
	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
20-21	-1.12	-1.00	-0.47
22	-2.05	-2.37	-0.79
23+24+25	-3.48	-2.77	-1.02
26	-0.16	-1.04	3.51
27	-0.94	-1.61	1.14
28	-2.48	-3.57	-0.63
29	-3.26	-2.95	-0.63
30	-1.62	-1.26	0.08
31	-1.93	-0.44	-3.17
32	-2.41	-4.21	-1.57
33	-2.06	-3.77	-3.48
34+35+36	-1.69	-2.00	-1.52
37	-4.13	-2.68	-3.37
38	-3.91	-2.68	-1.06
TOTAL	-2.20	-2.75	-0.16

*Note: calculated as the ratio of emoluments to value of Output*

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The above table demonstrates the growth of labor cost per unit of output<sup>4</sup>. It shows the emolument per unit of output has been falling in both the periods. In eighties the labor cost per unit of output declined almost in all the industries. The highest decline was in case of the manufacture of non-metallic mineral products (32) and the paper products (28). It shows the fall is more in non-agriculture related industries. In nineties, incase of some industries the labor cost per unit of output has increased. The industries those show higher labor cost per unit of output include the manufacture of textile products including

<sup>4</sup> Emoluments per unit of output

wearing apparel (26), wood and wood products (27) and basic chemicals & chemical products (30). The rest of the industries show a negative growth of labor cost per unit of output. But relatively it has improved in comparison to the eighties. The growth of labor cost per unit of output for the whole study period is -2.20 percent and it is highest in case of the manufacture of transport equipment (37).

#### **2.14 Summary**

In order to analyze the performance of the manufacturing sector at 2-digit level of classification, trend growths and structural ratios have been calculated. Some key ratios have been calculated to answer certain important question like (i) what is the increase in the cost of creating one job, (ii) what is the level of growth in the productivity of an employee and in per unit of fixed capital, (iii) what is the increase in the fixed capital per unit of output (iv) what is the increase in the labor cost per unit of output & (v) what is the change in the value added generated by one unit of output. From the above analysis it is clear that the growth of manufacturing employment has increased in the post liberalization period in comparison to pre liberalization period. Where as the share of wages has declined in the post reform period. Labor productivity has declined marginally in the post reform period. Like wise the trend growth of output shows it has declined in the post reform period in comparison to the earlier time period. Gross value added and fixed capital also demonstrates an increase in the trend growth in the post reform period. The annual average investment ratio has increased. Capital intensity has increased in the post liberalization period. But capital productivity has declined in the post reform period in comparison to the earlier time period. The capital output ratio has increased in the post reform period, where as the labor cost though improved but still falling.

## Appendix

**Table: 2A: 1: State Wise Growth of Output in the Registered Manufacturing Sector from 1908-81 to 2000-01.**

(Percent)

States	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
AP	9.14	9.6	8.1
ASSAM	6.31	11.23	5.79
BIHAR	4.01	5.73	3.76
GUJURAT	8.5	5.96	11.73
HARYANNA	10.25	9.43	12.21
KARNATAKA	9.42	8.67	9.34
KERALA	6.64	4.72	1.91
MP	9.48	10.68	7.69
MAHARASTRA	7.28	6.76	8.14
ORISSA	7.15	10.2	2.26
PUNJAB	7.71	10.06	5.7
RAJASTHAN	9.68	10.43	8.87
TAMILNADU	7.88	7.16	7.93
UP	8.68	11.69	5.96
WB	3	1.96	4.51

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.



**Table: 2A: 2: State Wise Growth of Fixed Capital in the Registered Manufacturing Sector from 1908-81 to 2000-01**

(Percent)

States	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
AP	12.40	12.77	4.62
ASSAM	8.79	15.02	8.42
BIHAR	2.40	-1.99	6.15
GUJURAT	13.90	8.28	21.32
HARYANNA	11.89	7.58	17.27
KARNATAKA	11.78	6.88	23.92
KERALA	6.06	4.10	12.59
MP	7.99	6.31	10.71
MAHARASTRA	11.31	8.89	13.44
ORISSA	10.51	16.31	3.45
PUNJAB	9.12	6.21	9.59
RAJASTHAN	12.45	10.10	13.24
TAMILNADU	11.34	8.57	14.06
UP	13.38	9.82	17.30
WB	7.13	3.78	3.69

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

**Table: 2A: 3: State Wise Growth of Employment in the Registered Manufacturing Sector from 1908-81 to 2000-01**

States	(Percent)		
	1980-81 to 2000-2001	1980-81 to 1990-91	1991-92 to 2000-2001
AP	2.29	1.28	0.82
ASSAM	0.69	-0.79	-0.96
BIHAR	-1.21	-0.13	-3.17
GUJURAT	0.97	-0.61	1.92
HARYANNA	3.28	2.74	3.81
KARNATAKA	2.57	0.78	3.3
KERALA	1.88	-1.03	1.33
MP	1.76	1.57	0.06
MAHARASTRA	0.57	-0.88	1.08
ORISSA	1.69	1.79	-0.17
PUNJAB	2.8	5.69	1.58
RAJASTHAN	2.67	2.31	1.69
TAMILNADU	2.81	1.73	2.02
UP	0.19	0.03	-1.49
WB	-1.67	-3.01	-1.67

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

**Table: 2A: 4: State Wise Growth of GVA in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

(Percent)

States	1980-81 to 1990-91	1991-92 to 2000-01	1980-81 to 2000-01
AP	7.30	9.52	9.42
ASSAM	13.63	3.89	5.86
BIHAR	6.89	7.14	5.55
GUJURAT	5.83	12.29	9.43
HARYANNA	7.14	13.21	9.66
KARNATAKA	7.50	9.85	8.94
KERALA	5.71	9.75	6.02
MP	7.39	9.43	8.31
MAHARASTRA	5.80	8.75	7.44
ORISSA	13.31	5.69	8.60
PUNJAB	9.27	7.86	8.93
RAJASTHAN	8.95	11.30	9.78
TAMILNADU	7.52	7.47	7.89
UP	10.48	6.99	9.59
WB	-0.55	3.62	2.33

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

**Table: 2A: 5: State Wise Profit Rate in the Indian Registered Manufacturing Sector from 1980-81 to 2000-01.**

States	(Percent)	
	1980-81 to 1990-91	1991-92 to 2000-01
AP	6.4	6.36
ASSAM	46.05	27.53
BIHAR	8.77	14.27
GUJURAT	15.66	13.41
HARYANNA	21.87	17.26
KARNATAKA	13.22	15.15
KERALA	20.02	22.51
MP	11.48	11.87
MAHARASTRA	20.39	17
ORISSA	1.25	0.88
PUNJAB	18.55	20.92
RAJASTHAN	8.62	8.18
TAMILNADU	21.35	16
UP	7.74	11.57
WB	2.06	0.87

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

Chapter-3

***Growth and Profitability in Indian Registered  
Manufacturing Sector***

## **GROWTH AND PROFITABILITY IN INDIAN REGISTERED MANUFACTURING SECTOR**

The growth of the industry depends upon the growth of the firms in the industry. So by and large it is the performance of firms, which has an obvious bearing on the extent, to which the economy as a whole will operate efficiently in providing goods. The growth of the firm in any industry is influenced by various factors like, market structure, market demand, supply of inputs, supply of factors of production, financial policies, investment policies, profitability and the government policies. In a developing country like India the government policies have its effects on the expansion of the firm in particular and industry in general.

The profitability of the firm indicates its financial stability and the income earning capacity. Besides, profitability provides for the growth of the firm and thus contributes to the growth of the industry as well as the whole economy (Kaur, 1996).

It has been observed that a high rate of profit in a particular branch of economic activity attracts new investment. In one side it attracts new investment and on the other side encourages existing capital to achieve higher returns. So profitability plays a very dynamic role in the investment process of the economy. On one hand works as incentive for investment and on the other hand provides a source of investment through internal funds. So profitability plays a very crucial role in the growth process of the firm, the industry and the economy. Thus the relationship between growth and profitability is of considerable interest both from theoretical and practical point of view.

Mainly the growth of the firm is affected by two factors; (i) the ability of the firm to grow and (ii) the willingness of the firm to grow. The ability of the firm depends upon the profitability of the firm. As discussed earlier, higher levels of profit attract new investment, which finally leads to the growth of the firm. So far as the willingness of the firms to grow is concerned, it varies from firm to firm at a given point of time and varies over a period of time.

So with the above discussion, the present study attempts to empirically study the association between growth and profitability.

### **3.1 The Theories of The Growth Of The Firm**

A certain amount of work has been done over years on the growth and development of the firms. The most important issues those have been discussed are the determination of the optimum size of the firm. This traditional debate has led many to view firm growth as a moment towards optimum size. In this view growth is a transitory phenomena, which occurs only until equilibrium is re-established (Geroski, 1998).

Economists are yet to formulate a general theory of the growth of firm. However some major contributions in the theory of the growth of the firm have been done by Dowine (1958), Penrose (1959) and Mariss (1964), Hay & Moriss (1979), Greiner (1972) and Muller (1972). All these theories essentially outline systematic changes in optimum size over the life of the firm.

**Penrose (1959)** analyses a firm as basically a collection of resources and the process of growth in terms of the speed with which firms could accumulate and assimilate such resources and the opportunities for further growth which arises when a firm's internal resources are under used.

She considers firm as a pool of productive resources organized with in an administrative framework. {According to her the term 'growth' has been used in ordinary discourse with two different connotations. Sometimes it denotes merely increase in amount and at other times it is used in its primary meaning implying an increase in size or an improvement in quality, as a result of a process of development.}

The set of activities, which the firm is able to undertake at a 'profit', defines its 'productive opportunity'. The firm continues to grow as long as ' the productive

opportunity' allows it to do so. According to Penrose; every individual firm is supposed to have a unique productive opportunity, which makes the firm unique itself. She defines 'productive resources' as a bundle of potential services rather than merely the physical quantities.

In the later stages, the focus slightly shifts from the resources to wards the management of resources. Even many economic institutions and management schools explain; 'organizational capabilities' plays a major role in the growth of modern industrial enterprises. The firms improve these capabilities during the learning process. Given the firm productive services, the managerial expenses determine the character and the extent of productive services available for the expansion. The nature and availability of managerial services, both entrepreneurial and administrative will shape the rate and direction of the firm's expansion.

**Downie (1958)**, emphasized in analyzing the way in which alternative forms of market structure and conventions governing business behavior, affect the dispersion of efficiency between firms and the rate of technical progress. He defines; in an industry a group of firm having similarity of technical progress, there exists a dispersion of efficiency across the firms. Some firms are more efficient than the average and some are lower than this.

Dowine's model starts with the postulation of the steady encroachment in the market share of the less efficient firms by more efficient firms. In other way the means of growth what Downie takes into account are 'capacity of production' and 'customers'. So far as capacity of production is concerned, the efficient firms would be able to raise huge finance, which is assumed to have high rate of profit. So it indicates that there exits a positive relationship between ' the rate of growth of capacity expansion' and ' the rate of profit'.

So far as the 'capacity of customers' are concerned, the efficient firms having better techniques of production would be able to sustain a price reduction for its product and attracts new customers. This leads to expansion of its market.



But the price reduction strategy would be feasible only up to certain limits. That is, as long as it is operating on the 'elastic zone' of its demand curve. After that any further reduction in price would lead to reduction in the rate of profit. It implies an inverse relationship between the rates of market expansion (customer expansion) and the profit rate of the firm.

So from Downie's model we got two opposite trend in regard to the growth process of the firm; (i) the capacity side & (ii) the market side. On the capacity side, the growth varies positively with the rate of profit and on the market side; the rate of customer expansion varies inversely with the rate of profit. In Downie's model of growth, the financial and market demand restraints play the crucial role in the process of the growth of the firm.

In the Mariss (1964) model (as discussed in Sidharthen, Pandit & Agarwal, 1992); there is no optimum firm size, instead there is optimum growth path. The model deals with the demand for and supply of growth functions. The firm consciously tries to equate the demand and supply curves of growth in order to avoid excess capacity and shortage.

But for the demand and supply to grow, a firm has to invest sufficient capital. According to Mariss, growth can be achieved through diversification. Mariss model has three equations;

1. a demand for growth (DG) equation:- Where DG is considered as a function of successful diversification.
2. a supply of growth (SG) equation:- Where SG is determined by retention ratio<sup>1</sup>
3. a diversification equation:- Where diversification is determined by capital output ratio and profit margin

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<sup>1</sup> The undistributed profit as a percentage of total net profit

The model postulates that; “ at low level of growth both profit and growth rates could increase, but at higher levels of growth profit motive would have to sacrifice at the margins in favor of growth”. It assumes that, the DG curve does not shift or, diversification does not influence the super environment in which the firm operates.

The actual growth and profit position of the firm is indicated by the intersection of the DG and SG curves. That is, change the environment in which the firms operate so that they can enjoy higher values for both ‘profit margin’ and ‘growth’. Initially Mariss (1963) kept SG curves to be fixed and allowed DG curves to shift. His argument is “ the environment determining the retention ratio and the threat of take over in the share market might not differ across firms<sup>2</sup>”.

According to **Hay & Moris (1979)**; mainly three variables are influential in shifting the DG curves. Those are, ‘the size of the firm’, ‘the level of innovative activity’ and ‘ the marketing skill’. Their model emphasized all these variables as demand shift variables.

Other than the above models; a number of attempts have been made by other economists to identify the stages through which the firms grow.

According to **Greiner (1972)**; firms evolves through five phases. These phases have been identified with a label, which indicates the nature of management problem. These are; ‘creativity’, ‘direction’, ‘delegation’, ‘co-ordination’ and ‘collaboration’. According to **Muller (1972)**; it is likely that growth would be associated with innovation and it is likely to go on.

The above discussion gives a clear understanding about the factors influencing the growth of a firm. For Downie it is ‘internal efficiency’, for Penrose it is ‘managerial efficiency’ and for Mariss it is both ‘internal and external efficiency’ which leads to diversification of the firm. So it is clear that there exist certain forces those put a limit to firm size and its growth. A firm cannot expand beyond its optimal capacity and any

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<sup>2</sup> It is because; the stock markets are more competitive than the goods market.

further expansion would have to face 'negative returns to scale', which finally retards further growth.

### **3.2 Profits and Profitability: A Theoretical Review**

The notion of profit in general refers to the difference between the total revenue from the sales of a commodity and total cost incurred in producing it. On the other hand the term profitability implies, the extent of capacity of earning profit (Dutta, 1999). There are many theories regarding the origination of profit. According to F.B. Hawley 'profit as the reward for the risk and responsibilities shouldered by the entrepreneur'. F.B. Night links 'profit' to the 'emergence unforeseen uncertainties'. Where as according to Schumpeter, the origin of profit is due to the innovative activities of the entrepreneur (as cited in Dutta, 1999).

So far as profitability is concerned, there is no standardized theory of 'profitability'. However there are some theoretical considerations related to profitability. The major theoretical development that has done is the establishment of the link between 'market structure, and 'profitability'. In the early 1950's economists tried to explain inter-industry difference of profitability in terms of a single element of market structure, e.g. 'concentration' (Bain, 1951 & Mann, 1966). It was argued that concentrated industries provide the market environment in which firms realize their interdependence and cooperate to raise prices leading to an increase in their profitability. The above argument still persists in the theory and empirical analysis. Now it is argued that apart from concentration, profitability is measured in terms of price-cost margin, is determined by the condition of entry in the industry which in turn depends on other elements of market structure such as economies of scale, product differentiation (Bain, 1956 & Mann, 1966). Thus market structure is a multi-dimensional concept.

Apart from market there are other some other determinants of profitability, which attracts considerable attention of the economists. Out of those, the growth of the firm is an important one. Other factors like capital intensity, advertisement intensity, age of the

firm, business cycle trends, availability of raw materials, industrial policy etc., affect the profitability (Nagraj & Bhrathwall, 1990).

Right from 1950's some amount of research has been done on profitability analysis. Initially all economist tried to study the relationship between 'profitability and concentration'. However, concentration was occasionally supported bearing a positive relationship with profit. Later on some studies tried to explore the relationship of profit with other variables such as, size of the firm. Baumol tried to explain firm size and profitability relationship. According to Baumol, there exist a positive relationship between firm size and profit. He argues large firms are capable of enhancing the investment opportunities, which bring larger profit rates, but the smaller firms cannot take them because of financial difficulties.

### **3.3 Concepts**

#### **(i) Growth**

The growth of an industry depends upon the growth of the firm in the industry. Generally the growth of the firm in any industry is influenced by economies of scale, market structure, market demand, supply of factors of production, cost of borrowing, financial policy and in particular; by managerial skill, investment policy and profitability of the firm. The growth of an industry or firm can be measured in terms of employment, sales, output, turnover or capital etc (Rede, 1983). The employment is relatively stable, while the output tends to fluctuate. Capital stock however shows relatively regular changes from year to year and therefore considered as a more suitable measure of growth. In our study we are using ASI data and considering fixed capital as the growth variable, since it is more consistent. In the study annual simple growth rate of capital has been calculated.

#### **(ii) Profit & Profitability**

The notion of profit in general refers to the difference between the total revenue accruing from the sales of the commodity and the total cost incurred in producing it. On the other hand the term profitability implies “the extent of capacity of earning profits”, that is the profit rate. In the study profit rate has been calculated as the ratio of net profit to the fixed capital. Net profits are defined as total income minus total manufacturing expenses minus interest and tax charges. Total manufacturing expenses include expenses on raw materials, fuels, wages and salaries, managerial remuneration and depreciation.

### 3.4 Modeling the Growth & Profitability Relationship

Here the objective to examine whether the rate of profit has any influence on the growth of the industry. To examine the above objective the study uses the arguments and the methodology used by Rede (1983), Kumar (1885) and Kaur (1996).

In a fast growing economy like India, where there is no market constraint on the demand for final product, current rates of profits are expected to influence the current investment decisions. As discussed earlier, profits attract the attention, as it is relatively cheaper and easily approachable source of finance. Hence it is expected, there exist a positive association between current rate of growth and current rate of growth.

The model is,

$$G_t = \alpha + \beta P_t + \epsilon_t$$

Where; G: growth rate of industry<sup>3</sup>

P: profit rates for each industry<sup>4</sup>

$\alpha$  &  $\beta$ : are parameters

$\epsilon$ : error term

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<sup>3</sup> here growth rate implies, simple annual growth rate;  $(V_t - 1 - V_t) / V_t * 100$

<sup>4</sup> here rate of profit has been taken as the ratio of Net profit to Fixed Capital; Net profit/Fixed capital

The above equation tells that, growth rate in period 't' (current rate of growth) is a linear function of profitability in period 't' (current rate of profit).

Though current rate of profit plays an important role in shaping the future expectation. However a firm while undertaking new investment would always consider about its future profitability and past performances that is last years rate of profit. Generally retained earnings of the current year are normally utilized as internal source of finance next year. Thus past profitability plays a dual role in the process of investment. On the one hand, it acts as predictor of future prospects and on the other, as an internal source of finance for undertaking investment in future (Rede, 1983). Considering the above views, one period time lag model has been fitted.

$$G_t = \alpha + \beta P_{t-1} + \epsilon_t$$

Where,  $P_{t-1}$ : profit rate in the past period that is t-1.

The above equation tells that, the growth rate of a period 't' is a linear function of rate of profit of period, t-1. In other words, the current rate of growth depends upon the rate of profit with one period time lag.

To show a given change in profitability is associated with a constant proportionate change in growth rate, the following log linear model has been used.

$$\text{Log } G_t = \alpha + \beta \text{ log } P_t + U_t$$

### **3.5 Data and Coverage**

The study relies upon the Annual Survey of Industries (ASI) data, published by Central Statistical Organization (CSO). The study intends to examine the above-mentioned objective at 2-digit level of Industry classification. The period of study is from 1980-81 to 2001-02.

### 3.6 Empirical Results

**Table: 3.1-Growth-Profitability Regression Results {Model: I}**

Industry Group	$\alpha$	$\beta$	$R^2$
20+21	.884 (.155)	44.564** (1.608)	.326
22	10.226 (.828)	8.508 (.444)	.11
23+24+25	8.071 (3.166)	90.437** (1.474)	.108
26	10.138 (.874)	16.902 (.858)	.039
27	11.286 (.813)	8.544 (.134)	.01
28	12.223 (1.471)	-27.298 (-.291)	.005
29	12.3 (1.256)	3.831 (.112)	.001
30	-5.113 (-.562)	105.416** (1.717)	.141
31	24.282 (1.562)	-23.998 (-.488)	.013
32	10.225 (1.758)	35.357 (.719)	.028
33	4.856 (.772)	77.534 (.754)	.311
34+35+36	.585 (.049)	36.337 (.754)	.034
37	-5.292 (-.725)	94.47* (2.959)	.236
38	14.346 (2.263)	-9.340 (.573)	.018
Total	-2.159 (-.250)	94.435** (1.598)	.24

Note: Figures in parentheses indicate t-values.

\* Significant at 5 percent level

\*\* Significant at 10 percent level

Table 3.1 reveals that, model I proves to be a 'poor fit' for all other than five industry groups. Result shows, Industry groups 20-21, 23+24+25, 30,37 and total manufacturing got significant results. The  $\beta$  values for the above industry groups are significant at 10 percent level of significance. But the extent of explanation of variations in growth of industries provided by the profitability differs widely. It is obvious from the fact that, the value of  $R^2$  (co-efficient of determination) is very low for most of the industries<sup>5</sup>.

So the low values of co-efficient determination implies, profitability explains a very small of growth. There are other variables affecting the growth of the industries. The regression co-efficient shows, how a one-percentage point (change) increase in profitability leads to how many percentage point (change) rise in growth rate. The  $\beta$  value reveals that, other than three-industry group, i.e; 28, 31 and 38 the rest of the industries show a positive sign. But incase of five industries the value of  $\beta$  is significant.

So from the above result and analysis it is clear that, there exist a positive relationship between growth and profitability. But that relationship is not so strong and significant. Writing in other words, our study shows, there exist a positive but weak relationship between growth and profitability.

Another important implication is, the rate of profit explains a very small portion of growth. So there are other variables those are responsible for growth of the industry. However the study gives a clear sign so far as the relationship between these two (growth & profitability) is concerned and in case of maximum industries it shows a positive sign.

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<sup>5</sup> Low  $R^2$  may be because of very low profit rate (because the number of factories included are huge in number) and we have one explanatory variable.



**Table: 3.2-Growth-Profitability Regression Results with One Period time lag**

{Model: II}

Industry Group	$\alpha$	$\beta$	$R^2$
20+21	1.762 (.327)	40.586** (1.546)	.117
22	24.196 (1.917)	-14.476 (-.749)	.030
23+24+25	8.642 (3.208)	45.357 (.908)	.094
26	4.568 (.404)	27.398** (1.529)	.102
27	21.616 (1.474)	-48.952 (-.677)	.025
28	2.050 (.277)	83.408* (2.210)	.312
29	1.311 (.145)	52.552** (1.671)	.34
30	-2.989 (-.333)	91.399** (1.497)	.11
31	22.593 (1.359)	-17.611 (-.337)	.006
32	6.181 (1.111)	74.816** (1.607)	.125
33	1.207 (.187)	144.935** (1.494)	.196
34+35+36	-6.911 (-.539)	65.021** (1.295)	.085
37	1.007 (.130)	58.522** (1.417)	.088
38	11.374 (1.787)	-.614 (-.037)	.085
Total	-5.716 (-.707)	120.277** (1.967)	.177

Note: Figures in parentheses indicate t-values.

\* Significant at 5 percent level

\*\* Significant at 10 percent level

The table 3.2 gives the results of regression model with one period time lag in profit rate. The result shows, the model proved to be a 'poor fit' for all the industries. But the  $\beta$  is positive and significant for nine industry groups. The  $\beta$  value for all these nine industry groups and manufacturing total are significant at 10 percent level of significance. The regression coefficient result of 28-industry group is significant at 5 percent level of significance. But low co-efficient of determination implies that, one period time lag in profit rate is explaining a very small portion of growth. There are other factors affecting the growth of the industries.

**Table: 3.3- Growth –profitability, Log-Log Linear Regression Result {Model: III}**

Industry Group	$\alpha$	$\beta$	$R^2$
20+21	1.119 (3.169)	.169 (.365)	.19
22	1.282 (6.859)	-.0329 (-.047)	.01
23+24+25	1.088 (2.964)	.05989 (.509)	.18
26	1.246 (6.987)	.287 (.674)	.28
27	2.178 (6.584)	1.029* (2.755)	.528
28	1.642 (5.708)	.337* (2.308)	.491
29	1.240 (4.018)	.143 (.374)	.11
30	1.742 (3.212)	.744* (1.187)	.405
31	.926 (3.102)	-.582 (-1.24)	.100
32	1.083 (3.031)	-0.0459 (-.144)	.01
33	1.013 (4.155)	0.02557 (.205)	.03
34+35+36	-.465 (-.556)	-2.429 (-1.781)	.196
37	1.671 (4.915)	.747** (2.000)	.550
38	1.75 (4.528)	1.278* (1.988)	.233
<b>Total</b>	1.332 (1.606)	.464 (.502)	.016

Note: Figures in parentheses indicate t-values.

\* Significant at 5 percent level

\*\* Significant at 10 percent level

The results of the log-log linear model present some how better result (table: 3.3) incomparision to earlier results. In some cases, the  $R^2$  has improved. The results are statistically observed to be significant at 5 percent and 10 percent level. The  $\beta$  value in most of the cases show, a positive association between Growth and profitability.

The above results are very much similar to the results of Kumar (1995), Rede (1983) and Kaur (1996). Kumar concluded from his result profitability explains a very small part of growth in Indian context. But in some industries he found positive (not so strong) relationship between growth and profitability. Rede found positive and in some industries strong positive relationship between growth and profitability. Kaur found positive relationship between growth and profitability. Our study also finds positive relationship between the growth and profitability. But the relationship is not so strong.

### **3.7 Factor Intensity and Profit**

In chapter-II we have discussed the growth of factor intensity and the rate of profit in Indian registered manufacturing sector. In order to examine how factors of production (labor and capital) influence the over all profit of the industry. In other words we are interested to find out the factor intensity and profit relationship. Whether capital intensity and profit are positively related and the nature of relationship between labor intensity and profit of the industry. Here with the help of log linear model we are examining what has happened incase of Indian manufacturing.

Modeling Factor Intensity and profit Relationship

$$\text{Log (K/L)}_t = \log \alpha + \beta \log P_t + U_t$$

Where,  $\beta = d(K/L)/dP \cdot P/(K/L)^6$

$(K/L)_t =$  Capital Intensity

K= capital, L= labor

$\beta =$  Parameter to be estimated

$\text{Log } (L/K)_t = \log \alpha + \beta \log P_t + U_t$

L/K= labor intensity.

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<sup>6</sup> Elasticity in the form of,  $dY/dX \cdot X/Y$   
Slope in the form of,  $=\beta (Y/X)$

**Table: 3.4-Capital Intensity & Profit Regression Result**

Industry Group	Constant	$\beta$	$R^2$
20+21	3.074	.562 (5.475)*	.612
22	2.992	.499* (6.218)	.619
23+24+25	4.390	-.0107 (.207)	.002
26	3.689	.375* (7.854)	.765
27	4.351	.192** (2.170)	.319
28	5.050	.0826** (2.037)	.179
29	4.313	.217* (4.762)	.544
30	3.832	.494* (9.704)	.832
31	33.863	.494* (4.735)	.541
32	4.940	.115 (1.160)	.466
33	5.553	0.027 (.646)	.221
34+35+36	2.171	.833* (6.517)	.691
37	3.988	.383* (5.759)	.636
38	4.090	.352* (4.956)	.564
M Total	2.014	.765* (9.115)	.834

Note: \* Significant at 1 percent level of significant

\*\* Significant at 5 percent level of significant

Table: 3.4: shows the regression results of the log linear model, which explains capital intensity and the profit relationship. The log linear model explains, the elasticity of capital intensity with respect to profit. In other words, it shows one percent change in profit is associated with how much percentage change in capital intensity. Over all it explains the nature of relationship between profit and capital intensity.

The result shows incase of total manufacturing, the elasticity of capital intensity with respect to profit is .76 percent on an average. In other words, if profit goes up by 1 percent on an average, the capital intensity of the manufacturing sector goes up by .76 percent. Here the  $\beta$  value is significant at 1 percent level of significance. By and large, it shows a positive relationship between profit and capital intensity.

So far as individual industries are concerned, it shows mixed results. Other than textile products, the rest of the industries got positive result ( $\beta$  value). In case of textile industries (23+24+25), the result is different. Here the result shows a negative relationship between profit and capital intensity, and statistically it is not significant. So from the above result we can conclude that there exist a positive relationship between profit and capital intensity. In other way, industries those are capital intensive earn more profit.

**Table: 3.5-Labor Intensity & Profit Regression Result**

Industry Group	Constant	$\beta$	R <sup>2</sup>
20+21	-3.074	-.562* (5.612)	.612
22	-2.992	-.499* (6.218)	.670
23+24+25	-4.930	0.0106 (.207)	.002
26	-3.689	-.375* (7.854)	.765
27	-4.351	-.192** (2.170)	.319
28	-5.050	-.082** (2.032)	.249
29	-4.313	-.217* (4.762)	.554
30	-3.382	-.492* (9.704)	.832
31	-3.863	-.494* (4.735)	.541
32	-4.940	-.115 (1.160)	.066
33	-5.553	-.027 (.646)	.21
34+35+36	-2.121	-.833* (6.517)	.671
37	-3.988	-.383* (5.759)	.638
38	-4.090	-.352* (4.956)	.564
M Total	-2.014	-.765* (9.115)	.814

\* Significant at 1 percent level of significant, \*\* Significant at 5 percent level of significant



Table:3.5: shows, the regression result of the log linear model explaining profit and labor intensity relationship. The results of the log linear model explain, the elasticity of labor intensity with respect to profit. In general it explains the nature of relationship that exist between profit and labor intensity in the Indian manufacturing sector.

The result shows, the elasticity of labor intensity with respect to profit is -.76 percent. In other words, if profit goes up by 1 percent on an average, the labor intensity goes down by .76 percent. The  $\beta$  value is significant at 1 percent level of significance. So it shows a negative relationship between profit and capital intensity.

The individual industries also explain the same story except textile industries (23+24+25). It shows a positive relationship between profit and labor intensity. But  $\beta$  value is not statistically significant. So from the above result and its explanation it is very much clear that there exist a negative relationship between profit and labor intensity. In other way, it implies industries those are labor intensive earn less profit.

### **3.8 Summary**

The present chapter mainly focuses on two major objectives. First, it explores the nature of relationship between growth and profitability. Second, studies the factor intensity and profit relationship. With the help of empirical results the study found, positive relationship between growth and profitability. But profitability explains a very small portion of growth. So it shows a weak positive relationship. So far as the current year's growth and last year's profit relationship is concerned, the study found positive sign. But again here also it is explaining a small portion of growth. So it can be concluded that, there exist positive but weak relationship between growth and profitability and there are other factors (other than profitability) those explain growth. In regard to the factor intensity and profit relationship, the study found there exist a strong positive relationship between capital intensity and profit and a negative relationship between labor intensity and profit. So it is evident that, capital intensity is positively associated with profit and the profit in Indian registered manufacturing is due to capital intensity.

## **Appendix**

### **Firm Size and Growth**

A firm in any industry passes through various phases in the process of its growth. In the life cycle<sup>1</sup> of a firm, first they tend to be younger and therefore more likely to be at an earlier stage in their development (Elston, 2002). They grow faster until they reach some critical and sustainable size. So the size behavior of the firm needs to be studied as it plays an important role in the over all growth of the firm and industry. In this regard the growth behavior of small and large firms can be studied by examining 'Gibrat's Law of Proportionate Effect' (LPE).

In 1931, Prof. Gibrat, a German economist came out with a stochastic size-growth model, which is known as ' Law of Proportionate Effect'. The central theme of the LPE is “ the proportionate growth of any firm at any specified period of time is independent of its absolute initial size”. The implication of this law is that the large and small firms have the same average proportionate rates of growth.

### **Growth Theory and Gibrat's Law: A Review**

Gibrat's law of proportionate effect has been comprehensively interpreted by various authors. Sutton (1997, as cited in Elston, 2003) interprets law as an “ expected value of the increment firm size in each period is proportional to the current size of the firm”. According to Mansfield (1962, as cited in Elston, 2003) “ it is the probability of a given proportionate change in size during a specified period being the same for all firms regardless of their size at the beginning of the period”.

Many empirical studies have been carried out to examine the validity of the Law of proportionate Effect. Studies by Evans (1987) and Hall (1987) conclude that Gibrat's law does not always hold and presented the evidence of a negative relationship between firm size and growth for US manufacturing. Empirical studies by Singh & Whittington (1968)

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<sup>1</sup> Life Cycle theory suggests that younger/smaller firms will grow faster until they reach some critical or substantial size.

did not find the existence of any systematic relationship between average growth rates and the size of firm. Hart & Outhon (1996) found inconsistent relationship between firm size and its growth. Dasgupta (1985) testing the Gibrat's law in the Indian context found inconsistent relationship between size and growth of a firm. Study by Kumar (1995) on UK companies found weak negative relationship between size and growth. The above empirical studies invalidate the Law of Proportionate Effect.

On the other hand, some studies have concluded that initial firm size does impact firm growth. Studies by Wagner (1992), Reid (1995), Harshoff, Stahl & Woywode (1998), Weiss (1998), Audertsch (1995) holds Gibrat's Law. Studies by Mansfield (1962), Simmon & Bonni (1958) validate the Law Of Proportionate Effect.

It is clear from the above analysis that, studies are equally divided. Some are found to be consistent with the law and some are inconsistent. So it becomes to interesting to study it empirically and analyze the outcomes of our study.

### **Empirical Model: Growth and Firm Size**

There are number of ways to estimate the relationship between the size of the firm and its growth. The 'Stochastic Framework' has been widely used in order to formalize the relationship. The stochastic framework tells, " The growth of a firm is a random process"<sup>2</sup>.

The methodology adopted here is similar to Hart (1962) and Dasgupta (1985). In order to test Gibrat's Law the first order Auto Regressive Model (AR) has been used.

Starting with the general growth model,

$$S_{i,t+1} / S_{it} = \alpha$$

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<sup>2</sup> There may be large number of systematic factors affecting growth. Collectively they exercise only a limited influence on firm's proportionate growth (Hart, 1962).

Where,  $S_{it}$  is the size of 'i<sup>th</sup>' firm at time 't'.

$\alpha$  is the constant rate of growth.

In order to formalize the relationship between size and growth, the growth of a firm to be related to initial size;  $S_{it}^{\beta-1}$  and the random element  $e^{U_t}$ .

Thus the equation is,

$$S_{i,t+1} / S_{it} = \alpha S_{it}^{\beta-1} e^{U_t}$$

In the above equation, the initial size of growth is determined by the value of  $\beta$ . If  $\beta = 1$ , the exponent of  $S_{it}$  is zero, which implies the initial size has no effect on the future growth (thus, LPE holds). If  $\beta > 1$ , it implies large firms grow at a faster rate than small ones. If  $\beta < 1$ , then it implies initially small firms grow at a faster rate than large ones.

Taking the logarithms on both the sides,

$$\text{Log } S_{i,t+1} = \log \alpha + \beta \log S_{it} + U_t$$

The above model has been estimated using ordinary least squares (OLS) technique. It has been estimated using the pooled data (pooling time series data for five years 1999 to 2003 across all companies with in each industry).

The data used for the study covers 97 Indian manufacturing companies comprising 10 industries listed in different indices of NSE of India. It covers the time period from 1999 to 2003. Total asset<sup>3</sup> of the firm has been used as the variable for the firm size.

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<sup>3</sup> Total Assets = Net fixed assets (net fixed assets = fixed assets less depreciation) + capital work in progress + Investments + net current assets (net current assets = inventories + debtors + cash in hand and bank + loans and advances – current liabilities and provisions).

## Empirical Results

**Table: 3A.1: The Firm Size and Growth Regression Result**

Industry	Constant	$\beta$	$R^2$
Motor Vehicle	-0.0575	1.019 (35.01)*	.970
Auto 2 & 3 Wheeler	.101	0.954 (21.554)*	.957
Textile	-.135	1.045 (41.56)*	.902
Oil Refinery	1.58	0.949 (37.109)*	.777
Sugar	0.701	0.725 (4.548)*	0.535
Cement	-0.137	0.998 (46.42)*	.975
Petro-Chemicals	0.0657	0.978 (51.152)*	.986
Power	0.278	0.912 (16.05)*	.948
Steel	0.113	0.967 (10.596)*	0.836
Chemical	-0.128	1.036 (45.88)*	.986

Note: \* significant at 1 percent level of significance.

The above results show that, for motor vehicle industry, the LPE determining parameter the  $\beta$  value is significantly more than unity. Thus for the motor vehicle industry, the LPE does hold. It implies, larger firms are growing faster than the smaller ones. It says,

1 percent initial increase in the total assets resulted in 1.01 percent increase in the total assets of the firm in subsequent periods. Thus the growth of the motor vehicle industry in subsequent periods is independent of the initial size, which conforms the Gibrat's law.

Likewise incase of automobiles-2 & 3 wheelers industry,  $\beta$  value is significantly less than unity. Thus the result implies the PLE does not hold here. In case of textile industry, the  $\beta$  value is significantly greater than unity, which conforms the Gibrat's law. Similarly incase of oil refinery, sugar, cement, petro chemicals, power and steel industries, the  $\beta$  value is significantly less then unity. Which is contrary to the LPE. But incase of chemical industries, the  $\beta$  value is significantly is greater than unity and so conforms the Gibrat's law.

From the analysis of the results, it is found that the majority of the industries do not conform the Gibrat's law. Only in case of three industries, it holds the LPE.

### **Firm Size and Profitability**

In the previous section; we have analyzed the nature of growth of small and large firms. As we have discussed earlier, there are various factors those influence the profitability. Among various factors, we are interested to find out the firm size and profit relationship. It is interesting to study the relationship between profitability and size for two broad reasons; (i) its likely effect on industrial concentration and (ii) its possible implications for returns to scale and monopoly power (Whittington, 1980).

But in our study we are not going to analyze the above two effects in terms of size and profitability relationship. Rather we will narrow down the study by focusing only on the firm size effect on profitability and the effects of non-firm size factors on profitability.

The factors affecting profitability can be broadly classified in to – firm size and non-firm size factors. Firm size factor includes variables like the total assets, total share capital, net

sale etc. The non-firm size factors include, product differentiation<sup>4</sup>, degree of vertical integration<sup>5</sup>, prices of products and imports, government policies etc.

### **Review: Size and Profitability**

There has been large number of empirical studies in regard to the factors affecting the profitability of the firm and industry. However there has not been any uniformity in regard to the relationship between the size of the firm and its profitability. Initially Ban (1951) and Mann (1966) carried out some empirical research on concentration and profitability relationship. They conclude there exist significant positive relationship between concentration and profitability.

The credit goes to Baumol (1959) as he is the first one to empirically study the determinants of profitability. He shifted the focus from concentration to the size of the firm as a major determinant of profitability. Later on he concluded, large firms are in a better position to get funds as their capacities to adjust market fluctuations is high and their over all profit is also high compare to small firms.

In some cases the size of the firm influences the profitability has been concluded by Maracus & Wilson (1967). Hall & Weiss (1967) in their study on USA firms found positive relationship between size of the firm and profitability. Like wise the size of the firm as an important determinant of profitability has been concluded in empirical studies by Samuels & Smyth (1968), Gale (1972).

On the other hand, empirical study by Whittington (1980) found the average profitability is largely independent of the size of the firm.

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<sup>4</sup> When a firm under takes quality variation, so that its product can be differentiated and the product supplied by the firm can be identified and distinguished from the rest.

<sup>5</sup> Refers to the amalgamation of firms engaged in the different stages of production of the same commodity to achieve profitability.

So it is clear from the above discussion that, in most of the studies the size of the firm emerges as a major determinant of profitability. Along with firm size, there are also other factors those influence largely the profitability of the firm and industry. Now it becomes interesting to study the above discussed factors as determinants of firm profitability empirically.

### **Modeling Profitability**

As discussed earlier, there are large number of factors those influence the profitability of a firm. In our study we will take some important factors like the size of the firm, Vertical integration and product differentiation. In order to specify the relationship, a multiple regression model has been used.

$$NP_{it} = \alpha + \beta_1 S_{it} + \beta_2 VI_{it} + \beta_3 PD_{it} + U_{it}$$

Where, NP is net profit,

S, size of the firm (measured as total asset)

VI, vertical integration (measured in terms of value added<sup>6</sup>)

PD, product differentiation.

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<sup>6</sup> Value Added = Total sales less costs of inputs, repair charges and custom and excise duties.



**Table: 3A.2:Firm Size and Profitability Regression Results**

Industry	Constant	$\beta_1$ (S)	$\beta_2$ (VI)	$\beta_3$ (PD)	R <sup>2</sup>
Motor Vehicle	28.72	0.083 (2.864)*	-0.325 (3.477)*	0.286 (0.782)	0.254
Auto 2 & 3 Wheeler	-32.83	0.211 (4.871)*	-0.912 (2.731)*	2.044 (3.996)*	0.894
Textile	24.64	-0.0649 (3.298)*	-0.031 (0.418)	0.894 (3.181)*	0.109
Oil Refinery	27.232	-0.0267 (2.135)*	0.402 (9.274)*	0.0061 (0.377)	.958
Sugar	5.583	0.0361 (0.525)	0.0288 (0.073)	-0.923 (0.925)	.076
Cement	-12.95	0.087 (5.575)*	0.0066 (0.088)	-0.299 (1.889)**	.870
Petro- Chemicals	1.725	0.0568 (4.526)*	-0.232 (3.055)*	0.915 (3.913)*	.955
Power	-5.211	-0.063 (1.334)	0.0535 (0.175)	3.459 (0.639)	.405
Steel	-47.66	0.0071 (4.066)*	-0.598 (0.000)	3.026 (14.776)*	.965
Chemical	1.504	-0.037 (1.102)	0.192 (4.532)*	-0.412 (0.989)	.817

Note: \* significant at 1 percent level of significance.

\*\* Significant at 5 percent level of significance.

From the regression result it is evident that, incase of motor vehicle industry, the coefficient value of the firm size depicts that there exists a significantly positive relationship between the firm size and the profit level. Coming to the influence of other variables on profitability, it is seen that the degree of vertical integration is negatively and

significantly the profitability of the motor vehicle industry. The level of product differentiation is observed to have a positive effect on profit but it is not significant.

Like wise in Auto 2 & 3 Wheeler industry, the size of the firm show positive relationship between the firm size and profitability. It is significant at 1 percent level of significance. The other variable, the degree of vertical integration is negatively related and the product differentiation is positively related with the level of profitability.

In case of textile, oil refinery, power and chemical industries the result shows a negative relationship between the size of the firm and the level of profit. In textile and oil refinery industry the negative relationship is statistically significant at 1 percent level of significance. Where as in sugar, cement, petro chemical and steel industries, the firm size is positively related with the profitability. In cement, petro chemicals and steel industries the positive relationship is statistically significant.

The industries where the degree of vertical integration is significantly positively affecting the profit level include, oil refinery and electrical industries. Other than sugar, cement and chemical industry, the coefficient value of the product differentiation shows a positive relationship between the product differentiation and profit level.

### **Summary**

So far as the firm size and its growth relationship is concerned, our study found in case of majority industries (7 out of 10), it does not conform the Gibrat's law. In other words, it was found the initial size of the firm has influence on the subsequent growth of the firm. Which implies, initially the smaller size firms were growing at a higher rate than the large size firms during the study period.

The results of the firm size and profitability relationship shows, the firm size measured in terms of the total assets influenced positively the profits in six industries out of total ten industries. In rest four industries the relationship between firm size and profits level did

not show any systematic desired pattern. In case of the degree of vertical integration, we found in five industries, it is negatively associated with the level of profit and in rest five industries it is positively associated with profit. Similarly, the level of product differentiation was found to have a positive influence on profitability of seven industries.

**Table: 3AA.1: Growth and Profitability Regression Result**

Industry	Constant	$\beta$	R <sup>2</sup>
Motor Vehicle	3.92	.121 (0.74)	.124
Auto 2 & 3 Wheeler	7.23	.024 (.401)	.017
Textile	-3.24	.295 (2.92)*	.321
Oil Refinery	-12.76	1.023 (1.95)	.501
Sugar	9.87	.052 (.34)	.01
Cement	-0.87	.421 (1.98)	.076
Petro-Chemicals	-7.64	.056 (2.69)*	.423
Power	2.56	.105 (.365)	.021
Steel	2.85	.023 (.863)	.002
Chemical	-12.65	.965 (2.86)*	.434

*Note: \* Significant at 5 percent level of significance*

## **Chapter-4**

### ***Investment in Indian Registered Manufacturing Sector: An Inter-State Analysis***

## **INVESTMENT IN INDIAN REGISTERED MANUFACTURING SECTOR: AN INTER-STATE ANALYSIS**

The empirical literature on economic growth consistently showed that the rate of accumulation of physical capital or investment is an important determinant of economic growth (Nair, 2005). Particularly after the introduction of economic reforms in India, the importance of investment increased significantly as an instrument for faster economic growth. The recent economic reforms undoubtedly represent a milestone in the country's economic history and accounts many of the transformations that occurred. In this context it becomes very interesting and important to study its impact on investment.

The present study focuses on the investment at two digit manufacturing sector in India and across major Indian states. There are several factors those influence the investment decision in manufacturing sector. They are the rate of profit, the rate of interest, availability of internal fund, etc. But so far as the investment in manufacturing sectors of the differently states are concerned certain important factors like location, capital intensity, political climate and infrastructure facilities influence the investment behavior and pattern. More importantly many studies have shown the government policy plays a crucial role in a developing country like India.

The economic theory tells that an increase in saving leads to an increase in investment in the economy and a slow down in the rate of investment is due to the slowdown in the rate of domestic saving. In a cyclical way it further affects the investment in general and public investment in particular. This chapter tends to analyze the investment pattern and its determinants in two-digit manufacturing sector in India and also tries to study the patterns of investment at state level and tries to find out the important factors influencing the location of new investment.

#### 4.1 Investment in Different Sectors: An overview

The investment in Indian economy in general and manufacturing sector in particular has made several roads in to the industrial development. As discussed earlier capital formation is the key to economic growth and development, here the study focuses on capital formation in different sectors from 1980-81 to 2000-01.

**Table: 4.1(a): GFCF by Different Sectors In India**

(Rs in Crores)

Year	Total Agriculture	Manu- facturing	Constru- ction	Trade &Transport	Others	Total Economy
1980-81	13721	24125	1407	16582	35358	91193
1981-82	13407	38571	1907	17349	40070	111304
1982-83	13766	31452	2053	13246	49859	110376
1983-84	13926	29719	1781	13741	42326	101493
1984-85	13846	41835	1823	16878	43498	117880
1985-86	13061	45376	1459	19646	48622	128164
1986-87	12789	44506	1653	19822	52236	131006
1987-88	13375	30317	1885	18447	53978	118002
1988-89	14335	45357	1969	25161	57686	144508
1989-90	12728	48190	2744	27048	59688	150398
1990-91	15805	47141	2593	25525	26293	117357
1991-92	14546	58028	1856	30614	68483	173527
1992-93	15610	54138	2341	26442	68847	167378
1993-94	14749	62620	2021	28177	75240	182807
1994-95	15978	71880	3323	36178	89381	216740
1995-96	16824	116502	4935	40339	84402	263002
1996-97	17009	12748	2633	37114	189890	259394
1997-98	17046	112321	5617	30637	81443	247064
1998-99	17730	103381	4819	29541	86009	241480
1999-00	19712	96067	5096	33253	94108	248236
2000-01	19532	95329	5261	33597	95161	248880

*Note: Others include finance, insurance etc.*

*The values are at 1993-94 constant prices*

Source: - National Accounts Statistics, Govt Of India.

**Table: 4.1 (b): Growth rate of GFCF (by different sectors in India)**  
(in Percent)

Growth Rate	Total Agriculture	Manufacturing	Construction	Trade & Transport	Others	Total Economy
(1880-81 to 1990-91)	0.42	5.07	4.08	6.18	1.12	3.40
1991-92 to 1995-96	3.19	18.26	25.89	9.04	7.03	11.52
1996-97 to 2000-01	4.31	-6.25	13.74	-0.95	-11.63	-0.78
1991-92 to 2000-01	3.33	7.98	12.96	11.34	3.92	4.83
1980-81 to 2000-01	1.89	5.74	6.45	4.95	5.57	5.58

Source: Has been calculated from the table no 4.1 (a)

The above tables {Table: 4.1 (a) and (b)} show the investment (GFCF) in different sectors of the economy and the growth of investment in different sectors of the Indian economy from 1980-81 to 2000-01. It is clear from the above table (Table: 4.1 (a)) that, in the post reform period there is an increase in the growth investment in each and every sector of the economy in comparison to the pre-reform period. The investment growth in total agriculture has gone up from 0.42 percent to 3.33 percent in the post reform period. Like wise, the manufacturing sector experienced an increase from 5.07 percent in pre reform period to 7.98 percent in post reform period. Construction registered a significant increase from 4.08 percent to 12.96 percent, trade & transport from 6.18 percent to 11.34 percent and the total economy from 3.40 percent to 4.38 percent.

In the first half of the nineties (1991 to 96) the increase in investment in all sectors is much higher than the earlier time period. The highest growth rate of manufacturing sector has been witnessed during this period, which is 18.26 percent. So far as the growth of



investment in total economy is concerned, it is highest during this period, 11.52 percent. But the second half of the nineties witnessed a decline in investment growth almost in all the sectors of the economy. Some sectors like manufacturing, trade and transport etc shows negative growth rate during this period. Manufacturing growth declined drastically from 18.26 percent in first half to -6.25 percent in the second half of the nineties. Likewise trade and transport declined to -0.95percent and the growth of investment for the total economy declined to -0.78 percent. The construction sector also witnessed decline in the investment growth.

**Table: 4.2: Share of Public Sector in the Total Investment from 1980-81 to 2000-01**  
(in Percent)

Year	Share of public sector	Annual Average Share
1980-81	44.84	46.5
1981-82	40.99	
1982-83	49.62	
1983-84	51.94	
1984-85	46.69	
1985-86	44.82	
1986-87	49.11	
1987-88	52.84	
1988-89	45.1	
1989-90	42.59	
1990-91	42.94	
1991-92	39.78	32.61
1992-93	38.66	
1993-94	37.66	
1994-95	37.49	
1995-96	28.88	
1996-97	27.56	
1997-98	28.83	
1998-99	30.95	
1999-00	28.53	
2000-01	27.79	

Source- Various Issues Of National Account Statistics, Govt. Of India and Economic Survey, Govt Of India.

The table: 4.2: shows the share of public sector in the total investment. It is seen that, the share of public sector to total investment has declined over years. The share of public sector was 44.84 percent in 1980-81, which increased to 52.84 percent in 1987-88. After that it declined to 27.79 percent in 2000-01. The annual average share of public sector in total investment shows it has declined significantly from 46.5 percent in eighties to 32.61 percent in nineties. The pre reform period (eighties) shows a fluctuation in the public sector investment. Where as the period of nineties shows a continuous decline in the share of public investment except 1998-99. The reasons for declining share of public sector in total investment is due to the budget deficit which forced the government to devote a small portion of revenue for investment. Another reasons happens to be after economic reforms many public sector units were dis-invested and came to the hands of private sector, that automatically left the private sector more responsible for investment. Another important reason is lower rate of interest. The lower rate of interest encouraged the private sector to invest more.

#### **4.2 Growth and Structure of Investment in Indian Registered manufacturing Sector**

With the introduction of New Economic Policy, there has been a radical change in the over all development strategy. The new growth model is more of the outward looking in nature and more importantly, heavily reliant on the market forces. As mentioned earlier the share of public investment is declining, so the period of nineties limited the role of public sector in the investment expenditure. The manufacturing was not an exception to this. During the nineties there has been a huge fluctuation in the investment pattern in the Indian registered manufacturing sector. In this section the focus is on the performance of the two-digit classification of the manufacturing sector in India.

**Table: 4.3: All India Trend Growth Rate of GFCF in the Two-digit Registered Manufacturing Sector from 1980-81 to 2000-01.**

(in percent)

Industry Group	1980-81 to 1990-91	1991-92 to 1995-96	1996-97 to 2000-01	1991-92 to 2000-01	1980-81 to 2000-01
20-21	11.71	19.90	2.48	2.94	8.64
22	15.60	22.49	15.63	8.24	12.68
23+24+25	1.27	25.66	-13.32	3.16	7.63
26	17.56	46.01	19.97	14.01	19.02
27	5.26	13.23	3.11	15.23	7.01
28	0.81	57.54	-16.51	6.34	6.88
29	12.89	25.44	7.06	7.06	11.91
30	9.30	34.22	-11.07	7.10	9.63
31	5.66	10.34	-4.02	13.30	11.60
32	10.65	32.71	-13.24	6.09	8.02
33	4.43	9.44	-19.44	-6.23	5.64
34+35+36	7.14	24.34	-2.83	5.01	8.02
37	6.17	28.71	-8.45	14.21	10.35
38	14.54	32.82	1.91	8.30	12.74
Total	6.50	23.65	-8.74	5.22	8.81

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

Table: 4.3 shows the trend growth of manufacturing sector in both pre and post reform periods. The growth rate of GFCF shows, it was 6.50 percent in eighties for the whole manufacturing sector, which declined to 5.22 percent in the nineties. The decline is due to the negative growth rate in the basic metal and alloys industries (33). It declined from 4.43 percent in eighties to -6.23 percent in nineties. Decade wise analysis shows, in eighties industries those registered higher growth rate include textile products including wearing apparel (26), manufacture of scientific equipments, photographic cinematography, watches, clocks etc (38), beverages tobacco (22), leather & leather products (29), food products (20-21) and non-metallic mineral products (32). The industries those registered lower GFCF growth in eighties include paper products (28), and textile product (23+24+25). Textile products including wearing apparel (26)

demonstrate the highest growth of GFCF in eighties, where as paper products (28) demonstrates the lowest GFCF growth.

In nineties, many industries those registered higher GFCF growth experienced a decline in the investment growth, where as industries those registered lower investment growth demonstrates higher investment growth. Industries those demonstrate higher GFCF growth include wood products (27), transport equipment (37) and include textile products including wearing apparel (26). But textile products including wearing apparel (26) registered a decline in the post reform period, even though it maintains a higher investment growth rate in nineties. The industries those show a decline in investment growth in nineties in comparison to eighties include food products (20-21), beverages tobacco (22), textile products including wearing apparel (26), leather & leather products (29), basic chemicals & chemical products (30), non-metallic mineral products (32), basic metal & alloys (33), machinery & equipments (34+35+36) and manufacture of scientific equipments, photographic cinematography, watches, clocks etc (38).

A disaggregated study of the growth rate of the real investment shows large fluctuations in some industry groups. During 1990-91 to 1995-96 more or less all industry groups registered an impressive GFCF growth rate. But in subsequent periods, they could not maintain the pace. Which results a very dismal performance in the second half of the nineties. Some industries like textile products including paper products (28), wearing apparel (26), basic chemicals & chemical products (30), non-metallic mineral products (32), manufacture of scientific equipments, photographic cinematography, watches, clocks etc (38), leather & leather products (29), textile product (23+24+25) and transport equipment (37) show higher investment growth in the first half of nineties. The manufacture of paper products (28) registered the highest growth in investment as 57.54 percent. During 1996-97 to 2000-01, many industry group registered sharp decline in the growth of investment. Many industry groups demonstrate a negative growth rate during that period. Industries those show negative growth rate in the second half of nineties include textile product (23+24+25), textile products including paper products (28), basic chemicals & chemical products (30), manufacturers of rubber, plastic, petroleum, coal

products, processing of nuclear fuels etc (31), non-metallic mineral products (32), basic metal & alloys (33), machinery & equipments (34+35+36) and transport equipment (37).

The increasing trend of GFCF during 1990-91 to 1995-96 is well explained as a period of 'investment boom' (Uchikawa, 2003). According to Uchikawa (2003) the abolition of industrial licensing encouraged investment on the basis of entrepreneurship. The increased demand for intermediate goods through backward linkages also encouraged investment in some particular industries like food products, man made textile etc. As a result of increased demand for intermediate goods plastic materials, man-made fiber, refined petroleum products, steel etc led the intermediate good industries. In order to meet the increased demand huge investment was made during 1994-95 and 1996-97. So the large-scale investment created more demand for the capital goods.

So far as the full study period is concerned, the industries those show higher investment growth include textile products including wearing apparel (26), manufacture of scientific equipments, photographic cinematography, watches, clocks etc (38), beverages tobacco (22), leather & leather products (29) and the manufacturers of rubber, plastic, petroleum, coal products, processing of nuclear fuels etc (31).

**Table: 4.4 (a): Total Share of Investment (All India) in the Registered Manufacturing Sector by Two-digit Industry Group**

(in percent)

Industry Group	1980-81	1990-91	2000-01
20-21	5.59	7.48	6.84
22	0.91	1.40	3.01
23+24+25	15.37	10.48	8.17
26	0.43	0.88	3.26
27	0.30	0.19	0.33
28	5.25	4.28	3.68
29	0.46	0.76	0.86
30	17.37	17.13	17.19
31	5.10	8.00	15.28
32	4.74	5.26	5.84
33	25.69	24.88	13.47
34+35+36	12.57	13.11	12.16
37	5.68	5.30	8.54
38	0.55	0.85	1.37

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The above table shows the share of investment in registered manufacturing sector at three points of time. It is seen that, the manufacture of basic metal & alloys (33) has the largest share in 1980-81 and 1991-91. The disaggregate analysis also shows the same trend (Table: 4.4 (b)). The industry that has been much consistent through out the study period is the manufacture of basic chemicals & chemical products (30). In 1980-81 its share was 17.37 percent that declined marginally to 17.13 percent in 1990-91 and in 2000-01 its

share was 17.19 percent. Many industries registered a decline in the share of investment in nineties. Industries those witnessed a decline include the manufacture of textile products (23+24+25) and paper products (28). Other than these industries the rest of the industries witnessed an increase in their investment share.

The share of investment has been more through out in manufacture of basic metal & alloys (33), other than for the year 1986-87 and 1999-2000. The industries those show higher share in GFCF in eighties include the manufacture of textile products (23+24+25), basic chemicals & chemical products (30), manufacture of basic metal & alloys (33) and the manufacture machinery & equipments (34+35+36). In nineties industries those have higher investment share include the manufacture of textile products (23+24+25), basic chemicals & chemical products (30), manufacture of basic metal & alloys (33) and the manufacture machinery & equipments (34+35+36).

**Table: 4.4 (b): Share of GFCF in Total Registered Indian Manufacturing from 1980-81 to 2000-01. (in Percent)**

Year	20-21	22	23+24+25	26	27	28	29	30	31	32	33	34+35+36	37	38
1980-81	5.59	0.91	15.37	0.43	0.30	5.25	0.46	17.37	5.10	4.74	25.69	12.57	5.68	0.55
1981-82	5.29	0.73	11.09	0.41	0.21	5.01	0.32	15.14	9.81	5.78	28.24	11.60	5.76	0.62
1982-83	6.21	0.71	13.97	0.53	0.31	6.07	0.55	12.26	8.45	5.72	25.06	12.81	6.88	0.49
1983-84	6.67	1.17	12.45	0.42	1.05	7.75	0.29	17.61	9.74	6.39	17.84	12.08	5.86	0.68
1984-85	5.32	0.81	10.88	0.47	0.29	6.55	0.42	15.23	9.58	6.52	23.40	11.48	8.09	0.95
1985-86	5.84	0.87	10.39	0.51	0.20	5.27	0.40	15.31	7.82	8.23	23.34	13.40	7.88	0.53
1986-87	7.01	1.04	8.89	0.60	0.25	5.50	0.40	22.63	7.16	9.40	18.28	10.48	7.42	0.93
1987-88	6.66	1.46	9.29	0.84	0.35	4.33	0.44	17.68	5.96	9.63	24.87	11.16	6.40	0.94
1988-89	7.49	2.70	7.02	0.94	0.75	3.94	0.70	18.42	7.59	9.51	18.70	14.56	6.46	1.22
1989-90	11.07	1.25	9.13	1.07	0.26	2.76	0.57	21.00	6.71	7.38	19.21	12.54	5.91	1.14
1990-91	7.48	1.40	10.48	0.88	0.19	4.28	0.76	17.13	8.00	5.26	24.88	13.11	5.30	0.85
1991-92	7.55	1.22	10.16	0.98	0.12	2.30	0.55	15.69	9.79	4.19	31.06	10.85	4.80	0.76
1992-93	7.51	1.75	10.66	0.98	0.18	3.29	0.65	14.87	7.93	6.02	26.87	12.51	5.67	1.09
1993-94	5.41	1.69	11.59	1.84	0.24	4.51	0.60	17.05	9.46	6.23	23.26	10.58	6.26	1.28
1994-95	7.00	1.37	11.62	2.06	0.16	11.37	0.63	14.20	4.82	5.98	24.59	11.41	3.89	0.88
1995-96	6.70	1.32	10.54	1.55	0.27	4.15	0.59	24.18	7.10	5.98	17.63	11.68	7.09	1.21
1996-97	5.24	1.66	10.57	1.08	0.24	5.10	0.49	16.79	16.67	6.55	13.77	10.08	11.03	0.74
1997-98	5.41	0.91	12.26	1.56	0.16	4.75	0.40	25.31	7.13	6.45	18.49	9.54	6.20	1.44
1998-99	2.52	0.50	7.10	0.96	0.44	3.71	0.66	14.38	14.57	5.63	26.51	9.47	9.47	0.79
1999-00	10.13	2.94	12.26	2.63	0.29	3.67	0.64	18.63	14.13	4.90	5.55	12.29	10.67	1.25
2000-01	6.84	3.01	8.17	3.26	0.33	3.68	0.86	17.19	15.28	5.84	13.47	12.16	8.54	1.37

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.



**Table: 4.5: All India Trend Growth Rate of GVA in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

Industry Group	(in Percent)				
	1980-81 to 1990-91	1991-92 to 1995-96	1996-97 to 2000-01	1991-92 to 2000-01	1980-81 to 2000-01
20-21	9.03	14.59	4.02	9.7	8.61
22	10.23	8.02	13.03	10.5	9.73
23+24+25	3.54	11.62	-1.67	3.67	4.17
26	13.28	25.85	14.08	11.85	15.36
27	3.33	9.67	12.62	10.98	5.54
28	6.72	15.91	8.92	5.58	6.85
29	11.45	7.29	4.03	5.76	10.77
30	7.38	20.41	8.12	11.13	10.08
31	14.72	17.27	4.23	7.12	9.76
32	9.91	7.22	10.10	6.3	7.98
33	7.28	21.40	-1.29	8.49	7.62
34+35+36	7.08	13.31	1.09	5.52	6.88
37	5.69	19.52	-2.97	8.13	7.08
38	7.62	21.60	11.53	12.69	11.23
Total	6.64	16.19	1.76	8.22	7.8

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

Table: 4.5 shows the trend growth rate of Gross Value Added (GVA) in the registered manufacturing sector from 1980-81 to 2000-01. GVA is widely accepted as a good indicator of market condition<sup>1</sup>. The disaggregated industry wise analysis shows the same growth pattern as it was for GFCF. In eighties the industries those demonstrate higher growth include the manufacture of coal products, processing of nuclear fuels etc (31), textile products including wearing apparel (26), leather & leather products (29) and beverages tobacco (22). The manufacture of coal products, processing of nuclear fuels etc

<sup>1</sup> It is because a rapid growth of Gross Value Added in any industry would increase the expectation that there would be rapid growth of that industry in future, which in turn increases the investment.

(31) registered the highest growth rate of 14.72 percent in eighties followed by textile products including wearing apparel (26) 13.28 percent and leather & leather products (29) 11.45 percent. Taking manufacturing as a whole, the growth rate of GVA in the eighties was 6.64 percent.

The growth of GVA accelerated in the manufacturing sector as a whole in nineties. It increased from 6.64 percent in eighties to 8.22 percent in nineties. Some industries like the manufacture of wood and wood products (27), basic chemicals & chemical products (30), transport equipment (37) and photographic cinematography, watches, clocks etc (38) show an increase in the GVA growth in the nineties. The increase in the overall GVA in nineties is due to higher GVA growth in the above-mentioned industries. The manufacture of wood and wood products (27) registered a significant increase in growth of GVA from 3.33 percent in eighties to 10.98 percent in nineties. There are also some industries those witnessed a decline in the growth of GVA in nineties. These are the manufacture of leather & leather products (29), processing of nuclear fuels etc (31) and machinery & equipments (34+35+36). The manufacture of leather & leather products (29) registered a sharp decline in the GVA growth rate from 11.45 percent in eighties to 5.76 percent to nineties. Where as the manufacture of coal products, processing of nuclear fuels etc (31) demonstrate a huge decline from 14.72 percent to 7.12 percent.

A desegregated analysis of nineties shows, GVA growth accelerated particularly in the first half of nineties (1990-91 to 1995-96). During this period the growth rate of value added was 16.19 percent, which declined drastically to 1.76 percent in the second half. This is because some industries those registered higher value added growth in the first half of nineties, witnessed a sharp decline leading to a negative value added growth in the second half. Some industries like the manufacture of textile products (23+24+25), basic metal & alloys (33) and transport equipment (37) experienced negative GVA growth. These industries registered higher growth rates of 11.62 percent, 21.40 percent and 19.52 percent respectively. Other than these industries, some industry groups like the manufacture of beverages tobacco (22), wood and wood products (27) and non-metallic

mineral products (32) registered an increase in the growth of value added in the second half of nineties.

The whole study period (1980-81 to 2000-01) shows the value added growth is highest in the manufacture of textile products including wearing apparel (26), which is 15.36 percent followed by 11.23 percent growth in the manufacture of photographic cinematography, watches, clocks etc (38), 10.77 percent in leather & leather products industries (29) and 10.08 percent in the manufacture of basic chemicals & chemical products (30). Total manufacturing shows a moderate growth of 7.8 percent in value added. In all time periods the growth of value added is higher incase of the manufacture of textile products including wearing apparel (26), which is also same incase of GFCF.

Table: 4.6: shows the share of Gross Value Added (GVA) in Indian registered manufacturing sector from 1980-81 to 2000-01. It is clear that the manufacture of machinery & equipments (34+35+36), textile products (23+24+25), basic chemicals & chemical products (30) and basic metal & alloys (33) have larger GVA share among industries. All the above-mentioned industries other than the manufacture of basic chemicals & chemical products (30) demonstrate a decline trend in the share of GVA. The share of the manufacture of basic chemicals & chemical products (30) was 15.44 percent in 1980-81, which increased to 21.40 percent in 2000-01. The industries those have increasing share include the manufacture of Food products (20-21) and processing of nuclear fuels etc (31). Where as the manufacture of textile products (23+24+25) witnessed a sharp decline in the share of value added. It was 18.47 percent in 1980-81, which declined to 7.24 percent in 1999-00 and 8.19 percent in 2000-01.

It is evident that, the share of GFCF and GVA follow the same pattern. Incase of GFCF the share is more in the manufacture of basic metal & alloys (33), basic chemicals & chemical products (30), machinery & equipments (34+35+36) and textile products (23+24+25). Incase of GVA also the share is more in the above-mentioned industry groups. It is also observed that the share of both GVA and GFCF in the manufacture of

**Table: 4.6: Share of GVA in the Total Registered Indian Manufacturing Sector from 1980-81 to 2000-01.**

(in percent)

Year	20-21	22	23+24+25	26	27	28	29	30	31	32	33	34+35+36	37	38
1980-81	7.03	2.06	18.47	1.07	0.59	4.26	0.65	15.44	5.19	3.95	12.90	18.81	8.40	1.19
1981-82	7.87	1.95	15.49	1.14	0.58	4.40	0.60	15.61	5.04	4.06	14.76	18.32	9.18	1.00
1982-83	8.52	1.75	13.66	1.11	0.54	3.63	0.59	15.60	6.69	5.27	13.19	19.03	9.29	1.13
1983-84	9.86	3.02	14.30	1.02	0.62	3.64	0.67	16.55	4.20	5.28	12.92	18.39	8.36	1.17
1984-85	8.97	2.33	13.41	1.36	0.55	4.28	0.73	15.30	5.69	5.71	11.70	20.26	8.41	1.29
1985-86	8.76	2.10	12.59	1.05	0.47	3.46	0.64	15.31	9.27	5.92	12.85	18.36	7.48	1.76
1986-87	9.15	2.59	13.29	1.16	0.48	4.07	0.62	15.33	9.12	5.27	11.21	17.68	8.66	1.36
1987-88	9.03	2.59	11.52	1.35	0.49	3.97	0.76	16.26	9.10	5.29	11.64	19.06	7.67	1.29
1988-89	9.38	2.78	10.55	1.50	0.47	3.54	0.72	15.50	8.92	4.93	14.63	18.34	7.63	1.10
1989-90	10.52	2.59	12.30	1.72	0.37	3.86	0.81	15.50	7.98	5.06	12.46	18.29	7.34	1.21
1990-91	8.83	2.67	12.21	1.84	0.42	3.93	0.96	15.05	8.29	5.60	13.71	17.60	7.88	1.00
1991-92	9.28	3.10	10.71	2.21	0.38	4.07	1.10	16.16	7.01	7.22	10.40	19.34	7.67	1.35
1992-93	8.21	2.83	9.82	2.04	0.35	3.68	0.97	19.16	8.82	5.05	12.60	18.16	6.99	1.32
1993-94	9.21	2.69	11.10	3.26	0.39	3.87	1.30	18.62	8.77	4.49	11.61	16.04	6.54	2.10
1994-95	9.68	2.76	10.89	3.16	0.33	3.74	0.91	17.90	7.83	4.46	12.42	17.61	6.82	1.49
1995-96	7.97	2.18	8.33	2.65	0.29	4.00	0.76	19.99	7.79	5.14	13.04	17.32	8.94	1.59
1996-97	9.30	2.78	9.32	2.60	0.44	3.36	0.77	19.08	8.81	4.39	11.81	16.45	9.36	1.54
1997-98	9.01	2.90	9.70	2.42	0.29	2.92	0.88	18.51	6.42	4.84	16.15	16.34	7.84	1.77
1998-99	9.61	2.64	7.70	2.82	0.35	2.74	1.49	22.91	7.27	4.00	12.31	17.17	7.07	1.91
1999-00	8.86	3.78	7.24	3.14	0.54	3.11	0.84	22.94	7.28	5.22	12.45	14.45	7.80	2.37
2000-01	9.42	3.70	8.19	3.64	0.48	4.19	0.79	21.40	8.34	5.64	10.41	15.24	6.67	1.90

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

textile products (23+24+25) has declined over years. In case of other industries the trend is same in case of both GFCF and GVA.

#### **4.3 Increase in Investment: Sources**

It is seen that the growth of investment is more in the first half of the post reform period (1991-92 to 1995-96). But the story for the second half of the nineties is just the reverse. In the second half (1996-97 to 200-01) the growth of GFCG declined drastically. Some industries even registered negative growth rate. As mentioned earlier, the first half period is the period of investment boom. According to Uchikawa (2003), the investment boom could be because of four reasons. First favorable market condition, second easy financing Pattern, third the availability of internal finance for further investment and fourth if relative price of capital goods vis-à-vis product price decreases, firms might increase investment. Out of the above four possible reasons two reasons look obvious. These are the availability of the internal funds (profit) and financial liberalization in the nineties. The financial liberalization made it easy for the investors to raise funds for new investment<sup>2</sup>.

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<sup>2</sup> After financial reforms in nineties, the stock markets started playing a dominant role in encouraging investment. Especially after the enactment of Security and Exchange Board of India (SEBI) act in 1992, the stock markets are playing important role in raising new funds for private investors.

**Table: 4.7: New Capital Issued by Non-government Public limited Companies from 1981-82 to 2000-01.**

(In Crores)

Year	Ordinary Shares	Preference Shares	Debentures	Total Amount
1981-82	305.2	2.8	290.4	598.4
1982-83	258.7	2.3	445.0	706.0
1983-84	381.6	1.7	454.2	837.5
1984-85	363.0	0.1	693.3	1056.4
1985-86	898.4	1.2	845.7	1745.3
1986-87	1007.5	0.7	1573.2	2581.4
1987-88	1105.2	6.8	675.7	1787.7
1988-89	1033.6	3.3	2187.9	3224.8
1989-90	1220.1	7.9	5281.9	6509.9
1990-91	1284.3	13.1	3014.8	4312.2
1991-92	1916.2	1.5	4275.4	<b>6193.1</b>
1992-93	9952.6	0.5	9850.3	<b>19803.4</b>
1993-94	9959.7	0.3	9370.3	<b>19330.3</b>
1994-95	17414.4	131.4	8870.9	<b>26416.7</b>
1995-96	11877.4	150.1	3970.1	<b>15997.6</b>
1996-97	6101.4	74.9	4233.2	10409.5
1997-98	1162.4	4.3	1971.6	3138.3
1998-99	2562.7	59.7	2390.7	5013.1
1999-00	2752.5	0	2400.8	5153.3
2000-01	2607.6	142.2	3068.3	5818.1

*Note: Prices are at current Prices*

Source: The Handbook of Statistics on Indian Economy, RBI 2003-04.

From Table: 4.7 it is clear that the new capital issued by the non-government public limited companies is more during the first half of nineties (1991-92 to 1995-96). This increase is due to sharp rise in the issue of new debentures and ordinary shares. The total new capital issued by the non-government public limited companies was Rs 598.4 crore in 1981-82, which increased to Rs 4312.2 crore in 1990-91 and in 1995-96 it increased to Rs 15997.6 crore. So the sharp increase in the issue of new debentures and shares made the increase in the investment in the first half of nineties.

As we have already discussed, another important reason for investment boom is the availability of internal finance for further investment and the level of depreciation. The availability of internal finance depends on the share of 'profit' to total income. So if the share of profit to gross income is more then more internal finance is available for further investment. Where as incase of depreciation it is just the reverse. If the depreciation were more then the entrepreneur would not like to invest much. So the higher share of profit to gross income has a positive effect on investment, where as incase of depreciation it is just the reverse.

**Table: 4.8: The share of Profit and Depreciation to Gross Income**

	(in percent)			
	1980-81 to 1990-91	1991-92 to 1995-96	1996-97 to 2000-01	1990-01 to 2000-01
Profit	23.47	35.9	33.05	33.81
Depreciation	19.87	18.37	23.66	21.46

Source: Has been calculated from Annual Survey of Industries, CSO, Various Issues.

It is evident from the above table (Table: 4.8) that the share of profit is higher in the first half of the nineties (1991-92 to 1995-96). During this period it is 35.9 percent, which is the highest for any time period. In the second half it has declined to 33.05 percent. The share of depreciation to gross income shows, during the first half it was 18.37 percent, which increased to 23.66 percent in the second half of the nineties. So it is clear from the above analysis that in the first half investment boom was due to three major factors; (i) increase in the issue of new capital by non-government public limited companies, (ii) increase in the share of profit to gross income and (iii) lower share of depreciation to gross income. Apart form the above reasons; another reason could be if the relative prices of the capital goods become cheaper then, investment may rise. It is because the decrease in the relative price of capital goods is advantageous to investment in intermediate and consumer durable goods industry.

The investment boom started in the first half of the nineties and was over by mid nineties. According to Uchikawa (2003) five reasons could be attributed to the end of the investment boom. First, decline in demand. Second, new capital issued by private corporate sector dropped. Third, tightened monetary policy in the 2<sup>nd</sup> half of nineties refrained investment. Fourth, payment of high interest became burden of manufacturers. Fifth, import substituted domestic production.

**Table: 4.9: Share of Interest to Gross Income**

(in percent)

	1980-81 to 1990-91	1991-92 to 1995-96	1996-97 to 2000-01	1990-01 to 2000-01
Interest Payment	24.61	30.96	29.45	32.46

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

Table 4.9 shows the share of interest to gross income has increased in the nineties. In eighties it was 24.61 percent, which increased to 32.46 percent in nineties. But a disaggregated analysis of nineties shows, there is not much difference in the payment of interest between the first half and the second half of nineties. But the pre-post analysis shows in the post reform period (1990-91 to 2000-01) it has increased significantly and may be a significant reason for declining investment growth in nineties.

So the above analysis shows, the decline in investment in the second half of nineties is due to decline in the share of profit, increase in the share of depreciation and decline in the issue of new capital by the private corporate sector.

#### **4.4 Modeling Determinants of Manufacturing Investment**

As discussed earlier, the majority of the studies found capital, profit (internal fund), the rate of interest, value added, market structure etc as the major determinants of investment. From the above analysis, the three most important variables those visibly



influence the investment behavior in the Indian registered manufacturing sector are the rate of profit and the rate of GVA and the rate of interest. The current year interest rate determines the current year investment, but in case of profit and value added it's the last year profit and value added which determines the current year investment. So the rate of investment would be regressed over the rate of last year value added, last year profit and current year investment. Writing in equation form:

$$GFCF_t = \alpha + \beta_{1t} VA_{t-1} + \beta_{2t} P_{t-1} + \beta_{3t} I_t + U_t$$

Where, P: the rate of profit<sup>3</sup>

VA: the rate of value added<sup>4</sup>

I : the rate of interest<sup>5</sup>

The above equation shows that the current year rate of investment depends on the rate of last year GVA, last year profit and current year interest. It is because an entrepreneur determines its investment on the basis of the last year profit and GVA. Higher is the rate of profit, higher is the investment. So it implies the rate of profit and the rate of investment are positively correlated. On the other hand, higher the rate of value added, greater would be the investment. But the rate of interest is inversely related with the rate of investment. Higher is interest rate lower is the rate of investment.

So from equation, we will expect  $\beta_1 > 0$ ,  $\beta_2 > 0$  and  $\beta_3 < 0$ . The results of the regression have been presented in table: 4.10.

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<sup>3</sup> Rate of profit= Profit/Fixed Capital

<sup>4</sup> Rate of value added= Value added/ the value of the output

<sup>5</sup> Rate of interest= Interest Payment/ Gross Income

**Table: 4.10: Regression Results of the Determinants of Investment in the Indian Registered Manufacturing Sector.**

Industry Group	Constant ( $\alpha$ )	GVA ( $\beta_1$ )	PROFIT ( $\beta_2$ )	INTEREST ( $\beta_3$ )	R <sup>2</sup>
20-21	.310	-.537 (.418)	.163 (.784)	-.204 (1.109)	.214
22	.676	.825 (2.105)**	.100 (1.763)***	-.206 (3.233)*	.597
23+24+25	.359	-.310 (.493)	.132 (.446)	-.186 (2.222)**	.281
26	.283	.097 (.196)	.094 (1.91)***	-.515 (2.028)***	.634
27	.090	.707 (.879)	-.071 (.338)	-.170 (.696)	.166
28	.175	.576 (.468)	.211 (.596)	-.419 (1.288)	.185
29	.291	-.592 (1.433)	.191 (2.939)*	.039 (.236)	.456
30	.172	.026 (.690)	.009 (.029)	-.032 (.523)	.124
31	.378	1.076 (2.185)**	.155 (.766)	.308 (.770)	.346
32	.426	-.575 (.773)	.213 (.751)	-.205 (1.96)***	.523
33	.252	-.503 (.972)	.420 (1.018)	.077 (.628)	.17
34+35+36	.065	.040 (.131)	.579 (4.159)*	-.058 (.247)	.782
37	.511	-.788 (1.306)	.081 (.489)	-.505 (1.078)	.133
38	.261	.218 (.786)	.109 (1.409)	-.0004 (.004)	.228
Total Manufacturing	.133	.370 (1.905)***	.455 (2.498)**	-.146 (1.259)	.612

\*\*\* Significant at 10 percent level of significant

From the above table it is evident that the regression results of the total manufacturing shows, the rate of profit and the rate of value added have been significantly influencing the level of investment in registered manufacturing sector. The results are according to the expectation. The rate of value added is positively related with the rate of investment and it is significant at 10 percent level of significance. In total manufacturing investment, the rate of profit comes out to be the most important influencing factor and it is significant at 5 percent level of significance. As expected the rate of interest is inversely related to the rate of investment. The individual industry wise analysis shows, in case of most of the industries the rate of profit comes out to be the major influential factor in determining the level of investment followed by the rate of value added and the rate of interest.

But the coefficient of determination, the  $R^2$  in many industries is low. Which implies other than the above three, there are some other factors those affect the level of investment. Due to the limitation of data we cannot include all variables.

#### **4.5 Variation in the Investment in the Registered Manufacturing Sector in India: An Inter State Analysis**

Right from the independence regional disparity has been a common feature in the India's industrial development. Developed states like Maharashtra, Gujarat, Tamilnadu; Karnataka etc. are more industrially developed than the poorer states like Orissa, Bihar, etc. Here in order to study the regional pattern of industrial investment we study the growth and share of investment and value added at the state level.

**Table: 4.11: State Wise Growth of GFCF in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

(in percent)

States	1980-81 to 1990-91	1991-92 to 2000-01	1991-92 to 1995-96	1996-97 to 2000-01	1980-81 to 2000-01
AP	8.89	0.83	11.94	-11.28	7.92
ASSAM	16.56	11.07	8.14	42.05	7.57
BIHAR	3.43	2.91	16.25	1.16	6.75
GUJURAT	6.55	11.03	42.23	-10.46	11.01
HARYANNA	7.40	13.75	27.64	11.69	13.12
KARNATAKA	4.08	32.13	33.84	-0.21	11.41
KERALA	1.42	9.33	23.46	-4.65	5.05
MP	0.38	-1.22	32.74	-15.28	4.69
MAHARASTRA	7.69	5.25	23.03	-15.67	9.19
ORISSA	11.29	-10.50	8.64	-24.89	6.13
PUNJAB	11.78	3.16	27.35	-4.72	7.54
RAJASTHAN	5.86	1.18	8.89	-8.80	8.40
TAMILNADU	7.74	4.36	29.42	0.23	9.44
UP	9.90	4.89	29.72	-19.1	10.86
WB	6.08	-14.12	-12.90	-12.5	1.66

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

Table: 4.11 portray the state wise growth of GFCF in registered manufacturing sector from 1980-81 to 2000-01. It is seen that Haryana registered the highest growth rate of 13.12 percent during the whole study period (1980-81 to 2000-01) followed by Karnataka 11.41 percent, Gujarat 11.01 percent. West Bengal shows the lowest growth rate of GFCF for the full study period, which is 1.66 percent. The other states those registered lower investment growth during the full study period include Madhya Pradesh, 4.69 percent followed by Kerala 5.05 percent. Other industrially developed states like Maharastra and Tamilnadu registered a moderate growth of 9.19 percent and 9.44 percent respectively. The poorer states like Assam, Orissa and Bihar registered average investment growth for the entire study period. In eighties the states those show higher

investment growth include Assam 16.56 percent, Punjab 11.78 percent, Orissa 11.29 percent. Madhya Pradesh registered the lowest growth rate of investment of 0.38 percent during eighties. Kerala also show very lower investment growth of 1.42 percent during that period. In nineties Karnataka registered highest investment growth of 32.13 percent followed by Haryana 13.75 percent Assam 11.07 percent and Gujarat 11.03 percent. Some poorer states like Madya Pradesh and Orissa registered a negative growth rate in nineties. The states those demonstrate lower investment growth in nineties include Andhra Pradesh 0.83 percent, Rajasthan 1.18 percent, Bihar 2.91 percent and Punjab 3.16 percent. In nineties states those registered an increase in the growth of GFCF include Gujarat from 6.55 percent to 11.03 percent, Haryana 7.40 to 13.75 percent, Karnataka 4.08 to 32.13 percent, and Kerala 1.42 to 9.33 percent. The rest of the states registered a decline. West Bengal registered a huge decline in the growth of investment from 6.08 percent to -14.12 percent followed by Orissa 11.19 to -10.50 percent and Madhya Pradesh 0.38 to -1.22 percent. Industrially developed states like Maharastra and Tamilnadu registered a decline in investment growth in the nineties.

A more disaggregated study of nineties shows, during the first half there has been sharp increase in the growth of investment. This period is also known as the period of 'investment boom'. Many states registered huge investment growth during this period. Gujarat registered a growth of 42.23 percent during this period followed by Karnataka 33.84 percent, Madhya Pradesh 32.74 percent, Uttar Pradesh 29.72 percent and Tamilnadu 29.42 percent. The poorer states those show lower investment growth for nineties, registered higher investment growth during this period. But the second half of nineties shows a very dismal performance. Other than Assam, Bihar, Haryana and Tamilnadu the rest of the states registered a negative growth of investment. Orissa registered the highest negative growth rate of investment, which is -24.89 percent followed by Uttar Pradesh -19.1 percent, Maharastra -15.67 percent and Madhya Pradesh -15.28 percent. Another contrasting figure shows that during the second half of the nineties Assam registered a higher growth rate of 42.05 percent. This is because in 2000-01 the GFCF of Assam was quite high in comparison to the previous years. But the

share of GFCF is very negligible. The reason for the higher investment growth in the nineties had already been discussed in the earlier section.

Table: 4.12: shows the share of GFCF across major Indian states from 1980-81 to 2000-01. It shows the total share of major states to the total GFCF is around 95 percent on average for last two decades. In 1980-81 the total share of major states was 93.24 percent, which increased to 96.6 percent in 1991-92, and 92.32 percent in 2000-01. The state wise analysis shows the share is more in case of Maharashtra, Gujarat and Tamilnadu. The states those have less share include Assam, Haryana, Punjab, Rajasthan and Orissa. It is seen that the advanced states like Maharashtra, Gujarat and Tamilnadu have larger share in GFCF in comparison to the poorer states. The analysis shows Maharashtra accounts the highest share of GFCF followed by Gujarat and Tamilnadu. In most of the states the share of GFCF has been fluctuating over years. In case of Maharashtra in 1980-81 its share was 18.61 percent, which increased to 22.74 percent in 1989-90, 27.55 percent in 1996-97 and 18.43 percent in 2000-01. The combined share of Maharashtra, Gujarat and Tamilnadu is around 40 percent. Whereas the combined share of poorer states like Orissa, Rajasthan, Assam, Bihar account only 10-15 percent. The share of Haryana is increasing consistently even though it is marginal. Karnataka is also following the same path. The states those show decreasing share include Andhra Pradesh, Madhya Pradesh, Bihar and West Bengal. In case of Andhra Pradesh its share was 6.48 percent in 1980-81, which declined to 4.63 percent in 2000-01. Like wise in case of West Bengal it was 6.43 percent, and declined to 3.51 percent in 2000-01. In case of Madhya Pradesh it declined from 13.34 percent in 1980-81 to 4.93 percent in 2000-01. Mostly the developed states got higher investment share due to better infrastructure development.

**Table: 4.12: Share of GFCF in Major Indian States from 1980-81 to 2000-01. (Percent)**

Year	A.P	Assam	Bihar	Haryana	Gujarat	Karnataka	MP	Maharashtra	Orissa	Punjab	Rajasthan	Tamilnadu	UP	WB	Total
1980-81	6.48	0.74	6.55	1.75	11.93	6.03	13.34	18.61	3.27	2.06	3.1	8.13	4.83	6.43	93.24
1981-82	3.94	0.97	8.18	1.91	8.72	4.23	10.16	16.63	2.3	2.2	2.42	11.31	13.64	8.31	94.9
1982-83	5.42	0.32	11.94	2.51	11.95	5.21	8.43	17.34	2.72	2.97	2.99	9.8	6.04	6.56	94.18
1983-84	9.77	0.6	5.82	1.99	17.66	7	7.02	15.96	2.88	2.95	3.96	8.88	5.49	5.12	95.09
1984-85	6.05	1.4	5.18	2.79	8.57	4.68	14.67	21.25	2.91	2.96	4.47	10	6.14	5.26	96.33
1985-86	4.97	2.57	5.12	3.7	9.97	4.92	10.49	18.16	2.76	2.3	4.87	9.56	6.68	9.75	95.82
1986-87	6.85	3.2	7.45	2.69	15.12	4.23	6.82	17.86	5.01	2.43	2.86	9.07	6.61	5.36	95.57
1987-88	6.44	1.03	6.32	2.18	10.09	3.76	8.27	16.67	13.43	3.67	3.47	7.18	7.69	5.93	96.13
1988-89	5.55	1.67	5.39	2.97	9.08	5.09	6.9	18.68	5.31	3.94	3.4	11.44	10.65	5.63	95.7
1989-90	5.4	1.22	6.01	2.61	11.37	4.95	7.63	22.74	1.91	4.26	2.11	10.02	10.25	5.64	96.12
1990-91	9.49	1.14	6.42	1.44	12.89	4.32	5.49	18.03	3.25	2.86	3.25	12.18	7.52	7.97	96.25
1991-92	7.79	1.07	8.03	2.84	10.27	0.87	4.5	17.33	5.19	2.38	5.52	9.21	9.3	11.75	96.06
1992-93	7.5	0.77	4.45	2.64	9.26	3.8	11.15	20.9	3.88	2.49	3.14	10.28	7.66	7.77	95.69
1993-94	5	0.68	6.36	3.96	14.05	3.13	7.41	18.17	5.01	2.68	2.96	12.49	7.25	5.88	95.05
1994-95	5.45	0.54	8.55	2.28	9.59	4.14	11.05	15.22	2.94	2.26	3.07	16.52	11.01	3.37	95.99
1995-96	5.65	0.65	4.35	3.56	20.56	3.78	6.51	19.46	3.08	2.89	2.97	9.23	9.89	3.07	95.66
1996-97	5.55	0.4	4.16	3.05	13.23	6.28	5.4	27.55	2.1	1.89	2.79	9.35	10.84	2.38	94.97
1997-98	5.74	0.61	3.5	2.63	19.71	7.68	6.82	19.52	1.87	2.29	3.19	7.36	10.17	2.63	93.71
1998-99	3.92	0.32	0	4.39	14.74	16.5	4.58	14.59	1.39	1.62	2.6	8.61	11.97	1.97	87.22
1999-00	6.31	0.68	-0.76	6.53	21	11.35	3.98	19.56	-0.77	2.57	3.54	10.54	7.45	0.8	92.77
2000-01	4.63	4.81	6.13	5.24	11.75	7.31	4.93	18.43	1.24	2.18	2.65	12.54	6.98	3.51	92.32

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

**Table: 4.13: Annual Average Share of GFCG in Major Indian States in Pre and Post Reform Periods.**

(in percent)

States	1980-81 to 1990-91	1991-92 to 2000-01
AP	6.39	5.75
ASSAM	1.35	1.05
BIHAR	6.76	4.55
GUJURAT	11.58	14.42
HARYANNA	2.41	3.71
KARNATAKA	4.95	6.49
KERALA	11.23	5.05
MP	8.01	6.63
MAHARASTRA	18.36	19.07
ORISSA	4.16	2.6
PUNJAB	2.96	2.32
RAJASTHAN	3.35	3.24
TAMILNADU	9.17	10.61
UP	7.77	9.25
WB	6.54	4.31

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

The average annual share of GFCF shows in six, out of fifteen major Indian states it has increased in the post reform period. Where as in case of the rest nine states it has declined in the nineties. The states those registered an in the average share of GFCF include Gujurat (11.58 percent to 14.42 percent), Haryana (2.41 to 3.71 percent), Karnataka (4.95 to 6.49 percent), Maharastra (18.36 to 19.07 percent), Tamilnadu (9.17 to 10.61 percent) and Uttar Pradesh (7.77 to 9.25 percent). In case of some states the share of investment has declined significantly in the nineties. In case of Kerala, the average annual share of investment declined significantly from 11.23 to 5.05 percent in the post reform period. In nineties the states those demonstrate higher investment share include Maharastra, Gujurat, Tamilnadu and Uttar Pradesh.



**Table: 4. 14: State Wise Growth Rate of GVA in the Registered Manufacturing Sector from 1980-81 to 2000-01.**

(Percent)

States	1980-81 to 1990-91	1991-92 to 2000-01	1991-92 to 1995-96	1996-97 to 2000-01	1980-81 to 2000-01
AP	7.30	9.52	19.55	0.92	9.42
ASSAM	13.63	3.89	5.82	7.27	5.86
BIHAR	6.89	7.14	5.38	-4.50	5.55
GUJURAT	5.83	12.29	25.15	6.74	9.43
HARYANNA	7.14	13.21	19.80	4.90	9.66
KARNATAKA	7.50	9.85	10.80	2.30	8.94
KERALA	5.71	9.75	7.16	8.43	6.02
MP	7.39	9.43	24.08	2.69	8.31
MAHARASTRA	5.80	8.75	20.64	3.49	7.44
ORISSA	13.31	5.69	7.24	11.49	8.60
PUNJAB	9.27	7.86	12.21	0.18	8.93
RAJASTHAN	8.95	11.30	16.49	11.40	9.78
TAMILNADU	7.52	7.47	13.96	5.97	7.89
UP	10.48	6.99	10.93	-0.92	9.59
WB	-0.55	3.62	9.15	4.55	2.33

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues.

Table: 4.14 demonstrates the state wise growth of value added from 1980-81 to 2000-01. During the full study period (1980-81 to 2000-01) the industrially developed states like Gujurat, Karnataka performed well along with some states those are industrially not well developed. Rajasthan registered the highest GVA growth during that period followed by Uttar Pradesh, Haryana, Gujurat, Andhra Pradesh and Karnataka. The pre and post reform analysis shows that the industrially developed states have performed well in the post reform period in comparison to the pre reform period. In eighties West Bengal registered a negative growth of value added. In nineties Haryana show the highest rate of GVA growth followed by Gujarat, Rajasthan and Karnataka. A more dis-aggregated analysis of nineties demonstrates the rapid growth of GVA during the first half of the nineties. During this period Gujarat registered the highest growth of 25.15 percent

followed by Madhya Pradesh 24.08 percent, Maharashtra 20.64 percent and Andhra Pradesh 19.55 percent. In the second half many states registered a decline in the growth of value added. Bihar and Uttar Pradesh registered negative growth rates.

Table: 4.15: shows the share of Gross Value Added (GVA) across states from 1980-81 to 2000-01. It shows Maharashtra has the major share during the entire study period. In 1980-81 the value added share of Maharashtra to total value added was 25.21 percent, which declined marginally to 21.27 percent in 2000-01. The other industrially developed states like Gujarat and Tamilnadu have larger GVA share. Maharashtra, Gujarat and Tamilnadu have around 45 percent share of GVA. The major Indian states share around 95 percent of total GVA. The states those have negligible share include Assam, Orissa, Kerala, Punjab and Rajasthan.

**Table: 4.15: Share of GVA Across states in registered manufacturing sector from 1980-81 to 2000-01 (in Percent)**

Years	AP	Assam	Bihar	Gujarat	Haryana	Karnataka	Kerala	MP	Maharashtra	Orissa	Punjab	Rajasthan	TN	UP	WB	Total
1980-81	4.55	0.99	5.16	10.49	2.96	5.11	2.97	5.24	25.21	1.80	2.78	2.18	10.10	6.11	11.56	97.22
1981-82	4.85	1.00	7.84	9.76	3.24	4.33	2.88	5.73	24.55	1.43	3.13	2.22	10.29	6.03	10.30	97.61
1982-83	5.53	0.96	6.53	10.19	3.10	4.88	2.86	5.75	22.40	1.31	2.85	2.27	10.56	7.75	10.22	97.17
1983-84	6.43	1.38	6.22	11.97	2.85	5.85	2.69	5.34	23.26	1.49	2.97	3.10	9.82	4.97	8.83	97.16
1984-85	6.23	1.76	6.58	9.75	2.97	4.94	2.91	5.33	23.32	1.10	2.93	2.54	11.24	6.69	8.95	97.22
1985-86	5.40	2.16	6.52	10.29	3.12	5.01	2.57	4.85	24.92	1.52	3.20	2.44	10.43	6.45	8.31	97.18
1986-87	5.44	2.16	5.98	11.10	3.22	5.01	2.68	4.55	23.97	1.79	2.72	2.67	10.89	7.53	7.65	97.39
1987-88	5.10	1.80	6.78	10.55	3.19	5.06	3.02	5.53	21.52	1.95	3.44	2.71	10.25	7.76	8.45	97.11
1988-89	5.03	1.40	7.61	10.84	3.00	4.93	2.65	6.11	22.95	2.76	3.20	2.38	10.89	7.12	6.07	96.94
1989-90	5.29	1.95	6.46	9.39	3.04	5.40	3.23	5.56	22.64	2.60	3.84	2.70	10.82	8.91	5.27	97.11
1990-91	5.79	1.62	5.70	9.02	3.31	5.36	2.27	6.16	22.87	2.21	3.61	3.04	11.29	8.36	6.10	96.71
1991-92	6.05	1.58	6.18	8.80	3.39	6.17	2.73	4.92	19.54	2.37	3.86	2.99	11.55	9.55	6.09	95.77
1992-93	6.21	1.36	4.73	12.21	2.71	5.31	2.20	5.50	23.15	2.14	3.08	2.90	11.01	8.49	5.46	96.46
1993-94	5.69	1.10	4.72	11.18	3.16	4.95	1.79	5.51	24.66	1.73	3.82	2.44	11.54	7.97	5.87	96.13
1994-95	6.71	1.05	4.12	12.17	3.25	5.21	1.81	5.42	22.31	1.78	3.52	3.11	11.14	8.70	5.01	95.31
1995-96	6.71	1.12	4.07	12.78	3.61	4.91	2.01	6.89	24.03	1.74	3.03	2.93	10.42	7.48	4.63	96.36
1996-97	5.95	0.76	4.72	13.09	4.03	6.04	2.00	5.17	21.74	1.38	3.72	2.85	10.41	9.06	4.35	95.28
1997-98	8.61	1.01	5.78	10.26	3.80	5.55	1.98	6.39	21.77	1.37	3.25	2.84	9.41	8.05	4.37	94.44
1998-99	5.74	1.00	5.64	13.32	3.77	6.52	2.70	5.34	21.09	1.67	3.40	2.64	9.50	7.99	4.29	94.61
1999-00	5.92	1.01	5.12	13.61	4.18	5.27	2.16	5.06	21.83	1.77	3.58	3.58	9.66	7.16	3.69	93.61
2000-01	6.20	0.89	3.29	13.00	4.03	5.73	2.37	5.47	21.27	1.73	2.95	3.60	11.33	7.57	3.99	93.42

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

**Table: 4.16: Annual Average Share of GVA in Major Indian States in Pre and Post Reform Periods.**

(percent)

States	1980-81 to 1990-91	1991-92 to 2000-01
AP	5.42	6.38
ASSAM	1.56	1.09
BIHAR	6.5	4.83
GUJARAT	10.3	12.04
HARYANA	3.09	3.6
KARNATAKA	5.08	5.5
KERALA	2.8	2.18
MP	5.47	5.57
MAHARASTRA	23.41	22.14
ORISSA	1.81	1.77
PUNJAB	3.15	3.42
RAJASTHAN	2.57	2.98
TAMILNADU	10.6	10.6
UP	7.06	8.2
WB	8.33	4.77

Source: Has been calculated from the Annual Survey of Industries, Summary Result of Factory Sector, Various Issues.

It is evident from the above table that the share of value added has increased in Gujarat, Haryana, Karnataka, Punjab, Tamilnadu and Uttar Pradesh. The states those have higher GVA in post reform period are Maharashtra (22.14 percent), Gujarat (12.04 percent), Tamilnadu (10.6 percent) & Uttar Pradesh (8.2 percent).

From the above analysis it is clear that the industrially developed states have majority share of GFCF and the growth rate also show a better performance in the post reform period. So far the variation across states incases of investment growth and its share is concerned, it is due to better infrastructure facility and better investment climate.

#### 4.6 Variations Across States: Explanations

The analysis shows there exist wide variation across major Indian states in terms of investment growth and share. It shows states from western and southern region have performed better in comparison to the rest of India. Industrially developed states like Maharashtra, Gujarat, Tamilnadu and Karnataka have more investment share in comparison to the other states. As we have discussed earlier, the two major factors those are responsible for higher investment growth in India during nineties are the rate of profit and the rate of GVA. Here the study tries to explore the reasons for the above-mentioned variations.

**Table: 4.17: Relative Income Index of Major Indian States.**

States	1980-81	Rank	1990-91	Rank	1995-96	Rank	2000-01	Rank
AP	85.67	11	94.7	6	96.7	8	103.52	8
ASSAM	86.29	10	76.81	12	69.01	12	60.34	12
BIHAR	63.8	15	61.65	14	32.68	15	39.39	15
GUJURAT	120.15	4	121.09	4	139.56	3	128.95	5
HARYANNA	139.86	2	153.3	2	138.32	4	141.16	3
KARNATAKA	92	9	91.38	9	100.27	7	120.83	6
KERALA	105.93	5	94.4	7	104.81	6	106.72	7
MP	94.63	7	87.5	10	81.38	11	72.51	11
MAHARASTRA	132.19	3	140	3	158.39	1	145.87	2
ORISSA	76.03	14	59.25	15	62.35	14	56.48	14
PUNJAB	157.13	1	162.27	1	155.84	2	153.75	1
RAJASTHAN	79.18	12	93.15	8	86.45	10	82.29	10
TAMILNADU	98.02	6	108.36	5	121.58	5	132.17	4
UP	76.93	13	73.61	13	62.97	13	56.56	13
WB	92.18	8	82.55	11	89.76	9	99.48	9

Source: Has been calculated from the data published in "The Handbook of Statistics on Indian Economy, 20003-04", RBI.

Table: 4.17 shows the relative income index of the major Indian states at 1980-81, 1990-91, 1995-96 and 2000-01. It clear from the above table that, investment concentrating in states, those are rich. Punjab and Haryana have higher income but they are not industrially so developed, where as they are agriculturally well developed. Industrially developed states like Maharastra, Gujarat, Tamilnadu and Karnataka show higher income and are richer states. The ranking of states according to relative income index shows, states those have larger GFCF share are rich states and the states those have very lesser share in GFCF are economically poor. In 2001, the rank according to relative income index for Bihar is 15, for Orissa is 14, Assam 12 and Madhya Pradesh is 11.

**Table: 4. 18: Composite Index of Infrastructure Across States.**

States	1981	Rank	1991	Rank	1995	Rank	2001	Rank
Andhra Pradesh	0.707	10	0.769	9	0.834	9	0.880	9
Assam	0.656	11	0.613	12	0.557	14	0.644	12
Bihar	0.609	13	0.467	15	0.426	15	0.447	15
Gujrat	1.026	6	1.132	6	1.219	5	1.341	3
Haryana	1.150	5	1.010	7	0.965	7	0.975	7
Karnataka	0.949	8	0.883	8	0.865	8	0.883	8
Kerala	2.300	1	2.249	1	2.112	1	2.118	1
Madhya Pradesh	0.516	14	0.606	13	0.685	10	0.604	13
Maharastra	1.212	4	1.129	4	1.274	4	1.063	6
Orissa	0.945	7	1.152	5	1.115	6	1.107	5
Punjab	1.615	2	1.726	2	1.645	2	1.636	2
Rajasthan	0.477	15	0.566	14	0.578	13	0.549	14
Tamilnadu	1.339	3	1.397	3	1.386	3	1.324	4
Uttar Pradesh	0.650	12	0.669	10	0.667	12	0.693	11
West Bengal	0.849	9	0.632	11	0.673	11	0.736	10

Source: The Statistical Abstract India, CSO, Various Issues & Basic Road Statistics of India, Transport, Research Wing, Ministry of Road Transport and Highways, Government of India.

As we have discussed earlier, that the rate of profit and the rate of GVA play very crucial roles in the flow of investment. Many studies have emphasized the role of profit as a

determinant of investment. In order to increase the rate of profit and decrease depreciation there is a need of a good infrastructure environment. Improved infrastructure facility will reduce the production cost and depreciation cost, which finally leads to the higher rate of profit. The above table shows the composite index of infrastructure. It is seen that, the states those show higher GFCF share, have good infrastructure facility. Industrially developed states like Tamilnadu, Maharastra, and Gujurat have better infrastructure facility.

Here we have taken two variables, (i) per capita power consumption and (ii) roads per 100 square kilometer area. Some limitations of the above composite index are, states like Orissa and Kerala those are industrially not so well developed have higher ranking. It is because of higher density<sup>6</sup> of road network. Data for electricity has been collected from the various issues of “ The Statistical Abstract India” and road net work has been collected from “ Basic Road Statistics of India, Transport, Research Wing, Ministry of Road Transport and Highways, Government of India”.

As explained by Chakravarty (2003), the physical infrastructure plays a major role in the location of new investment in India. Here in our study in order to explain the variation in investment growth and share we have taken power and road and have made a composite index. Now we will examine the relationship between the rate of investment and the index of infrastructure. So we will regress the rate of investment of the states on the value of the infrastructure index. Writing in equation form;

$$GFCF_t = \alpha + \beta_t I_i + U_t$$

Where,  $I_i$  is Infrastructure index.

Here the value of  $\beta$  is expected to be greater than zero, which implies a positive relationship between investment and the physical infrastructure.

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<sup>6</sup> Higher road density because of small size of the state.

**Table: 4.19: The Regression Result of Investment and Physical Infrastructure**

Year	Constant	$\beta$	$R^2$
1981	-.391	.622 (2.932)*	.498
1991	-.151	.333 (3.207)*	.542
2001	.243	.064 (.986)	.170

Note: \* Significant at 1 percent level of significance

It is evident from the above table that in all three cases the  $\beta$  value is positive. The regression result of 1981 shows, the  $\beta$  value is positive and significant at 1 percent level of significance. In 1991, it is positive and significant at 1 percent level of significance. Where as in 2001, it is positive but not significant. The  $R^2$  is also very low, which implies there are other factors those explain the level of investment. But the over all analysis shows a positive relationship between the level of investment and the physical infrastructure.

#### **4.7 Variation in Investment Growth Across States: An Analysis of Individual Industry Groups**

From the above analysis it is clear that, there have been huge variations across states in the growth and share of the same individual industry group. Table: 4. 20: shows the industry wise growth rate of GFCF for major Indian States from 1980-81 to 2000-01.

##### **4.7.1 Manufacture of Food and Related Product (20-21)**

For the entire study period (1980-81 to 2000-01) the growth of investment is highest in Madhya Pradesh, which is 17.51 percent in the manufacture of Food and other food



products (20-21). The states those registered higher investment growth during this period include Haryana 16.90 percent, Orissa 15.80 percent and Kerala 13.08 percent. But the share of GFCF of these states is not much larger. In the one hand these states have lesser share of GFCF and on the other hand have higher investment growth rate. Assam has the lowest growth of GFCF for the industry group 20-21. A pre and post reform analysis shows, in pre reform period Andhra Pradesh registered negative growth rate. The highest growth of investment during this period for Food and related food products was observed in case of Tamilnadu and Madhya Pradesh. Tamilnadu registered 24.72 percent investment growth in eighties followed by Madhya Pradesh of 22.47 percent. Rajasthan and Gujarat registered a very low investment growth during this period. In nineties states like Assam, Madhya Pradesh and Rajasthan registered negative growth rate. Karnataka registered the highest growth rate of 23.68 percent in the nineties.

#### **4.7.2 Manufacture of Beverages, Tobacco and Related Products (22)**

In case of the growth of investment in the manufacture of beverages, tobacco and related products (22), Madhya Pradesh registered the highest growth of 23.33 percent for the entire study period. The states those registered higher investment growth during this period for this industry group include, Maharashtra 18.12 percent, Orissa 17.81 percent, Rajasthan 17.77 percent, West Bengal 17.26 percent and Haryana 16.15 percent. Assam is the only state to registered a negative growth rate of -5.85 percent. A more disaggregated analysis shows in eighties Rajasthan show a negative growth rate of -5.31 percent. The states those show higher investment growth in eighties include Madhya Pradesh 32.62 percent followed by Karnataka 26.18 percent, Tamilnadu 18.20 percent and Maharashtra 17.03 percent. In nineties Madhya Pradesh registered a negative investment growth of -6.44 percent. States like Rajasthan (43.55 percent), Orissa (32.33 percent), Maharashtra (24.94 percent) show higher investment growth in nineties followed by Karnataka (21.72 percent) and Kerala 18.17 percent. But the important point to be noted is, the states showing higher investment growth in nineties for this industry group have a lesser share of GFCF. The higher growth rate may be due to the larger variation. Maharashtra, Tamilnadu and Karnataka have around 40-50 percent of the GFCF share.

#### **4.7.3 Manufacture of Cotton Wool, Silk, Jute and Textile Products (23+24+25)**

The growth rate of GFCF for the manufacture of cotton wool, silk, jute and textile products is highest in case of Madhya Pradesh, which is 13.15 percent for the entire study period followed by Andhra Pradesh 8.4447 percent, Tamilnadu 8.08 percent and Rajasthan 7.84 percent. Some states like Orissa, Assam and Bihar registered negative growth rates during this period. In eighties many industrially developed states like Gujarat, Maharashtra and Karnataka registered negative growth rates. In case of nineties it was highest for Karnataka, which is 32.43 percent. During nineties also most of the states experienced a negative investment growth. So far the share of GFCF for this industry group is concerned, it is highest in case of Gujarat followed by Maharashtra, Tamilnadu, Karnataka and Punjab. The big five have more than 50 percent share of GFCF.

#### **4.7.4 Manufacture of Textile Products {including wearing apparel} (26)**

The growth rate of investment for textile products is highest in case of Haryana (34.28 percent) for the entire study period followed by Karnataka 29.42 percent, Tamilnadu 26.47 percent and Andhra Pradesh 23.33 percent. In eighties Orissa has the highest growth of 38.04 percent followed by Karnataka 32.51 percent, Haryana 23.53 percent, Uttar Pradesh 23.39, Tamilnadu 22.14 percent, Punjab 21.45 percent and Andhra Pradesh 21.01 percent. Bihar and Gujarat registered negative growth rates during this period. In nineties Haryana registered highest investment growth for this industry group, which is 50.31 percent. Other states that demonstrate higher investment growth during nineties include Bihar, Madhya Pradesh and Andhra Pradesh. Gujarat registered a negative growth rate of -1.50 percent. In case of share of GFCF, Tamilnadu has the highest share followed by Maharashtra, Karnataka, Punjab and Tamilnadu. It shows over years the share of GFCF in Gujarat has declined. The share of the above mentioned states are around 70 percent of the total GFCF.

#### **4.7.5 Manufacture of Wood and Wood Products (27)**

The growth of investment was highest for wood and wood product industries in case of Rajasthan, which is 23.27 percent for the entire study period. Haryana 21.36 percent, Uttar Pradesh 20.04 percent and Punjab 14.76 percent follow Rajasthan. Other than Assam the rest of the major states registered positive investment growth during this period. Assam registered a negative investment growth of -1.10 percent during this period. In eighties Kerala and Tamilnadu registered negative growth rates. Investment growth was highest in case of Uttar Pradesh (41.91 percent), followed by Punjab 30.02 percent, Bihar 20.71 percent and Orissa 19.77 percent. In nineties Assam, Orissa and West Bengal registered negative growth rates. The states that show higher investment growth during this period include Rajasthan 47.57 percent, Andhra Pradesh 36.14 percent, Maharashtra 33.52 percent, Haryana 30.32 percent and Karnataka 24.65 percent. So far as the share of GFCF in case of wood and wood product industries are concerned, it is more in states like Karnataka and Assam.

#### **4.7.6 Manufacture of Paper and Paper Products (28)**

So far as the investment growth in manufacture of paper and paper product is concerned it is highest in case of Uttar Pradesh (11.83 percent) during the entire study period. Other states that have higher investment growth during this period include Assam 10.83 percent, Punjab 10.12 percent and Tamilnadu 10.06 percent. A disaggregated analysis shows in eighties six states registered negative growth rates. Assam registered the highest investment growth rate of 53.11 percent during eighties, followed by Orissa 18.99 percent and Kerala 12.63 percent. In nineties again Assam shows the highest investment growth rate of 2223.81 percent. Four states witnessed negative growth rate during this period. One important point to be noted is Orissa, which registered higher growth rate during eighties shows negative growth during nineties. An analysis of share of GFCF shows, the major shareholders are Andhra Pradesh, Karnataka, Tamilnadu and Maharashtra.

#### **4.7.7 Manufacture of Leather and Leather products (29)**

The growth of investment for leather and leather related product is highest in case of Haryana (24.39 percent) for the entire study period (1980-81 to 2000-01). States like Punjab, Karnataka and Uttar Pradesh registered higher GFCF growth during this period. Bihar registered a negative growth rate of -4.92 percent. In eighties the growth of GHCF is more incase of Karnataka, Haryana and Andhra Pradesh. These states registered, 31.52 percent, 23.99 percent and 22.85 percent growth of GFCF respectively. Where as in nineties four states (AP, Karnataka, MP & Rajasthan) experienced negative investment growth rates. Haryana show the highest growth of GFCF of 29.72 percent during this period, followed by Punjab and West Bengal. The share of GFCF shows it is highest in Tamilnadu, followed by Uttar Pradesh.

#### **4.7.8 Manufacture of Basic Chemicals and Chemical Products (30)**

Andhra Pradesh registered the highest growth rate of GFCF for chemical and chemical products during the entire study period. It was 11.56 percent followed by Gujarat 11.51 percent, Tamilnadu 10.87 percent and Rajasthan 10.04 percent. West Bengal shows the lowest growth rate of GFCF of 0.56 percent during same time period. In eighties three states experienced negative growth rates. Highest growth of GFCF was observed in case Punjab. In nineties Assam registered highest growth rate of 31.83 percent followed by Bihar 25.67 percent and Andhra Pradesh 25.67 percent. The share of GFCF is highest in case of Gujurat, followed by Maharastra and Andhra Pradesh.

#### **4.7.9 Manufacture of Rubber, Plastic, Petroleum and Coal Products (31)**

The growth of GFCF for the manufacture of the rubber, plastic, petroleum and coal product is highest in Madhay Pradesh (36.46 percent) during the entire study period. The states those have higher investment growth during this period include Orissa 22.90 percent, Karnataka 21.90 percent and Gujurat 14.37 percent. A disaggregated study shows in eighties Madhya Pradesh registered the highest growth rate of 55.24 percent

followed by Orissa 33.97 percent, Punjab 18.05 percent and Assam 16.07 percent. Uttar Pradesh is the only state, which registered a negative GFCF growth. In nineties Karnataka registered the highest growth of 70 percent. During nineties four states experienced negative growth rates. The share of GFCF is highest in Maharashtra followed by Tamilnadu and Gujarat. These big three share around 50 percent of the total GFCF.

#### **4.7.10 Manufacture of Non-metallic Mineral Products (32)**

Punjab registered the highest growth rate of GFCF for non-metallic mineral products during the entire study period. The other states those registered higher GFCF growth during this period include Andhra Pradesh 11.05 percent, Gujarat 10.76 percent and Maharashtra 8.6 percent. In eighties Karnataka and West Bengal demonstrate negative growth rate. The highest growth of GFCF was observed in Assam, which 19.99 percent followed by Haryana 19.97 percent, Andhra Pradesh 18.68 percent, Rajasthan 16.42 percent and Maharashtra 11.46 percent. In post reform period that is nineties seven states experienced negative growth rate. The highest growth of GFCF was observed in Punjab, which is 34.90 percent. Developed states like Maharashtra and Tamilnadu registered moderate GFCF growth. The share of GFCF is more in case of Maharashtra, Gujarat, Uttar Pradesh, Maharashtra and Andhra Pradesh.

#### **4.7.11 Manufacture of Basic Metal and Alloys Industries (33)**

The highest growth rate of GFCF for basic metal and alloys industries was observed in case of Gujarat (20.28 percent) during the entire study period. It was followed by Karnataka 18.72 percent, Uttar Pradesh 15.04 percent and Haryana 12.75 percent. During eighties Andhra Pradesh registered highest growth rate of 18.91 percent followed by Uttar Pradesh 17.98 percent, Assam 13.65 percent, Maharashtra 13.16 percent and Kerala 12.6 percent. Four states show negative GFCF growth. Whereas in nineties nine states experienced negative growth rate. The highest growth was observed in case of Karnataka, 37.40 percent. Andhra Pradesh, which registered highest growth during eighties, shows

negative growth during nineties. So far as the share of GFCG across states are concerned, it is more in case of Madhya Pradesh, Bihar, West Bengal and Maharashtra.

#### **4.7.12 Manufacture of Metal, Parts, Machinery and Transport Equipments (34+35+36) & Transport Equipment parts (37)**

In case of metal, parts, machinery and transport equipments highest growth was observed in Bihar (13.23 percent) during the entire time period. Where as in case of transport equipment parts, highest growth of GFCF was observed 19.19 percent in Haryana followed by 17.45 percent in Uttar Pradesh and 14.61 percent in Karnataka. During eighties highest growth of GFCF was observed in Orissa, which is 22.76 percent in case of metal, machinery and equipments. Where as in case of transport equipment parts it is highest in case of Haryana, followed by Madhya Pradesh. In nineties the growth of GFCF in metal, machinery and transport equipment was highest in Rajasthan 27.35 percent. During these period six states experienced negative GFCF growth states. In case of transport equipment parts Karnataka show the highest growth rate of 27.35 percent. The other states those show higher GFCF growth include Andhra Pradesh, Uttar Pradesh and Tamilnadu.

#### **4.7.13 Manufacture of Photographic, Cinematographic Equipments, Watches and Clocks (38)**

The growth of GFCF for Photographic, Cinematographic Equipments, Watches and Clocks was highest in Rajasthan and Haryana during the entire study period. In eighties Madhya Pradesh has the highest growth of GFCF, which is 61.44 percent. The other states those have higher GFCF growth during eighties include Tamilnadu and Andhra Pradesh. In nineties Haryana registered the highest growth rate of GFCF, which is 41.58 percent. So far as the share of GFCF across states are concerned, it is more in case of Karnataka, Tamilnadu and Maharashtra. These three share around 60 percent of the GFCF.

**Table: 4.20 (a): Industry Wise Growth of GFCF Across Major Indian States in Registered Manufacturing Sector from 1980-81 to 2000-01.**

(in Percent)

STATE	20-21	22	23+24+25	26	27	28	29	30	31	32	33	34+35+36	37	38
AP	10.62	12.13	8.47	23.33	6.61	7.7	3.52	11.56	10.97	11.05	3.3	3.2	1.17	11.21
ASSAM	6.02	-5.85	-5.29	..	-1.10	10.83	..	5.49	14.28	7.72	0.02	-0.93	6.50	..
BIHAR	9.62	10.07	-5.01	17.47	7.90	-0.59	-4.92	8.68	2.01	4.25	-1.11	13.23	5.09	-0.41
GUJURAT	6.22	5.92	5.10	9.43	7.77	8.35	9.49	11.51	14.37	10.76	20.28	9.21	11.09	18.00
HARYANNA	16.90	16.15	4.72	34.28	21.36	1.82	24.39	2.41	11.83	6.07	12.75	10.61	19.19	22.75
KARNATAKA	10.76	14.94	6.88	29.42	2.66	1.41	15.61	8.37	21.90	5.70	18.72	7.49	14.61	8.86
KERALA	13.08	9.18	4.57	..	..	2.9	..	3.04	5.68	6.55	-0.12	..	..	-5.93
MP	17.51	23.33	13.15	9.38	8.81	-6.61	4.10	6.30	36.46	3.08	-1.04	9.58	16.17	22.43
MAHARASTRA	10.14	18.12	4.17	13.33	12.17	7.96	8.32	9.22	11.02	8.60	10.74	8.33	8.29	15.07
ORISSA	15.80	17.81	-10.77	15.68	-6.05	7.86	..	8.78	22.90	0.24	4.68	5.78	6.34	..
PUNJAB	6.61	10.50	7.54	14.99	14.76	10.12	18.85	6.87	11.70	13.40	3.38	5.23	10.80	10.30
RAJASTHAN	5.32	17.77	7.84	17.45	23.27	3.67	..	10.04	8.08	7.68	0.97	9.34	6.92	22.78
TAMILNADU	11.23	8.44	8.08	26.47	9.82	10.06	8.84	10.87	5.29	8.31	9.78	6.80	7.64	14.69
UP	7.44	13.71	5.57	18.95	20.04	11.83	14.97	9.56	10.94	5.92	15.40	7.56	17.45	13.00
WB	7.42	17.26	2.02	9.38	9.69	3.86	6.33	0.56	12.31	7.04	0.21	4.45	-1.68	6.75

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

Table: 4.20 (b) : Industry Wise Growth of GFCF Across Major Indian States in Registered Manufacturing Sector from 1980-81 to 1990-91.

(in Percent)

STATES	20-21	22	23+24+25	26	27	28	29	30	31	32	33	34+35+36	37	38
AP	-3.73	13.33	6.05	21.01	12.81	-2.32	22.85	4.6	15.33	18.68	18.91	0.49	-2.59	36.77
ASSAM	16.09	..	21.95	..	1.73	53.11	..	-13.30	16.87	19.99	13.65	5.82	3.68	..
BIHAR	17.50	5.79	0.08	-30.34	20.71	-9.11	-13.32	13.19	8.06	3.32	-0.35	16.24	1.65	17.66
GUJURAT	1.60	11.57	-5.96	-4.90	16.80	-8.78	3.08	13.13	11.74	9.85	3.63	4.14	15.08	13.50
HARYANNA	14.78	16.64	0.82	23.53	13.69	1.44	23.99	14.65	14.44	19.97	4.66	2.26	29.42	11.90
KARNATAKA	8.24	26.18	-2.13	31.52	2.86	-16.56	31.52	-1.40	3.77	-0.03	-5.11	12.94	21.46	18.88
KERALA	6.13	9.14	1.41	..	-6.83	12.63	..	7.58	4.02	5.18	12.68	..	..	9.81
MP	22.47	30.62	2.43	8.37	4.98	-2.39	2.71	0.15	55.24	14.32	-7.27	11.58	23.20	61.44
MAHARASTRA	14.73	17.03	-2.86	17.45	5.10	6.74	21.05	9.13	9.35	11.46	13.16	7.83	3.40	6.25
ORISSA	14.32	7.29	-3.13	38.04	19.77	18.99	..	12.47	33.97	6.65	8.49	22.76	22.67	9.88
PUNJAB	17.60	8.70	9.65	21.45	30.02	10.13	12.48	27.35	18.05	4.09	7.29	10.38	12.96	7.89
RAJASTHAN	0.45	-5.31	-2.50	8.68	14.68	-7.08	..	-1.75	7.26	16.42	4.45	12.89	6.21	15.35
TAMILNADU	24.72	18.20	7.16	22.14	-0.39	2.06	13.65	15.41	7.60	6.95	-2.59	3.58	1.70	35.21
UP	17.52	15.28	3.30	23.39	41.91	7.40	11.66	11.24	-0.56	6.41	17.98	10.03	20.39	11.65
WB	5.27	14.52	-8.61	9.64	15.36	6.34	0.90	1.64	6.77	-2.61	11.42	-3.08	-12.50	7.15

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues



**Table: 4.20 ©: Industry Wise Growth of GFCF Across Major Indian States in Registered Manufacturing Sector from 1990-91 to 2000-01.**

( in Percent)

STATES	20-21	22	23+24+25	26	27	28	29	30	31	32	33	34+35+36	37	38
AP	3.46	14.01	0.07	27.64	36.14	13.17	-4.76	23.45	10.33	8.51	-31.45	3.13	20.04	-14.47
ASSAM	-3.66	..	-16.15	..	-29.37	23.81	..	31.83	22.65	-7.08	-30.82	-4.65	8.57	..
BIHAR	4.51	4.00	-13.32	47.57	7.17	8.31	6.13	25.67	15.81	-8.78	-24.32	14.61	-1.02	-13.50
GUJURAT	-0.96	3.92	0.84	-1.50	14.27	-0.32	9.79	16.02	11.45	6.78	9.91	8.93	9.87	14.29
HARYANNA	8.12	6.34	-6.27	50.31	30.32	5.64	29.72	-12.54	22.83	-8.10	18.18	16.93	12.63	41.58
KARNATAKA	23.68	21.72	32.43	8.58	24.65	13.70	-5.70	13.84	70.61	-6.72	37.40	-0.54	27.35	8.12
KERALA	3.17	18.17	-3.35	11.53	..	3.75	..	5.41	14.2	0.58	12.83	-6.63	-9.36	24.42
MP	-5.40	-6.44	9.91	30.62	7.13	-15.82	-4.17	13.96	-4.35	-15.49	-2.19	6.19	2.25	3.31
MAHARASTRA	9.45	24.94	-5.66	8.93	31.52	9.52	0.86	1.03	7.41	7.32	-1.76	3.35	11.78	21.48
ORISSA	10.85	32.43	-22.55	10.59	-17.28	-0.34	..	13.69	-17.89	-22.02	-18.64	-0.03	-23.44	
PUNJAB	5.48	6.11	-4.50	19.12	11.62	8.42	19.94	9.03	4.50	34.90	-11.83	-4.54	4.68	11.76
RAJASTHAN	-8.34	43.55	-6.72	14.56	47.57	13.43	-2.43	14.01	-9.88	4.79	-13.08	27.35	5.17	14.39
TAMILNADU	9.41	4.93	1.79	15.04	24.47	-0.34	3.77	0.21	-8.00	12.84	8.50	2.50	14.97	-15.08
UP	0.02	7.93	-6.78	15.58	7.11	7.06	4.12	-9.11	19.43	-3.88	4.02	10.94	17.17	-15.61
WB	10.48	5.71	-4.02	6.09	-0.64	4.30	15.27	3.01	12.79	3.90	-28.39	-1.16	-6.44	7.94

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

## 4.8 Summary

The present chapter studies two important objectives. First, to study the pattern of growth and structure of investment in Indian registered manufacturing sector and the pattern of investment growth and structure across major Indian states. Second, to explore the factors those influence the level of investment in Indian registered manufacturing sector and to find out the reasons for uneven growth and share of investment across major Indian states. The study found, at all India level there has been investment boom in the first half of nineties and after that sharp decline in investment. The story remains same in case of majority of the states. The study found the reasons for investment boom are, (i) increase in the share of profit during this period, (ii) declining share of depreciation, (iii) issue of new capital in the stock market by the non government private companies. The reasons for sharp decline in investment is due to decline in the share of profit, rise in the share of depreciation and the issue of new capital during this period dropped. The study found three major factors those influence the level of investment in Indian registered manufacturing sector include the rate of profit, interest payment and rate of value added. The rate of profit and the rate of value addition found to be positively related with the level of investment. Where as the rate of interest was found to be negatively associated with the level of investment. In regard to the variation across the major Indian states in terms of growth and structure of investment, the study found physical infrastructure as the most important factor, which affects the decision in regard to the location of new investment. It is seen that states with better infrastructure facility have higher investment share.

Appendix:

Table: 4A:1: Industry Wise Growth of GVA Across Major Indian States in Registered Manufacturing Sector from 1980-81 to 1990-91.

(in Percent)

States	20-21	22	23+24+25	26	27	28	29	30	31	32	33	34+35+36	37	38
AP	6.53	6.5	2.05	16.27	6.52	1.69	..	0.46	14.41	6.28	4.59	2.72	-3.57	12.77
ASSAM	-0.46	..	-2.54	..	-6.97	..	..	-17.94	36.59	-0.11	12.53	0.97	-13.47	..
BIHAR	3.77	11.55	-2.7	..	15.81	-8.23	0.24	..	12.57	6.05	9.61	5.31	1.66	..
GUJURAT	8.13	5.26	-0.96	16.44	3.38	6.14	4.97	12.66	..	9.62	7.31	10.05	4.94	11.15
HARYANA	15.74	11.51	2.91	5.1	8.35	6.37	4.76	2.24	4.92	5.66	4.55	3.81	21.28	13.36
KARNATAKA	11.95	13.41	2.11	16.91	2.17	11.66	36.34	3.28	13.2	12.74	7.01	10.21	3.66	5.86
KERALA	5.11	8.85	-0.28	-5.63	-10.17	9.12	..	0.22	14.55	2.17	8.89	4.14	-12.16	-0.48
MP	16.28	16.35	1.82	..	4.1	5.5	21.9	9.12	..	13.21	2.51	10.37	11.41	12.67
MAHARASHTRA	13.26	7.57	1.31	11.08	1.09	4.17	22.63	6.35	15.23	10.4	5.66	6.01	5.85	8.99
ORISSA	0.74	9.21	10.85	..	2.79	3.99	..	..	..	5.52	16.35	8.47	..	..
PUNJAB	12.46	11.28	12.54	14.92	5.17	31.25	19.16	4.37	15.2	..	6.76	8.5	9.63	4.8
RAJASTHAN	4.89	..	4.97	9.64	12.91	9.47	..	10.95	..	14.91	2.74	6.33	5.36	17.99
TAMILNADU	8.37	7.76	6	20.01	-1.24	5.81	9.36	3.07	15.88	5.56	2.56	4.46	2.94	11.35
U.P.	10.9	16.52	2.8	5.08	20.81	13.82	14.13	11.97	..	11.21	9.92	13.55	14.26	24.88
WEST BENGAL	8.38	18.16	-1.55	1.47	3.47	-3.04	-5.9	0.36	8.79	-2.55	-7.61	0.98	-1.72	2.85

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

**Table: 4A: 2: Industry Wise Growth of GVA Across Major Indian States in Registered Manufacturing Sector from 1991-92 to 2000-01**

States	20-21	22	23+24+25	26	27	28	29	30	31	32	33	34+35+36	37	38
AP	7.45	5.88	0.61	29.85	14.13	6.31	..	9.95	5.22	5.41	17.17	7.94	10.07	2.09
ASSAM	2.06	..	-6.69	..	-42.72	..	..	8.92	-0.47	-1.13	-8.37	3.59	-24.5	..
BIHAR	5.19	-3.19	-7.43	..	1.61	-8.85	-3.06	..	-2.25	-1.56	8.49	0.26	-7.27	..
GUJURAT	7.86	21.43	6.53	6.13	13.05	9.04	13.39	15.41	..	8.41	9.55	5.59	3.23	14.02
HARYANA	7.83	4.73	-7.34	29.86	3.86	-6.09	25.91	0.84	5.75	-3.21	7.39	8.56	9.56	5.07
KARNATAKA	13.84	21.66	3.69	18.57	26.71	2.16	-1.65	11.86	20.95	3.15	7.68	3.37	9.07	5.17
KERALA	9.22	-5.34	6.48	16.65	6.23	2.93	..	6.12	5.42	0.42	6.51	2.86	4.71	-7.59
MP	1.63	2.86	10.03	..	1.17	-5.03	8.1	8.98	..	7.5	13.11	0.84	9.18	10.07
MAHARASHTRA	10.48	12.59	0.38	4.46	38.92	5.67	-6.05	8.23	10.23	3.05	7.38	5.21	6.22	18.39
ORISSA	5.16	19.05	-17.28	..	-0.89	-1.81	..	..	..	5.12	5.84	-3.48	..	..
PUNJAB	9.04	2.02	1.73	11.39	22.36	0.26	18.76	7.46	12.49	..	-2.36	6.25	2.48	9.94
RAJASTHAN	5.09	..	-0.05	22.4	33.1	10.98	..	27.23	..	13.82	10.77	6.05	1.04	28.8
TAMILNADU	5.42	16.58	3.38	17.85	14.97	6.3	-2.02	10.78	1.53	4.36	7.81	3.19	9.93	9.88
U.P.	6.51	7.71	-2.73	16.74	18.93	6.38	2.11	4.53	..	2.99	10.45	-1.75	13.63	11.85
WEST BENGAL	5.86	25.44	10.14	8.59	7.87	14.49	15.62	7.81	-3.88	9.17	4.74	5.38	-4.16	-0.92

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

**Table: 4A: 3: Industry Wise Growth of GVA Across Major Indian States in Registered Manufacturing Sector from 1980-81 to 2000-01**

States	20-21	22	23+24+25	26	27	28	29	30	31	32	33	34+35+36	37	38
AP	7.36	6.25	2.4	19.85	1.34	4.56	..	10.46	8.71	8.11	12.38	3.39	3.55	4.78
ASSAM	1.08	..	-0.05	..	-12.51	..	..	-5.01	12.16	5.88	4.29	0.08	-6.81	..
BIHAR	3.67	12.44	-2.81	..	5.78	-3.35	-1.9	..	2.23	-0.58	7.33	0.1	-1.6	..
GUJURAT	7.12	7.83	1.58	9.8	5.78	7.88	10.14	12.55	..	10.44	13.02	7.77	8.28	12.21
HARYANA	10.03	8.24	2.27	20.83	9.53	1.66	19.8	3.56	1.73	3.5	5.13	6.12	15.55	13.06
KARNATAKA	10.27	12.91	6.23	15.71	2.34	8.11	19.41	8.29	13.48	7.52	10.69	8.8	8.34	5.15
KERALA	7.65	4.27	4.72	-6.75	-1.47	6.69	..	3.85	5.75	4.25	5.95	4.07	3.69	1.41
MP	13.29	9.4	8.24	..	0.27	1.66	11.62	13.12	..	8.77	6.48	5.94	13.21	19.75
MAHARASHTRA	10.12	7.89	1.42	12.58	11.19	6.03	8.71	8.96	1.29	5.64	5.38	6.56	6.81	13.19
ORISSA	8.21	6.79	-3.21	..	4.55	2.09	..	..	..	6.11	9.85	4.18	..	..
PUNJAB	9.55	11.64	7.29	10.98	9.96	13.67	16.07	6.12	10.05	..	4.57	9.48	8.27	9.64
RAJASTHAN	10.58	..	6.69	19.33	20.76	10.01	..	13.37	..	11.37	1.62	6.99	3.51	21.53
TAMILNADU	6.49	10.1	6.18	21.73	2.27	6.68	8.23	6.24	8.4	6.82	5.29	5.14	6.08	14.21
U.P.	7.42	12.36	1.16	13.62	14.23	9.41	11.28	12.24	..	5.08	9.16	7.33	14.73	15.89
WEST BENGAL	6.86	15.32	4.53	5.82	5.41	6.14	5.65	7.53	3.36	5.44	4.73	4.53	-0.89	2.69

Source: Has been calculated from the Annual Survey of Industries, Summery Result of Factory Sector, Various Issues

**Chapter-5**

***Conclusion***

## CONCLUSION

The present study focuses on five major objectives and it spreads over five different chapters. The objectives are; first, to study the pattern of growth and structure in Indian registered manufacturing sector at 2-digit level from 1980 onwards. Second, to study the nature of relationship between growth and profitability in Indian registered manufacturing sector. Third, to study the nature of relationship between the factor intensity and profit in Indian registered manufacturing sector. Fourth, to study the growth and patterns of investment in registered manufacturing at 2-digit level industries in India and 15 major states. Fifth, to study the determinants of investment in the Indian registered manufacturing sector and also to explore the major factors those influence the location of investment in major Indian states.

In order to analyze the performance of the manufacturing sector at 2-digit level of classification, the trend growths and structural ratios have been calculated. Some key ratios have been calculated to answer certain important question like (i) what is the increase in the cost of creating one job, (ii) what is the level of growth in the productivity of an employee and in per unit of fixed capital, (iii) what is the increase in the fixed capital per unit of output (iv) what is the increase in the labor cost per unit of output & (v) what is the change in the value added generated by one unit of output.

The growth of some key structural ratios shows, the cost of creating one job has increased from 8.35 percent in pre reform period to 9.45 percent in the post reform period. In other words, the capital intensity has increased in the post reform period in comparison to the pre reform period. So far the growth of labor productivity is concerned, in post reform period it has declined from 6.62 percent to 6.13 percent, where as the growth of capital productivity registered a negative growth in both the pre and the post reform period. The study found the increase in the capital out put ratio is 4.58 percent per annum in the post reform period. This means every unit of output is produced with more and more of

capital. A rising output per employee resulted in a fall in the labor cost per unit of output. The value added generated by every unit of output in the registered manufacturing sector is still negative in the post reform period.

So far as the growth of manufacturing employment is concerned, it was stagnant in eighties. It was 0.27 percent in the eighties, which increased to 1.1 percent in the nineties. Increase in employment is seen in textile products including wearing apparel (26), manufacturing of scientific equipments, photographic cinematography, watches, clocks etc (38) and the manufacturers of rubber, plastic, petroleum, coal products, processing of nuclear fuels etc (31).

The share of wages in Indian registered manufacturing sector has declined significantly in the post reform period. It was 25.63 percent in eighties and declined to 17.81 percent in nineties. The growth of labor productivity declined marginally from 6.62 percent in eighties to 6.13 percent in nineties. The growth of labor cost also shows some improvement but still it is negative.

The growth of manufacturing output has declined from 9.3 percent in eighties to 8.38 percent in nineties. The growth of value added registered an increase from 6.64 percent in eighties to 8.22 percent in nineties. But the growth of value added per unit of output is still negative in nineties, even though it has improved in comparison to the earlier period. The growth of capital registered an increase from 7.33 percent in eighties to 12.95 percent in nineties. The investment ratio experienced an increase from 0.07 percent in eighties to 0.08 percent in nineties. The growth of capital intensity witnessed an increase from 8.35 percent in pre reform period to 9.45 percent in the post reform period. But the growth of capital productivity shows, it has declined from -0.64 percent in eighties to -4.52 percent in nineties. The growth of capital output ratio registered an increase in the nineties.



In regard to the relationship between the growth and profitability in Indian registered manufacturing sector the study found positive relationship between growth and profitability. But profitability explains a very small portion of growth. So it shows a weak positive relationship. Except three industries {paper products (28), manufacturers of rubber, plastic, petroleum, coal products, processing of nuclear fuels etc (31) and photographic cinematography, watches, clocks etc (38)}, the rest of the industries show a positive sign. It is seen in case of four industries and total manufacturing the relationship is statistically significant at 10 percent level of significance.

Another important implication comes out of the study is, since the rate of profit explains a very portion of growth, there are other variables those explain the growth in registered manufacturing sector.

The regression model with one period time lag in rate of profit found the model to be a poor fit for all most all the industries. But the  $\beta$  value is positive and significant for nine industry groups. The positive sign implies the current year growth is positively associated with the last year rate of profit. But the low co-efficient of determination implies one period time lag in profit rate explains a very small portion of growth in the Indian registered manufacturing sector.

In regard to the factor intensity and profit relationship the study found positive significant relationship between the capital intensity and profit in Indian registered manufacturing sector. Where as labor intensity and profit relationship shows a negative sign. It implies profit is positively associated with capital intensity and negatively with labor intensity. In other words, industries those are capital intensive earn more profit and those are labor intensive earn less profit. It can be concluded from the above analysis that, profit in Indian registered manufacturing is due to more of capital.

The study found, at all India level there has been investment boom in the first half of nineties and after that sharp decline in investment. The trend growth rate of investment shows, it was 6.50 percent in eighties. During the first half of nineties, it creased to 23.65 percent. This period is considered as the period of investment boom. In the second half of nineties, it declined sharply to -8.74 percent. The study found the investment boom is mainly due to three reasons. First, the issue of new capital by non-government public limited companies increased significantly during this period. Second, the share of profit was higher (35.9 percent) during this period. Third, the share of depreciation was very low (18.37 percent) during this period.

The reasons for sharp decline in the investment in the second half are, (i) the issue of new capital by the non government public limited companies dropped significantly, (ii) the share of profit declined to 33.05 percent, and (iii) the share of depreciation increased to 23.66 percent.

In regard to the determinants of investment, the study found three important factors those influence the Indian registered manufacturing sector are profit, value added and interest payment. The rate of profit and value added have a positive relationship with the level of investment, where as the rate of interest found to be negatively related with the level of investment.

In regard to the variation across major Indian states in terms of growth and share, majority of the state also experienced the same pattern of investment growth. During the first half of nineties, for majority of the states it was the period of investment boom. In the second half of nineties, it declined sharply. So far as the share of investment is concerned, it is concentrated more in few industrially developed states like Maharastra, Gujurat, Tamilnadu, Karnataka and Uttar Pradesh.

The study found the physical infrastructure plays a crucial role in determining the level of investment. It also influences the location of the new investment. States with better infrastructure have higher investment share. States like Maharashtra, Gujarat, Tamilnadu and Karnataka have higher investment share because of better infrastructure. It is also seen states having higher per capita net state domestic product attract more investment.

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