

GROWTH AND PERFORMANCE OF MANUFACTURING SECTOR: A STUDY OF HARYANA

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CERTIFICATE

This is to certify that the dissertation entitled **“Growth and Performance of Manufacturing Sector: A Study of Haryana”**, submitted to the Department of Economics, Central University of Haryana for the award of the Degree of Master of Philosophy in Economics, is appearing as the record of original work done by Ms. Dipika (Enrolment No. CUH/21/2015, Roll No.6022), under my supervision and guidance. The matter presented in this dissertation has not been submitted in part or full, for any other award of any degree/diploma of this university or any other university/institution.

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DECLARATION

I hereby declare that the research work embodied in this dissertation entitled **“Growth and Performance of Manufacturing Sector: A Study of Haryana”** has been carried out by me at the Department of Economics, Central University of Haryana for the partial fulfilment of the requirement for the award of the degree of Master of Philosophy in Economics, is a record of original research work done by me under the supervision of Dr. Ajeet Kumar Sahoo, Assistant Professor Department of Economics, Central University of Haryana. The manuscript has been subjected to plagiarism check and the work is submitted to consideration of award of M.Phil Economics. The content of this dissertation has not been submitted so far in part or in full for any degree or diploma in other institution.

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CHAPTER-1

INTRODUCTION

1.1 Background

The goal of industrialization is sought in the developing world as an essential ingredient of the expansion, diversification and modernization of their economies and thereby of improving the general living standards (UN, 1972).

The process of sustained increase in the level of industrialization is a trademark of economic strength and immovability of an economy. Even the growth and development of agriculture sector cannot go very far unless there is an industrial development to take the excess manpower and to provide a solid technical base for transformation of agriculture. Due to its deep forward and backward linkages with several key segments of the economy, industrial sector has a strong multiplier effect and is capable of being the driver of economic growth. It is the industrialization that ensures a sharp rise in national income and standard of living by more extensive and intensive utilization of the productive resources, increasing the productivity of economy, generating profitable employment opportunities and making available basket of goods and services in large scale. For the developing countries like India industrialization is considered a principal objective and solution of various social and economic evils.

Development literature frequently emphasizes the importance of a strong agricultural base for developing countries. A top priority to agriculture is always suggested in their case. Diverse gains emanating from agricultural development are highlighted: employment to large number of people, self reliance in food production, provision of industrial raw materials and generation of surplus resources for other sectors of economy. There is, however, a limit to which agriculture can develop itself. It has to be supported by a vibrant industrial sector for a sustained economic growth. Therefore,

industrialization is vital to the development process in numerous ways. It is primarily through industrialization that traditional societies are transformed into modern one. Rise in standard of living also associated with industrialization which allows more intensive use of available resources. Industrialization is essential to agricultural development by way of mechanization of agricultural development by way of agricultural raw materials and reducing pressure on population from agricultural to industry. It has indeed a great employment generation capacity. Industrialization also brings in a revolution in the social life of the economic structures and new mental attitudes. Industrialization is crucial for the uplift of developing societies. For us, it is imperative here to examine the industrial development in Haryana after having analyzed its agricultural development because agriculture and industries are the two major factors of the economy of any region on the basis of which the overall level of economic development of that region is measured.

1.1.1 The Global Manufacturing Sector:

Manufacturing Sector is the main engine of technical change and economic growth. The majority of innovations is first and commercialized in this sector. In many countries, the manufacturing sector is in a state of transition. It is growing in emerging economies; lessening but becoming more productive in advanced economies. The share of manufacturing GVA (Gross Value Added) in total GVA is increasing. In 2014-15 it was 17.2%. So, manufacturing sector is playing an important role in the world economy.

1.1.2 The Asian Manufacturing Sector:

Asia is the fastest growing economic region and the largest continental economy by GDP PPP in the world. China and India are currently the first and third largest economies in the world, respectively. Moreover, Asia is the site of some of the world's longest modern economic booms, starting from the Japanese economic miracle (1950-1990), Miracle of the Han River (1961-1996) in South Korea and the economic boom (1978-2013) in China.

The manufacturing sector in Asia has traditionally been strongest in the East Asia region-particularly in China, South Korea, Japan, Singapore, and Taiwan. Major Asian manufacturing companies are mostly based in either South Korea or Japan. Many

developed-nation firms from Europe, North America, Japan and South Korea have significant operations in developing Asia to take advantage of the abundant supply of cheap labour, Textile industry is one of the major employers in manufacturing in Asia. Much of the world's supply of clothing and footwear now originates in South Asia and Southeast Asia, particularly in China, Vietnam, China, India, Thailand, Bangladesh, Pakistan and Indonesia.

1.1.3 Indian Manufacturing Sector:

Manufacturing contributes 16% to India's GDP. Share of manufacturing sector in the country's GDP have been largely along expected lines, though it was slightly down. The reasons attributed for this, are the global economic recession, changing pattern of consumer consumption and a stringent liquidity policy. The Government of India had launched the 'Make in India' program to accelerate manufacturing sector growth in world context. Indian Government has set a target of increasing the contribution of manufacturing output to 25% of Gross Domestic Product (GDP) by 2025, from 16% currently. Business conditions in the Indian manufacturing sector continue to remain positive. With the help of 'Make in India' initiative, India is on the path of becoming the hub for hi-tech manufacturing. India has become one of the most attractive destinations for investment in the manufacturing sector. Today, India's share of global manufacturing stands at little over 2%. In India the share of manufacturing sector Gross Value Added (GVA) in total GVA at 2011-12 prices is 18.08%.

While there is a universal agreement on the importance of industrialization, there is still a much debate regarding the appropriate pattern of industrial development. Even after the five decades of planned development, industrial activities in India have not dispersed much across the few selected regions of the country. During the entire period 1951 to 1998, the two western states of Maharashtra and Gujarat have continued to dominate Indian industry which together accounts for a share of almost 34% in the total value added by the country's factory sector (Thomas, 2004). On the other hand, the eastern states of West Bengal, Bihar and Assam have been continually losing their prominence inspite of the fact that one of the key components of industrial sector in India is the

manufacturing sector. However, the performance of the organized manufacturing sector is continued to be a source of concern. There was a massive decline in employment in the public sector following the rationalization of staffing in some units and closure of some other sick units. In the early post reforms years, the increase in private sector employment has made a good decline in public sector (Government of India, 2012). Nevertheless, the overall performance of total employment in manufacturing sector shows a dismal picture since there has been a fall in employment. Further, the share of manufacturing sector in GDP is around 16% in India, compares unfavorably with many Asian and Southeast Asian countries including Thailand (35%), China (32%), Malaysia (31%), South Korea (29%), Singapore (28%), Philippines (23%) and Vietnam (20%) (Virmani and Hasim, 2009).

Manufacturing sector is the backbone of any economy. It fuels growth, productivity, employment, and strengthens agriculture and services sector. 'Indian Manufacturing' sector is broadly divided into- capital goods and engineering, chemicals petroleum, chemicals and fertilizers, packaging, consumer non-durables, electronics, IT marketplace and registering high growth on YOY basis, but large sections of 'Indian Manufacturing' sector still suffers from bottlenecks like-use of primitive technology or under utilization of technology, poor infrastructure, over hardware and peripherals, gems and jewellery, leather and non-ferrous metals, textiles and apparels, water equipment. Indian manufacturing sector is successfully competing in the global staffed operations, expensive financing and bureaucracy

1.1.4 Haryana Manufacturing Sector:

Haryana is the state situated in the heart of North India was formed in 1966 which was carved out from Punjab. Chandigarh is the capital city of the state. Haryana is one of the wealthier states of India and had the second highest per capita income in the country at INR 147076 at current prices in the year 2014-15, including the largest number of rural crorepatis in India. The economic growth of Haryana has been exemplary since its creation as a separate state. The state economy grew at a growth rate higher than the Indian economy during most of the period. Though, Haryana is geographically a small

state 1.3% of the country, the contribution of the state in the National Gross Domestic Product at constant prices has been estimated to be 3.5%.

But in recent past years the declining rate of growth has been observed. The much-touted “No. 1 Haryana” grew at a slower pace than India. The state’s growth rate was pegged at 7% in 2013-14 as against the all- India average of 7.4%. While the gross state domestic product (GSDP) grew at an impressive rate of 8.8% during the 11th Five-Year Plan (2007-2012) as compared to the national economic growth rate of 8% during the corresponding period, the growth rate dipped to 5.5% in 2012-13. However, the growth rate bounced back to 7% in 2013-14, but was still lower than the national growth rate of 7.4%. In 2014-15 growth rate of Haryana was 7.8% but still lower than the national growth rate of 8%.

Haryana State, the new Industrial Policy 2015 is on anvil to spur growth, give further boost to the Manufacturing Sector, laying special emphasis on ease-of-doing business. Inputs of various stakeholders, including industry representatives, would also be taken into consideration while framing the policy. The objective of “Make in India” campaign of Govt. of India have been visualized in the “Make in Haryana” initiative of the State Government.

The Industries Department has taken major initiative for improving “Ease of Doing Business” through simplification of procedures, minimizing of waiting period, improvement of business environment and introduction of information technology to make governance more efficient and effective. In order to make Haryana a preferred investment destination the state is encouraging Public Private Partnership in industrial infrastructure, power, roads and bridges, health, tourism, education sectors. As a part of this initiative to strengthen Haryana image as an investor friendly State, the State Govt. has already launched online filing of Entrepreneurs Memorandum Part-I & II on 25.12.2014 and others like Annual Return filing by Micro, Small and Medium Enterprises (MSMEs), online Registration and Inspection of Boiler under Act, 1923 is proposed to be done by 28.2.2015; online Registration of Society by 30.4.2015 and Composite Application Form under Single Window Clearances by 30.6.2015 as a part of simplification of various procedures with respect to industrial approval. The State

Government has already approved self-certification for boilers with surface area less than 1,000 square mt. and verification by 3rd parties and boilers operation engineers for boilers with surface area greater than 1000 square meters. The Estate Management Procedure, 2011 for allotment, transfer, leasing, resumption etc. of plots and all other related process and procedures to be followed by the State Development Agency will also be online and completed in six months.

1.1.5 Current Status of Economy:

At the time of its formation in 1966, the state Haryana was industrially backward and predominately agriculture dominated state. But now the situation is different, the share of agriculture sector in real GSDP is declining and the shares of industry and service sector are increasing. The state surrounds Delhi on three sides, forming the northern, western and southern borders of Delhi. A large area of the state is included in the National Capital Region (NCR). Within the state the cities of Gurgaon, Faridabad, Yamunanagar, Sonipat, Panipat and Rohtak have special potential for accelerated socio-economic development. Geographical location of the state provides easy and inexpensive access to domestic consumer markets. Moreover, the availability of land suitable for industrial use makes Haryana an ideal location for industry. Haryana's relatively small size makes it easier to govern.

The economy of Haryana has witnessed a significant growth path during the recent years. The real GSDP of the state has increased from about Rs. 104608 crores in FY2006 to about Rs. 199657 crores in FY2014. The average real GSDP of the state has grown at around 8.5% during the period FY2006-FY2014.

Services sector contributes a significant share of around 53% in the GSDP of the state followed by the industry and agriculture at 27% and 20% respectively during FY2014. However, the share of industry has declined from around 30% in FY2008 to 27% in FY2014, while share of services has scaled upwards from 47% in FY2008 to 53% in FY2014.

Table 1.1 GSDP and NSDP of Haryana			
Components	FY2008	FY2011	FY2014
GSDP (Rs.crore)	151596	260621	388917
NSDP (Rs. Crore)	136584	237163	353714
Economic Growth % (at constant prices)	8.5	7.4	6.9
Source: Economic Survey of Haryana			

Table 1.2 Sectoral Contribution in GSDP at current prices (%)			
Sectors	FY2008	FY2011	FY2014
Agriculture	23	21	20
Industry	30	29	27
Services	47	50	53
Source: Economic Survey of Haryana			

The state is an emerging manufacturing hub for Indian economy having immense scope for the development of micro, small and medium enterprises (MSME) sector. The state has more than 1,347 large and medium industrial units and 80,000 small-scale industrial units having foreign collaborations. The has presence of many manufacturing clusters in the cities of Ambala, Panipat, Karnal, Kaithal, Yamunanagar, Sonipat, Rohtak among others which has boosted industries such as IT, textiles, automobile, food and handlooms. Further, 2013 was declared as the ‘Year of Industry and Employment’ with a view to boost industrial growth and employment opportunities in the state.

1.1.6 Performance of main manufacturing industries in Haryana:

Haryana is one of the leading states in terms of industrial production, especially passenger cars, two-wheelers, mobile cranes and tractors. The state is host to many large automotive players. The state produces two-thirds of passenger cars, 50% of tractors, 60% of motorcycles and 50% of the refrigerators manufactured in the country. Gurgaon district is on 1st position in automobile manufacturing. Textile industry is another

important manufacturing industry in Haryana. This industry provides maximum employment in the state. Manufacturing of scientific and surgical instruments is an old and important industry in the state and it is mainly located in Ambala district. Industrial units here are engaged in manufacturing of electric appliances like electric presses, electric ovens, voltage stabilizers, electric meters and accessories of refrigerators.

1.2 Rational of the Study

The primary importance of the study is to provide quantified information about performance of manufacturing sector in the State of Haryana and relationship between manufacturing sector growth and economic growth of Haryana. This study will provide such information to a group of academia, government, industry, and other organizations. A part of quantified economic information enables such groups to make better decisions for future long or short-term plans related to the manufacturing industry.

1.3 Scope of the Study

The study draws the trends in input-output growth of manufacturing sector of Haryana. The study also examines the relationship and direction of causality between economic growth and manufacturing sector growth of Haryana by applying Angle-Granger Causality Test using annual data covering from period 1994 to 2010, which is a period of 17 years. The main data sources of this study are Statistical Abstract of Haryana, Economic Survey of Haryana, and Annual Survey of Industries.

1.4 Objectives of the Study

The study covers the following objectives:

- 1) To analyze industry wise recent trend in input-output growth of manufacturing sector in Haryana.
- 2) To analyze district wise recent trend in input-output growth of manufacturing sector in Haryana.
- 3) To find relationship between economic growth and growth of manufacturing sector in Haryana.

1.5 Hypotheses of the Study

The study has been taken up for the period 1994-2010 with the following null hypothesis.

H₀: There is no significant long run relationship between manufacturing sector and economic growth in Haryana.

H₁: There is a significant long run relationship between manufacturing sector growth and economic growth in Haryana.

1.6 Importance of the Study

The study attempts to analyze the important dimensions of manufacturing sector in Haryana. The study also examines the impact of manufacturing sector on economic growth in Haryana between the periods of 1994-2010. The period under the study is important for a variety of reasons. First of all it was during 1991 India opened its door to private sector and liberalized its economy. Second it was the period when there were large gaps between manufacturing sector input-output values in Haryana. This study will draw attention of the policy makers to make policies regarding this problem.

1.7 Organization of the Study

This study is divided into six chapters. Chapter one basically shows the background of study, introduction of the study, rational of the study, research objectives, scope of the study, research hypotheses, and importance of the study, organization of the study. In chapter two, a review of literature pertaining to this study is discussed. This includes the studies in world context, studies in Indian context and inter-state studies.

Chapter three shows the research design, data description and tools for analysis. Chapter four comprises of the trends in input-output growth of manufacturing sector in Haryana. Chapter five comprises the relationship between economic growth and growth of manufacturing sector in Haryana and chapter six shows the major findings of the study, conclusions, policy implications and limitations of the study.

CHAPTER-2

REVIEW OF LITERATURE

2.1 Introduction

Manufacturing sector is very important to both the developing and advanced economies. In developing economies, it provides a pathway from subsistence agriculture to rising incomes and living standards. In advanced economies, it is a vital source of innovation and competitiveness, making outsized contributions to research and development, productivity growth and exports. But now the manufacturing sector is changing. It is bringing both opportunities and challenges. Literature review is very essential part of any research work. Literature finds gaps in current knowledge. Literature increases knowledge in a particular area of research. It helps you to discover research methods which may be applicable to your research work. This chapter deals with the existing literature related to the topic of this study. Many studies related to manufacturing sector have been reviewed in this chapter. The reviewed literature is divided under the following heads:

- ❖ **Studies in World context**
- ❖ **Studies in Indian context**
- ❖ **Inter-State studies**

2.2 Studies in world context

Adam (2012) examined the role of structural dynamics and transformation, especially in the form of increased manufacturing share in aggregate output, in accelerating growth and reducing growth volatility in Africa. Using data from 36 African countries, examined the key determinants of manufacturing share in aggregate output and its relationship with real GDP growth and growth volatility. The analysis covers the crisis period of the 1980s, the post -adjustment era of the 1990s, and the recent and ongoing

recovery period of the 21st century. Each of these periods is characterized by a specific development orientation and has experienced broadly different outcomes especially in terms of growth and social development. For estimating a modified form of the Chenery-Syrquin model of economic transformation to show the pattern of manufacturing transformation in African countries cross-section as well as time -series data has been used in econometric methodology of this paper. To study the relationship between the share of manufacturing value added in GDP and GDP growth, the investment rate, labour force, official development assistance relative to GDP, public expenditure as a percentage of GDP and growth in Africa's major trading partners, namely OECD countries are taken as the major determinants of growth in the model. He explained that economic transformation by increased share of manufacturing value added in aggregate output has the capacity to accelerate growth and reduce growth volatility. Strong backward and forward linkages between manufacturing and other sectors, promoting manufacturing can foster economic transformation, employment as well as wealth creation for poverty reduction. He suggested that industrial policy should not focus on specific sectors but rather continuously search for new and high profitable activities for productive diversification in manufacturing, agriculture or services. Alternative for effective industrial policy should endeavor to create a process that ensures continuous collaboration between the private sector and the government to identify constraints and remedies to structural transformation, rather than concentrating on outcomes. Promoting regionally integrated value chains and markets can be the most powerful tool for widen the scope of profitable investment opportunities, increase productivity by scale economies and enhance international competitiveness.

Gomes (2004) analyzed the literature concerned with issues related to the different facets of manufacturing organizational performance. This literature review is concluded by presenting a conceptual framework outlining the evolution of manufacturing performance measures and measurement in an organizational context. The conclusion of this study is that in the context of manufacturing performance measurement, practitioners and scholars need combine their efforts in order to validate what is known and build on it. The results of this join effort may lead to the development of practical

philosophies, systems and measures, which the practice of manufacturing performance measurement badly need.

Sengupta (2006) explained that as the economy evolves from manufacturing to services, it is important to understand whether the lesson learned in the manufacturing sector can be directly extrapolated to service supply chains. Unfortunately, the majority of existing supply chain research focuses exclusively on the manufacturing sector. To address this deficiency, the article compares the effort of traditional manufacturing-oriented supply chain strategies on the operational and financial performance of firms in both services and manufacturing sector. This study is a part of a larger research project exploring supply chain-related practices, their relevance to managers, and their impact on firm performance. In this study, data were collected from both primary and secondary resources. The primary data was collected using a traditional mail survey to capture several items of interest, including the SCM strategies, and the operational and financial performance metrics. The possibility of non-response bias was investigated through a series of t-tests comparing the responses from the first and second mailing. The results indicate there are several differences in the relative important of the strategies across the industry sector and have disparate impacts on perceived performance.

Cheng (2011) constructed a theoretical framework on the relationship among government regulations, manufacturing strategy and performance, based on the environment-strategy –performance paradigm. Using structural equation model and a sample of 135 SME of JIANGSU Province, he examined the relationship among government regulations, manufacturing strategy and performance, the result of which shows that government regulations have a significant positive effect on cost, quality and innovation; cost, quality and innovation influence financial performance significantly and positively; quality and innovation have a significant positive effect on non-financial performance, whereas cost has not. Finally, suggestions for SME-Development promoting policy and manufacturing strategy selection are putting forward.

Kasie (2013) investigated the relationship between multi-criteria performance measurement (MCPM) practice and business performance improvement using the raw data collected from 33 selected manufacturing companies. He used questionnaire survey, interview and observation of records for primary and secondary data collection. He applied a combination of both qualitative and quantitative research approaches in his study. His study finds out that companies which measure their performance using important financial and non-financial measures achieve better business performance. His study have provided significant indications that traditional performance measures which are solely relying on financial goals and indicators fail to enhance business performance of manufacturing companies. Strong emphasis has been provided for employee satisfaction perspective and employee training and development perspective as compared to other models devised before.

Arnold (2012) demonstrated the significant impact of a neglected factor: India's policy reforms in services. He examined the link between those reforms and the productivity of manufacturing firms using Panel data for about four thousand Indian firms from 1993 to 2005. Paper states that Banking, Telecommunications, Insurance and Transport reforms all had significant, positive effects on the productivity of manufacturing firms. Services reforms benefited both foreign and locally-owned manufacturing firms, but the effects on foreign firms tended to be stronger. A one-standard-deviation increase in the aggregate index of services liberalization resulted in the productivity increase of 11.7% for domestic firms and 13.2% for foreign enterprises.

Sola (2013) examined manufacturing performance for sustainable economic development in Nigeria with some objectives, those are to look at the growth rate and contribution of manufacturing to GDP, to examine trend in both manufacturing and employment, to determine the structure of capacity utilization, to determine factors influencing manufacturing performance. Panel data analysis was used on secondary data from 1980-2008 that was extracted from CBN Statistical Bulletin. The results indicate positive relationship between manufacturing and each of capacity utilization and import as 1 percent change in capacity utilization and import lead to 43081 and 3.8

percent change in manufacturing respectively. However, there is a negative relationship between manufacturing and each of investment, exchange rate, and export. A 1% change in investment, exchange rate and export lead to 0.04, 12729, 0.3 percent reduction in manufacturing respectively. This showed that investment, capacity utilization and import were major determinants of manufacturing performance for the period. The study concludes that the key to reversing the poor performance of Nigerian manufacturing is to provide incentives for firms to become more export oriented.

Karim (2009) presented a conceptual model proposing relationship between advanced quality practices, perceived manufacturing difficulties and manufacturing performances. A survey- based approach was adopted to test the hypothesis proposed in this study. The selection of research instruments for inclusion, in this survey was based on literature review, the pilot case studies and relevant industrial experience of the author. A sample of thousands manufacturers across Australia was randomly selected.

2.3Studies in Indian context

Babu (2013) explained the extent of regional manufacturing performance in India by analyzing the trends in labour and total factor productivity for the organized manufacturing sector of 15 major Indian states. The study calculates the levels and trends in both partial and total factor productivity to measure partial factor productivity and labour productivity. Econometric determination of total factor productivity growth has proceeded with two approaches on the assumption of the existence of production function - frontier and non-frontier. In frontier approach aim is to find the bounding function i.e., the best obtainable positions given the inputs. A ‘cost frontier’ traces the minimum achievable cost given input prices and output and a ‘production frontier’ traces the set of maximum achievable output for a given set of inputs and technology. The study finds significant growth in labour productivity across states, for the period 1980-81 to 2007-08. The growth of labour productivity is of the range between 4 and 10 percent, in states like Bihar, Maharashtra, Andhra Pradesh and Gujarat registering highest growth rates. It also finds that the states where capital stock grew faster register

faster growth in labour productivity and slower growth in employment. Estimates of total factor productivity growth show that for the entire period total factor productivity has improved across all the states except for two states, Tamil Nadu and West Bengal. Overall, it finds that labour productivity growth and TFPG follow more or less a similar pattern.

Krishna (2004) focused on patterns and determinants of economic growth in Indian states. It brings out the difference between the patterns of growth of developing and developed countries, since instability and volatility characterize the former. The study observes the issues of growth variability and volatility in Indian states. The coefficient of variation of year-to-year growth rates for a state is used as a measure of volatility. The most volatile states in India were Orissa, Rajasthan, Gujarat and Uttar Pradesh while the least volatile states were Punjab, Maharashtra and Kerala. The author finds that the dispersion of growth rates of states increased considerably in the post reform period from 15% in 1980s to 27% in 1990s. This analysis shows that agriculture has a positive impact on industrial and service sector growth.

Virmani (2011) tested the hypothesis of the J curve of Productivity and Growth following major liberalization and find it to be broadly supported by the data: Technological obsolescence, gradual adoption of new technology and learning by doing result in negative effects on measured productivity. They have taken the data from 1981-82 to 2007-08 to trace the changing impact of reforms on productivity and output growth. They concentrated only on industries having an average share of more than 2% in the aggregate manufacturing output during the study period. In this study partial as well as total factor productivity are estimated for the manufacturing industries. Degree of variability in shares of factors across manufacturing sectors is found very wide. It shows that the manufacturing sector in India is skewed in favor of just a few large industries. They were able to demonstrate quite convincingly that total factor productivity growth (TFPG) in this sector had indeed followed a J curve pattern as a consequence of the 1990s reforms. It also found that partial factor productivity of capital, materials and services followed a J-curve pattern. The study decisively rejected

the leftist hypothesis that reforms and opening of the Indian economy damaged the Indian manufacturing.

Singh (2012) explained about economic reforms and industrial concentration in Indian manufacturing sector. The study of the concentration level in Indian manufacturing sector reveals the existence of high inequalities in terms of industrial development among Indian states. The study is using Annual Survey of Industries data over the period 1979-80 to 2006-07. The concentration level have been worked out using Lorenz curve based Gini coefficients and Herschman Herfindal index of concentration for each year. He uses six alternative variables for computing concentration levels among different states. According to study in India, trickle down and learning by doing process has failed at industrial front and Indian economy is moving toward loop sided development.

Pal (2014) analyzed the contribution of the manufacturing sector in the path of inclusive growth in the Indian economy in terms of both income and employment generation. The period of analysis was from 1983-84 to 2009-10. The paper find out that although there has been acceleration in the growth rates of NSDP at all- India level in the post –reforms period as compared to the pre-reforms periods, the growth rate of NSDP in the manufacturing sector has declined over the post-reforms years. This study also finds out the decline of growth rate of employment in the manufacturing sector of several states.

Mariappan (2011) estimated the economic returns to scale, marginal productivities of labour and capital inputs for two-digit level industries in India's unorganized manufacturing sector. The data is collected from National Sample Survey Organization (NSSO)'s quinquennial enterprise survey and Central Statistical Organization. He estimated returns to scale, elasticities and marginal productivities of labour and capital by a simple Cobb- Douglas Production Function in the unorganized manufacturing sector. Alternative formulations Translog and CES have been also applied pooling the five cross section data. It also estimated the value of substitution between labour and capital to test the validity of hypothesis of unitary elasticity of substitution. The labour

productivity and the capital intensity have shown increasing trends during the post-reform period in comparison with pre-reform period in all the selected Indian states. At an aggregate level, the results of CDPF show that the rate of return to scale is greater than unity in all types at industry level. Based on the CES production function, the elasticity of substitution between labour and capital is found to be greater than one in all types at industry. He finds that the Indian unorganized manufacturing sector at aggregate level suffers from decreasing returns to scale.

Evidence indicates that product quality and reliability are the main competitive factors for manufacturers. Design and manufacturing capability and on time delivery came second. Price is considered as the least important factor for the Australian manufacturers. Results shows that collectively the advanced quality practices proposed in this study neutralize the difficulties manufacturers face and contribute to the most performance objectives of the manufacturers.

Sharma (2014) presented that Industrial sector plays a vital role in the development of Indian economy because they can solve the problems of general poverty, unemployment, backwardness, low production, low productivity and low standard of living etc. The Indian Government had undertaken policy reforms since 1980, but the most radical reforms have occurred since 1991, after the severe economic crisis in fiscal year 1990-91. These reforms mainly aimed at enhancing the efficiency and international competitiveness in Indian industry. After nearly more than two decades of reforms, a question that has engaged the attention of the economists in recent times is what has been the effect of these economic reforms measures on the performance of industrial sector in the post-reform period in India. The present paper attempts to present the industrial development of India in pre reform and post reform period, and investigate the impact of globalization on industrial sector in India. It is find that industrial development in India clearly indicate that the average annual growth rate of Indian industry has declined in the post reform period as compared with the pre reform period. The fall in the growth rate was 7.8 per cent to 6.7 per cent. A decline is also observed in the manufacturing sector. It was 7.6 per cent in pre reform period and 7.0 per cent in the post reform period. Finally, it may be concluded that although the industrial sector of

India has grown after independence, the rate is below expectations, especially after globalization. Thus, the need for accelerated growth can hardly be overemphasized.

Pathak (1975) studied the problem of small scale entrepreneurs and the study was restricted to five major industrial groups, viz., textiles, chemicals, metal-based, machinery manufacture and miscellaneous industries located in the 15 out of 19 districts in the state of Gujarat. It was found that the more important problem areas were raw materials, finance and market, followed by Central and state Government policies along with labour and competition faced by small entrepreneurs.

Alagh (1982) have analyzed Indian industrialization during the seventies. Industry-wise growth rate had been calculated to show India's industrial performance whereas the states industrial structure was analyzed with the help of coefficient of specialization for 1960, 1965 and 1978. During 1965 to 1978, it was found that the states of Tamil Nadu, Karnataka, Punjab, Haryana, Gujarat and Maharashtra have shown remarkable increase in industrial diversifications. Like Rajasthan, Madhya Pradesh, U.P and Kerala have shown high growth rate in output and employment, but their industrial economies were not diversified.

2.4 Inter-State studies

Aggarwal (2010) analyzed the trends in productivity for the Punjab manufacturing for the period of 1991 to 2007. He stated that the productivity is a key performance benchmark for firm involved in manufacturing sector and it is directly relates to increase in profitability, lowering costs and suitable competitiveness. He used secondary data from ASI. He analyzed the Trends in labour productivity, capital productivity and capital intensity at two digit level for Punjab manufacturing.

Sharma (2012) focused on performance, potential and constraints of organized manufacturing sector of Punjab. His study covers the period of 1980-81 to 2002-03; it has been divided into two periods, pre-reform period (1980-81 to 1990-91) and post-

reform period (1991-92 to 2002-03). According to this paper there was higher trend growth rate of fixed capital in post reform period as compared to pre-reform period in organized manufacturing sector of Punjab. Organized manufacturing sector has 'jobless growth' and same momentum of output was not maintained in post reform period. Growth rate of emoluments was higher than that of its employment level in organized manufacturing sector. It implies that existing skilled labour force has been paid higher wages and perks rather than creating new employment opportunities for organized manufacturing sector of Punjab. In this study trend growth rate of important variable is calculated with the help of semi log linear relationship. Regression method has been used to calculate employment and output elasticities. Labour and capital were complementary in nature for organized manufacturing sector in post-reform period. Punjab's industry sector was and continues to be export based. According to this study, the situation demands for the restructuring of industrial pattern and process, this can help to resolve the structural problems of the existing model of growth.

Sehgal (2011) analyzed total factor productivity of manufacturing sector of Haryana. He analyzed the inter-temporal and inter-industry comparison of total factor productivity measured by Malmquist productivity index. He has taken the period from 1981-82 to 2007-08. Overall, he find out a productivity regress in manufacturing sector of Haryana. Technological change has found to be greater than efficiency change in all manufacturing industries.

Aneja (2013) focused on regional industrial disparities in Haryana over the period of 1990-91 to 2010-11. He used deprivation and principal component analysis (PCA) method to measure inter-districts industrial disparities. His study concluded that regional disparities in the industrial development in the state of Haryana were increasing over time. He proved this by increasing value of coefficient of variation of the constructed indices by DIM as well as PCI Method. He discovered that most of the industrial development in Haryana was concentrating on or near NH1 or near NCR areas.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Present study is descriptive in nature. The study relies upon secondary data. The main sources of data are the public agencies like Statistical Abstract of Haryana, Central Statistical Organization, Directorate of Economics and Statistics. The publications and websites of Economic and Political Weekly (EPW), Economic Survey of Haryana, Annual Survey of Industries also were made use of in the collection of data for the study. The study has covered 17 years of data i.e. from 1993-94 to 2009-2010. For the first objective to see the trends in input-output growth of manufacturing industries, year over year annual growth rate has been used. The second objective of this study is to examine the causal relationship between economic growth and manufacturing sector growth, Granger Causality Test has been used for this purpose. Gross State Domestic Product (GSDP) value has taken as an indicator of economic growth and manufacturing production value has taken as an indicator of manufacturing sector growth.

3.2 Research Design

Present study is descriptive cum causal in nature, wherein descriptive analysis is used for meeting the first two objectives that is to analyze district-wise and industry-wise trends in input-output growth of manufacturing sector in Haryana exclusively. Causal analysis is used to obtain the third objective that is to find out relationship between economic growth and growth of manufacturing sector in Haryana. This study provides insights into, and an understanding of various concepts related to manufacturing sector, and its growth, and attempts to reveal the relationship between economic growth and growth of manufacturing sector in Haryana.

3.3 Data Description and tools for Analysis

The study is based on secondary data. There is no comprehensive source of entire data used in this study. Therefore the data used in this study is taken from multiple sources as given below:

Table 3.1:Data Sources in Order			
Serial no.	Data Source	Period of Data Source	Objectives
1	Statistical Abstract of Haryana	1993-2010	1 st and 2 nd
2	Economic Survey of Haryana	1993-2010	3 rd
3	Annual Survey of Industries	1993-2010	3 rd
4	Directorate of Economics and Statistics	1993-2010	1 st and 2 nd

The study has covered 17 years of data that is 1993-94 to 2009-10. For the first and second objective to analyze district-wise and industry-wise trends in input-output growth manufacturing sector of Haryana, year over year annual growth rate has been used as a major instrument. To identify the relationship between economic growth and growth of manufacturing sector in Haryana, following model is developed:

$$GMS = \alpha_0 + \beta_0 EG + \mu_1 \dots\dots(1)$$

$$EG = \alpha_1 + \beta_1 GMS + \mu_2 \dots\dots(2)$$

Where,

GMS= Growth of Manufacturing Sector in Haryana measured by value of output in crore Rs.

EG= Economic Growth measured by GSDP value in crore Rs.

$\alpha_0, \alpha_1, \beta_0, \beta_1$ = Regression coefficients

μ_1, μ_2 = Error term

Before the development of the bidirectional regression model, Angle-Granger Causality Test has been applied to identify the existence of causal relationship.

3.4 Descriptive statistics

In descriptive research a researcher have no control over variable. Descriptive studies are aimed at finding out “What is.” One cannot define descriptive research either quantitative or qualitative research, because it can utilize elements of both, often within the same study. Descriptive research report summing up data such as measures of central tendency including the mean, median, mode, deviation from mean, variation, percentage, and correlation between variables. Descriptive studies can defer rich data that lead to important recommendations.

3.5 Testing for stationarity

In a stationary time series statistical properties such as mean, variance autocorrelation, etc. are constant over time. We can define it as below:

A time series Y_t is said to be stationary if:

- $E(Y_t) = \text{constant}$ for all t ;
- $\text{Var}(Y_t) = \text{constant}$ for all t ; and
- $\text{Cov}(Y_t, Y_{t+k}) = \text{constant}$ for all t and all $k \neq 0$

In order to have feasibility of inference and forecasting of a return time series, it is required to be stationary. A stationary return time series will tend to return to its mean and fluctuations around its mean will have broadly constant amplitude. Therefore, we can have a reliable prediction about its future behavior. A stationary time series helps in identification of stationarity in the sample data. Unit root test is a test that tests the null hypothesis of unit root against the alternative hypothesis of stationarity. This includes Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test.

3.6 Co-integration Test

Variables should be differenced before being used in the regression model to avoid a spurious regression, if they are non-stationary. If there is co-integration between variables or there is a long-run relationship between them over time, they could be used in the regression model in the level forms without leading to a spurious regression. We will use Johanson Co-integration Test to test for co-integration between the variables of our study. We will use Johanson test because it has an advantage over other co-integration tests as it takes into consideration the possibility of multiple co-integrating vectors.

3.7 Granger Causality Test

The Co-integration Test indicates only the existence of causal relationship but it does not indicate the direction of causal relationship between the variables. We will use Granger Causality Test to determine the direction of causality between the economic growth and growth of manufacturing sector in Haryana. The dynamic linkage may simply be examined using the concept of Granger's (1969, 1988) causality. Formally, a time series x Granger-causes another time series y if series y can be predicted with better accuracy by using past values of x rather than by not doing so, other information being identical.

3.8 Variables used in the Study

- ❖ GSDP as an indicator of economic growth.
- ❖ Production value of manufacturing industries as an indicator of growth of manufacturing sector.
- ❖ Input value of manufacturing industries.
- ❖ Output value of manufacturing industries.

CHAPTER 4

DISTRICT-WISE TRENDS IN INPUT-OUTPUT GROWTH OF MANUFACTURING SECTOR IN HARYANA

4.1 Introduction

This chapter is presenting the district-wise manufacturing sector input-output growth of Haryana. The study has taken 12 districts of Haryana. 17 years of data have been taken from various secondary sources. The main source of data is Statistical Abstract of Haryana. The study has been done district-wise because the manufacturing sector growth varies from district to district. The present analysis is showing the gaps between input growth and output growth.

4.2 Ambala District Manufacturing

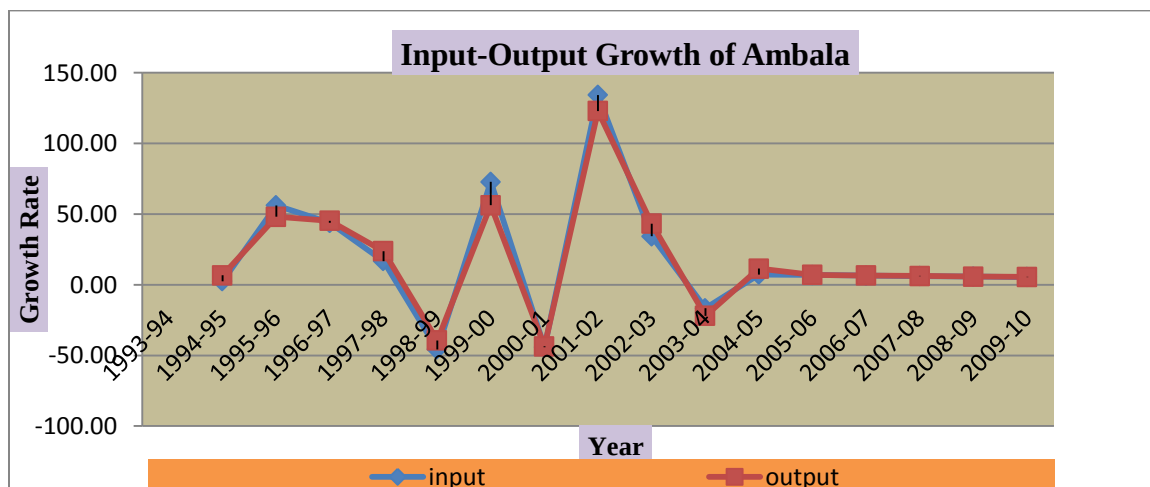
Being located in the Indo-Gangetic Plain, the land of Ambala district is generally fertile and conducive to agriculture. It is one of the largest producer of scientific and surgical instruments in the country and have to a large number of scientific manufacturers. It produces microscopes and other instruments used in chemistry laboratories. Ambala is known for the industries like, food and beverages, electronics and engineering.

Table 1 represents the growth rate of input-output of manufacturing industries of Ambala district since 1993-2010. The table is showing that there is year over year large variations in input-output growth rate of manufacturing. It has been seen that on an average the growth rate of input is greater than output growth except for few years. The absolute value of input and output is increasing but the growth rate is declining. Maximum input-output growth rate have been found in 1999-2000 with 73.99% and 55.72% respectively. Minimum input-output growth rate have been found in 2004-05 and 1998-1999 respectively since 1993-1994. Large variations have been seen in input-output growth of manufacturing industries since 1996-97 to 2004-05 and after that stagnant performance of growth rate have been observed.

Table 4.1: Growth rate of manufacturing input-output of Ambala district		
Year	Input	Output
1993-94	—	—
1994-95	3.90	5.91
1995-96	0.11	-3.93
1996-97	19.24	18.89
1997-98	-5.85	-3.21
1998-99	-33.64	-23.57
1999-00	73.99	55.72
2000-01	14.02	4.41
2001-02	35.35	35.06
2002-03	-8.98	-8.60
2003-04	-6.83	-3.13
2004-05	-53.58	8.80
2005-06	6.94	6.49
2006-07	6.49	4.95
2007-08	6.09	4.71
2008-09	5.74	4.50
2009-10	5.43	4.31

Source: Statistical Abstract of Haryana

Figure 4.1: Input-Output Growth of Ambala



4.3 Panchkula District Manufacturing

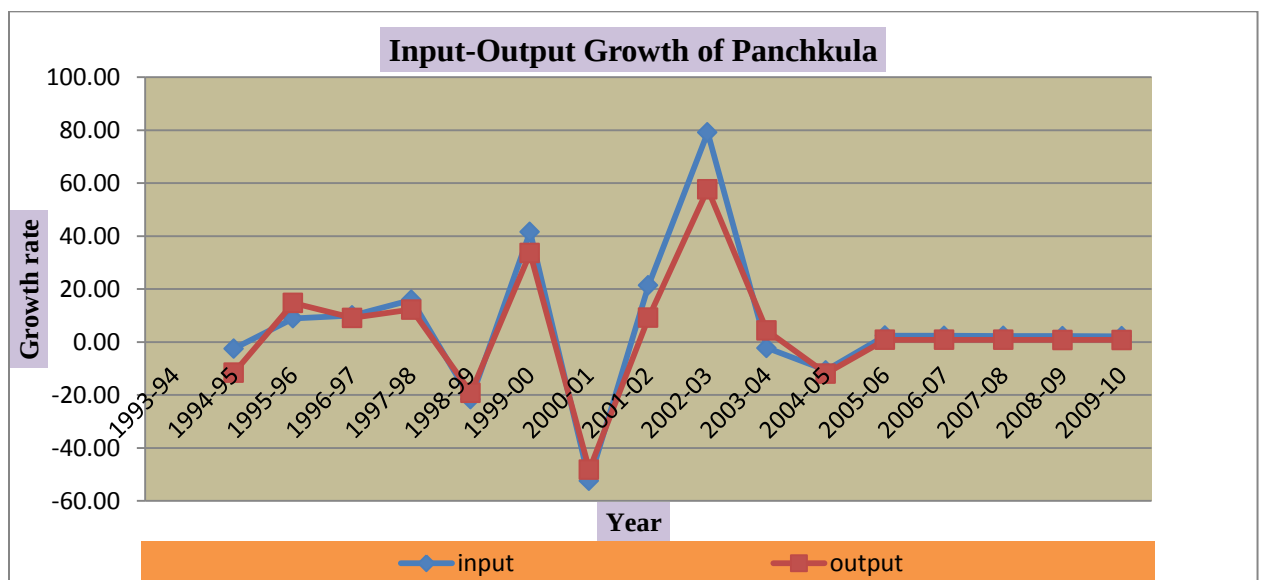
Panchkula was formed as the 17th district of Haryana on 15 august, 1995. The district has a mixed type of economy. The district serves as important link between the hills and the plains. The present district of Panchkula remained industrially backward particularly till the beginning of the 20th century. The town Panchkula had made rapid progress in the field of industrial development since it came into existence on 3rd July, 1989. The district now has a prominent place in the industrial map of Haryana. Panchkula urban estate, H.M.T., Pinjore and Surajpur are important industrial centers. It also keenly promotes animal husbandary, fisheries and forestry, which plays a subsidiary but an important role in agriculture economy. The main industries in Panchkula district are: engineering units, metal based industries, cotton textile industries, furniture based industries.

Table 4.2: Growth Rate of Manufacturing Input-Output in Panchkula District		
Year	Input	Output
1993-94		
1994-95	-2.49	-11.54
1995-96	8.92	14.73
1996-97	10.00	9.11
1997-98	15.95	12.28
1998-99	-21.67	-19.15
1999-00	41.65	33.59
2000-01	-52.48	-48.27
2001-02	21.35	9.20
2002-03	79.14	57.71
2003-04	-2.27	4.31
2004-05	-10.70	-11.92
2005-06	2.38	0.82
2006-07	2.33	0.81
2007-08	2.27	0.81
2008-09	2.22	0.80
2009-10	2.17	0.79
Source: Statistical Abstract of Haryana		

Table-2 represents the input and output growth of manufacturing industries of Panchkula. In Panchkula the maximum growth rate in input and output is in 2002-03 and 1999-2000.

Growth of manufacturing input vary from a minimum value -52.48 in 2000-01 to a maximum 79.14% in 2002-03. Five times the growth rate of input value is negative and it is four times when the output value growth rate is negative. In only two years, the growth rate of output exceeds to input growth. In 2001-02 the growth rate is minimum. The data is showing that the input growth is greater than the output growth in maximum years. There are huge fluctuations in input and output. After 2006-07 the growth rate is stagnant. This is showing the condition of manufacturing in Panchkula District. Figure-2 is showing the fluctuations in growth rates of input and output.

Figure-4.2: Input-Output Growth of Panchkula



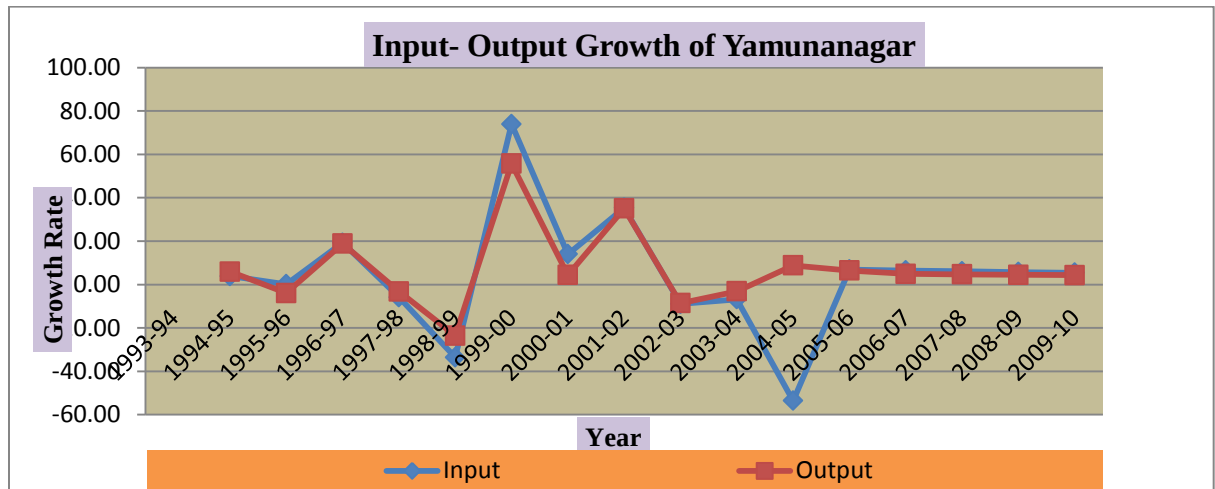
4.4 Yamunanagar District Manufacturing

Yamunanagar is well known for its industries. The city has a paper manufacturer giant. Ballorpur Industries Limited (BILT) is a flagship of the 4 billion dollar, Avantha Group and India's largest manufacturer of writing and printing paper. Yamunanagar is known for the industries like: wood and wood products and metal. Yamunanagar has emerged as a major industrial centre of the state.

Table 4.3: Growth Rate of Manufacturing Input-Output in Yamunanagar District		
Year	Input	Output
1993-94		
1994-95	3.90	5.91
1995-96	0.11	-3.93
1996-97	19.24	18.89
1997-98	-5.85	-3.21
1998-99	-33.64	-23.57
1999-00	73.99	55.72
2000-01	14.02	4.41
2001-02	35.35	35.06
2002-03	-8.98	-8.60
2003-04	-6.83	-3.13
2004-05	-53.58	8.80
2005-06	6.94	6.49
2006-07	6.49	4.95
2007-08	6.09	4.71
2008-09	5.74	4.50
2009-10	5.43	4.31
Source: Statistical Abstract of Haryana		

Table-3 is representing the situation of input and output growth in Yamunanagar district of Haryana in manufacturing sector. The growth in input value is vary from a minimum value -53.58% in 2004-05 to a maximum value 73.99% in the year 1999-2000. The growth in output value varies from a minimum value -23.57% in 1998-99 to a maximum value 55.72% in 1999-2000. The maximum growth rate is in 1999-2000 and 2001-02. The maximum negative growth rate in inputs is in 1998-99. The results are showing that after doing so much investment in manufacturing, the production is not increasing on that rate. The growth of output is less than the input growth. Figure-3 is showing the fluctuations from 1993-94 to 2005-06 and after that there is less difference between input growth and output growth.

Figure 4.3: Input-Output Growth of Yamunanagar



4.5 Kurukshetra District Manufacturing

Kurukshetra has immense potential for industrial growth. This district is basically known for its fertile soil rich in agriculture. Kurukshetra is known for the industries like food and beverage. Major industries include rice milling, wood based industries, leather.

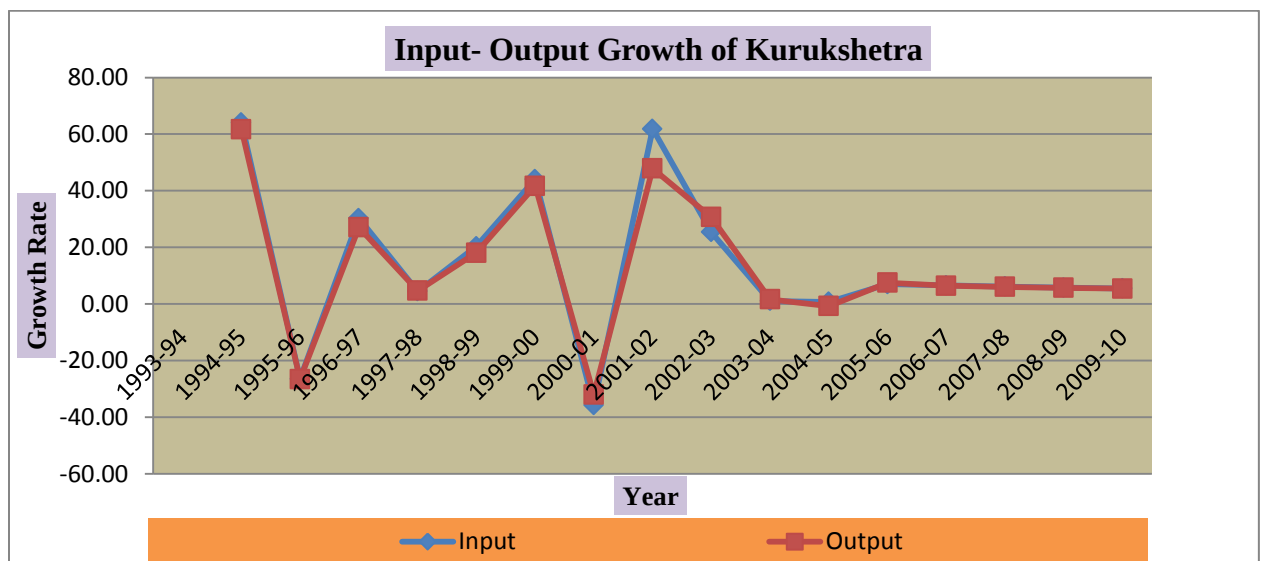
Table 4.4: Growth Rate of Manufacturing Input-Output in Kurukshetra District

Year	Input	Output
1993-94		
1994-95	64.12	61.74
1995-96	-26.44	-26.55
1996-97	30.29	27.09
1997-98	4.49	4.68
1998-99	20.36	18.07
1999-00	44.10	41.73
2000-01	-35.70	-31.98
2001-02	61.86	47.88
2002-03	25.39	30.69
2003-04	1.05	1.61
2004-05	0.71	-0.74
2005-06	6.99	7.52
2006-07	6.54	6.47
2007-08	6.13	6.07
2008-09	5.78	5.73
2009-10	5.46	5.42

Source: Statistical Abstract of Haryana

Table-4 is showing the growth of manufacturing input and output of Kurukshetra District. The maximum growth of input and output is in 1994-95. In Kurukshetra, the conditions are better than Ambala, Panchkula and Yamunanagar because in Kurukshetra there is less difference between input and output growth rates. The table also represents that the growth of input varies from a minimum value -35.70% in 2000-2001 to a maximum value 64.12% in 1994-95. The growth rate of output varies from a minimum value -31.98% in 2000-2001 to a maximum value 47.88% in 2001-02. But in all these districts after 2005-06 the growth rates are stagnant.

Figure 4.4: Input-Output Growth of Kurukshetra



4.6 Karnal District Manufacturing

Karnal district is known as the Rice Bowl of India. Karnal is famous for its world class research and development institutes. Karnal has agro based and leather based industries. It is also famous for manufacture of agriculture implements and its spares. More than 40% of country agricultural implements and spares are manufactured here.

Table 4.5: Growth Rate of Manufacturing Input-Output in Karnal District		
Year	Input	Output
1993-94		
1994-95	53.51	79.67
1995-96	-34.03	-34.22
1996-97	40.96	36.64
1997-98	8.24	11.80
1998-99	-7.61	-3.46
1999-00	66.05	57.95
2000-01	20.19	18.15
2001-02	-2.24	-2.52
2002-03	-6.66	4.70
2003-04	13.01	6.31
2004-05	9.08	9.53
2005-06	6.51	6.97
2006-07	6.11	6.40
2007-08	5.76	6.01
2008-09	5.44	5.67
2009-10	5.16	5.37
Source: Statistical Abstract of Haryana		

Figure 4.5: Input-Output Growth of Karnal

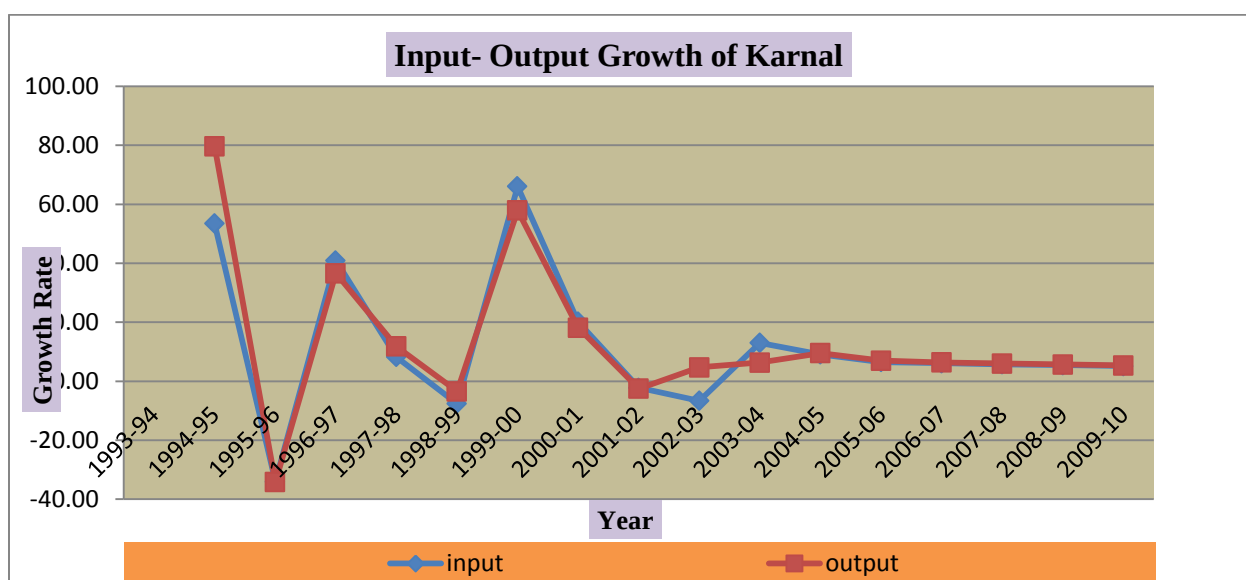


Table-5 is showing the large fluctuation in Karnal's input and output growth. The maximum growth rates are in 1999-2000, but in this year also growth of output is less than growth of input. In Karnal the gap between input and output growth is less than

other districts. The table also reports that from 1993-94 to 2001-02 there are fluctuations in input and output growth but after that the growth rates continually positive.

4.6 Sonipat District Manufacturing:

Industrial revolution of Sonipat has started in 50's with Atlas Cycle Industry. Sonipat district is one of the largest manufacturer of bicycles in the world. Sonipat is known for the industries like: food and beverage, textile, chemicals, rubber and plastic, paper and metal.

Table 4.6: Growth Rate of Manufacturing Input- Output in Sonipat District		
Year	Input	Output
1993-94		
1994-95	25.17	22.87
1995-96	16.02	14.71
1996-97	11.92	14.38
1997-98	35.63	27.85
1998-99	40.11	38.13
1999-2000	45.71	43.60
2000-2001	-55.68	-52.65
2001-02	66.15	71.32
2002-03	64.04	56.52
2003-04	-16.37	-14.08
2004-05	12.52	10.23
2005-06	7.66	8.83
2006-07	7.11	7.30
2007-08	6.64	6.81
2008-09	6.23	6.37
2009-10	5.86	5.99
Source: Statistical Abstract of Haryana		

Table-6 represents the growth rate of input and output of Manufacturing Industries of Sonipat since 1994-2010. It has been seen that on an average the growth rate of input is greater than output growth except for few years. Maximum input and output growth rate have been found in 2001-02 with 66.15% and 71.32% respectively. Minimum input and

output growth rate have been found in 2000-01 and 2003-04 respectively since 1993-1994. Large variations have been seen in input and output growth of manufacturing industries since 1996-97 to 2004-05 and after that stagnant performance of growth rate has observed.

Figure 4.6: Input-Output Growth of Sonipat

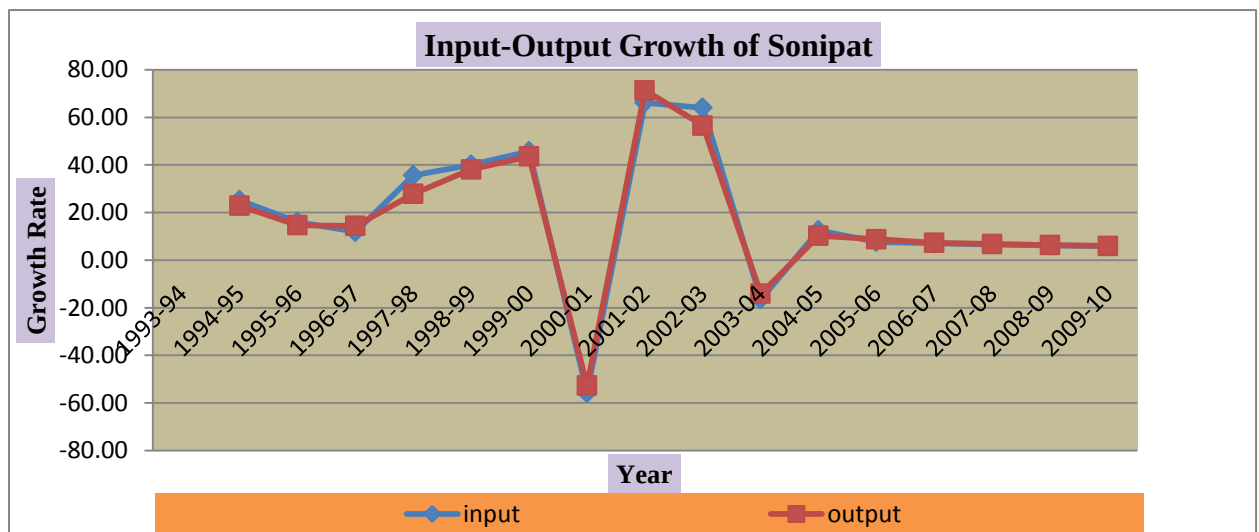


Figure 4.6 is showing that there is instability in input-output growth of manufacturing industries in Sonipat. From 1999-2000 to 2003-04 large fluctuations can be seen.

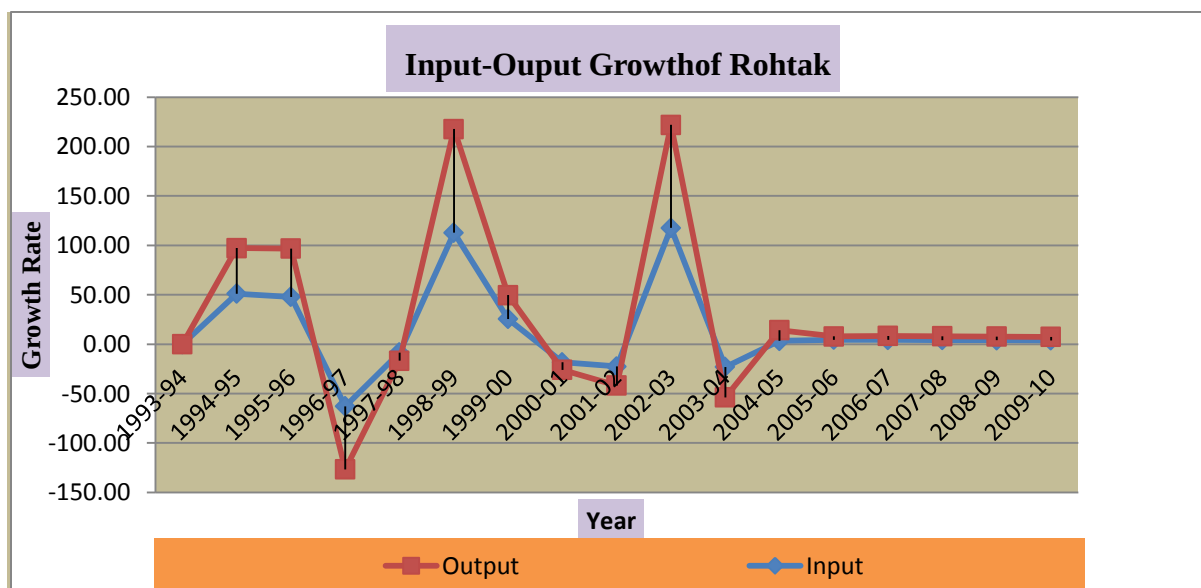
4.8 Rohtak District Manufacturing

Rohtak district is located in the southeast of Haryana and northwest of Delhi. The economy of the district is primarily agriculture. About 42% of the total workers are engaged in agriculture and allied activities, 7.68 % in cottage and household industries and the rest are engaged in other activities. City hosts world's leading precision screw manufacturing facilities, which supplies screws to domestic and international market. City has dairies and sugar mills. Rohtak city is also regional centre for textile and gold jewellery making etc.

Table 4.7: Growth Rate of Manufacturing Input-Output in Rohtak District		
Year	Input	Output
1993-94		
1994-95	51.16	46.17
1995-96	47.90	48.87
1996-97	-62.91	-63.77
1997-98	-8.48	-8.33
1998-99	112.82	104.95
1999-2000	25.55	24.19
2000-2001	-18.33	-7.66
2001-02	-22.57	-19.29
2002-03	117.72	104.29
2003-04	-23.09	-30.79
2004-05	3.34	10.79
2005-06	4.47	3.48
2006-07	4.28	4.10
2007-08	4.11	3.94
2008-09	3.95	3.79
2009-10	3.80	3.65
Source: Statistical Abstract of Haryana		

Table-7 is representing the input and output growth of manufacturing in Rohtak District of Haryana. The growth of input and output is maximum in 2002-03 and 1998-99. But there are also large fluctuations in input-output growth rates

Figure 4.7: Input-Output Growth of Rohtak



Growth in input varies from a minimum value -62.91% in 1996-97 to a maximum value 117.72 % in 2002-03. Growth of output varies from a minimum value -63.77% in 1996-97 to a maximum value 104.95% in 2002-03. After 2003-04 growth rates in both sides remains positive.

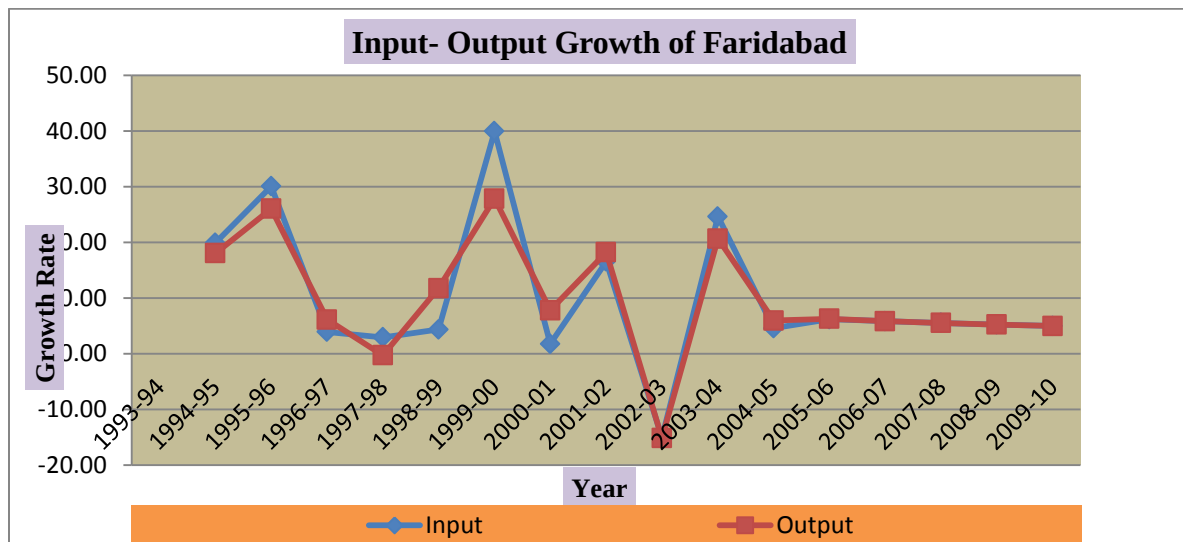
4.9 Faridabad District Manufacturing

Faridabad is the leading industrial centre and situated in the National Capital Region bordering the Indian capital New Delhi. Faridabad is also a industrial hub of Haryana. 50% of income tax collected in Haryana is from Faridabad and Gurgaon. Faridabad is known for the industries like: chemicals, rubber and plastic, electronics and engineering, automobiles and metal industries. Faridabad is famous for heena production from the agriculture sector. Faridabad has been sselected as one of the hundred Indian cities to be developed as a smart city under PM flagship Smart Cities Mission.

Table 4.8: Growth Rate of Manufacturing Input-Output in Faridabad District		
Year	Input	Output
1993-94		
1994-95	19.91	18.03
1995-96	30.06	26.04
1996-97	3.90	6.11
1997-98	2.93	-0.28
1998-99	4.33	11.74
1999-2000	39.92	27.84
2000-2001	1.75	7.79
2001-02	16.56	18.21
2002-03	-15.08	-15.16
2003-04	24.62	20.65
2004-05	4.56	5.94
2005-06	6.19	6.26
2006-07	5.83	5.84
2007-08	5.51	5.52
2008-09	5.22	5.23
2009-10	4.96	4.97
Source: Statistical Abstract of Haryana		

Table-8 is showing the input and output growth of manufacturing sector of Faridabad district of Haryana. The growth in input value varies from a minimum value -15.08% to a maximum 39.92% in 1999-2000. The growth in output varies from a minimum value -15.16% in 2002-03 to a maximum value 27.84% in 1999-2000. In Faridabad, it is only one time when the input growth is negative and it is in only two years when the growth of output is negative.

Figure 4.8: Input-Output Growth of Faridabad



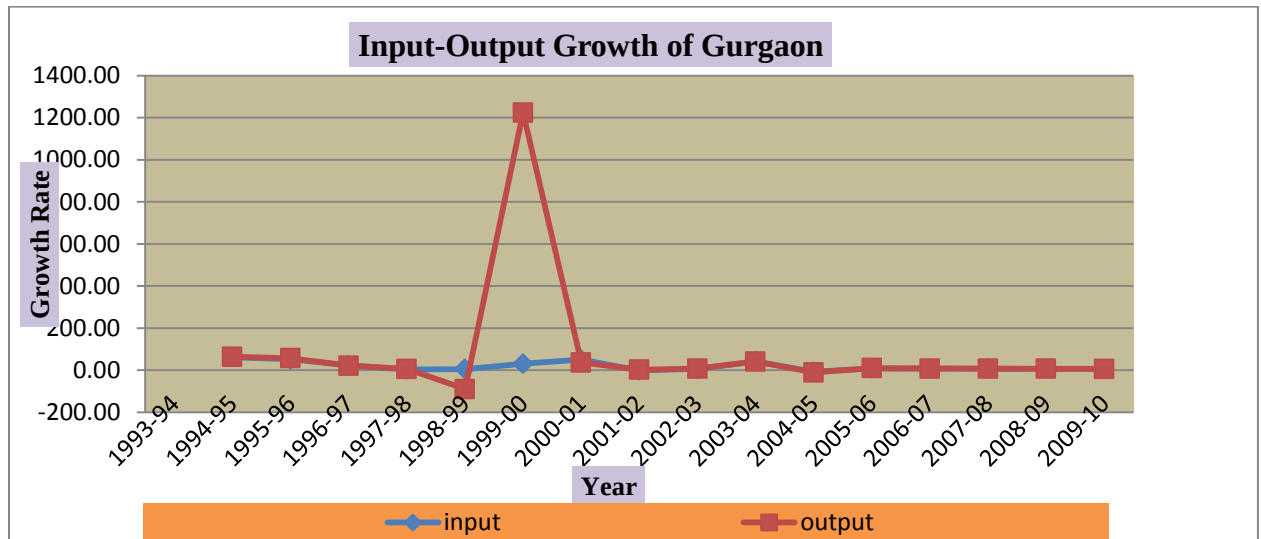
10.4. Gurgaon District Manufacturing

Now, Gurgaon also known as Gurugram. From an agriculture village, Gurgaon has emerged as Millennium City. With rapid urbanization, Gurgaon has become a leading financial and industrial hub with the third highest per capita income in India. Economic growth started in the city, when leading Indian automobile manufacturer Maruti Suzuki India Limited established in the 1970's. Today, Gurgaon has emerged as one of the most important offshoring centers in the world, providing outsourcing solutions in software, IT, services and sales through delivery facilities and call centers. Gurgaon district is known for the industries like: chemicals, rubber and plastic, electronics and engineering automobile and metal industries.

Table 4.9: Growth Rate of Manufacturing input-output of Gurgaon District		
Year	Input	Output
1993-94		
1994-95	61.77	64.30
1995-96	52.12	57.73
1996-97	23.00	21.46
1997-98	4.09	6.54
1998-99	5.76	-89.63
1999-2000	30.75	1224.28
2000-2001	50.33	37.14
2001-02	-0.45	2.30
2002-03	6.25	7.87
2003-04	42.28	41.73
2004-05	-7.43	-10.50
2005-06	8.56	10.46
2006-07	7.89	8.27
2007-08	7.31	7.63
2008-09	6.81	7.09
2009-10	6.38	6.62
Source: Statistical Abstract of Haryana		

Table-9 is representing the input and output growth rates of registered manufacturing industries of Gurgaon district of Haryana. The table is showing maximum output growth 1224.28% in the year 1999-2000. After this the growth rates are more or less stagnant. Figure-9 is showing a large gap between input and output growth in 1999-2000. After that the growth rates are approximately same.

Figure 4.9: Input-Output Growth of Gurgaon



4.11 Jind District Manufacturing

Jind lies in the heart of Haryana and is the fourth district of the jat belt along with

Table 4.10: Growth Rate of Manufacturing Input-Output in Jind District

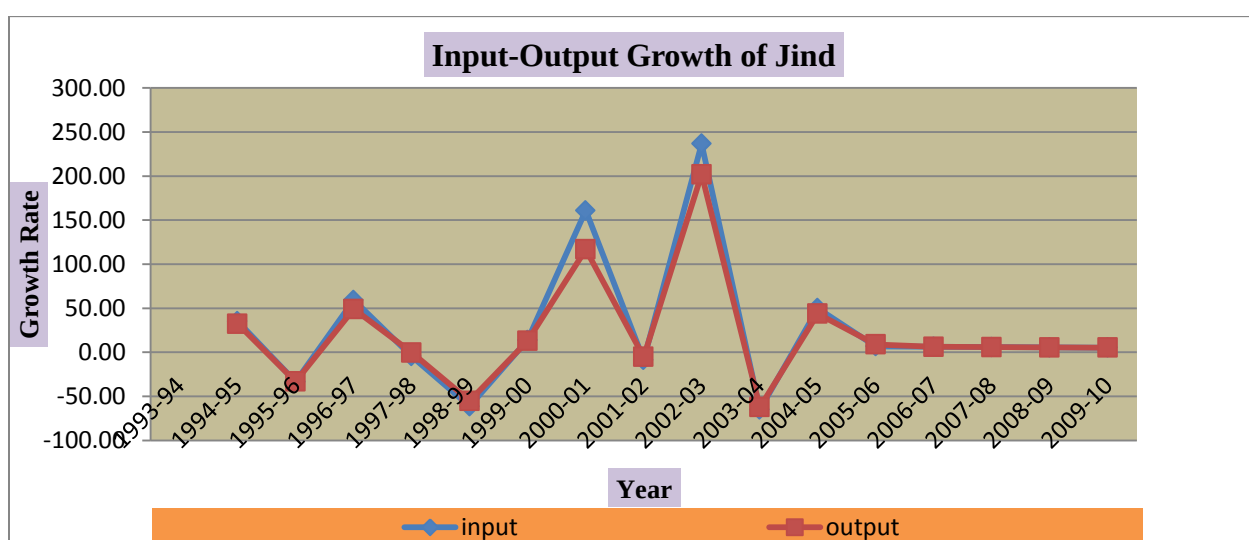
Year	Input	output
1993-94		
1994-95	35.25	32.39
1995-96	-33.39	-33.22
1996-97	59.27	49.10
1997-98	-4.53	-0.35
1998-99	-61.39	-55.15
1999-2000	13.74	12.96
2000-2001	160.85	116.75
2001-02	-8.68	-5.20
2002-03	236.68	201.86
2003-04	-65.14	-62.29
2004-05	49.90	43.77
2005-06	6.63	8.93
2006-07	6.22	6.21
2007-08	5.86	5.85
2008-09	5.53	5.52
2009-10	5.24	5.23

Source: Statistical Abstract of Haryana

Sonipat, Rohtak and Hissar. In the past only cottage industries like gold and silver smitheries, carpentry, oil pressing, leather working, pottery, weaving and stamping of cloth existed. Jind district is known for the industries like: wood and wood products.

Table-10 is showing the Jind district input and output growth of registered manufacturing industries. In most of the years there are so many fluctuations in growth rates. The maximum growth rate is in 2002-03, it is at 201.86%. After 2005-06 the growth rates are more or less stagnant.

Figure 4.10: Input-Output Growth of Jind



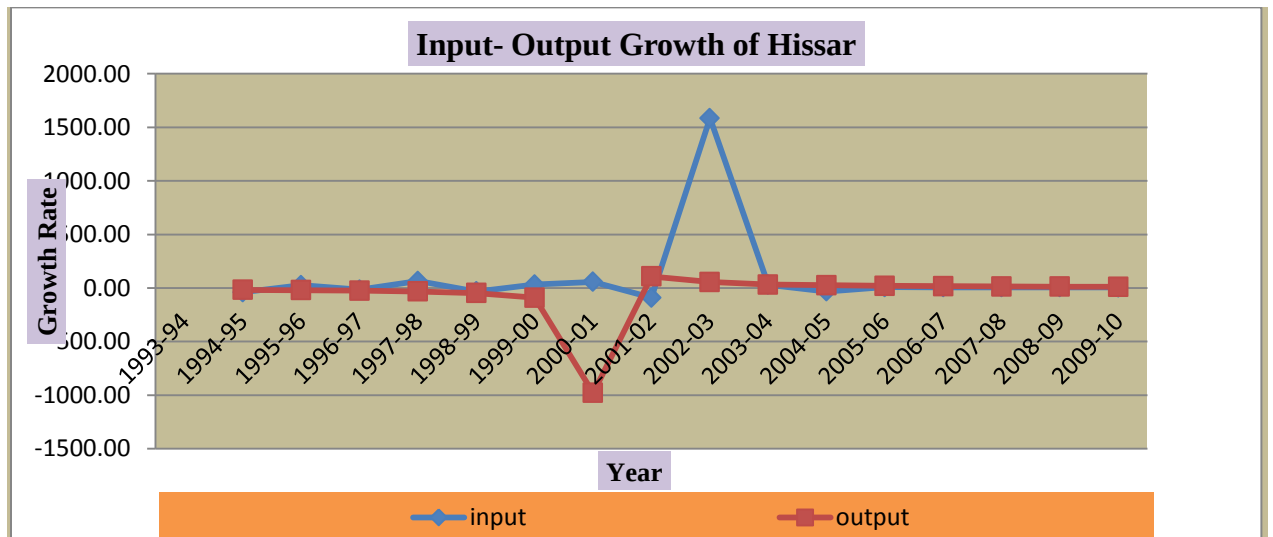
4.12 Hissar District Manufacturing

Hissar is the oldest district carved at the time of joint Punjab. District Hissar is known as a city of steel as one of the biggest producer of stainless steel. Hissar is known for the industries like: wood and wood products and metal.

Table 4.11: Growth Rate of Manufacturing Input-Output in Hissar District		
Year	input	Output
1993-94		
1994-95	-39.80	-16.39
1995-96	26.68	-19.60
1996-97	-15.26	-24.38
1997-98	65.52	-32.23
1998-99	-32.32	-47.57
1999-2000	32.18	-90.73
2000-2001	57.30	-978.22
2001-02	-90.13	109.11
2002-03	1584.87	56.54
2003-04	31.34	31.94
2004-05	-32.28	26.32
2005-06	7.68	20.42
2006-07	7.13	16.96
2007-08	6.66	14.50
2008-09	6.24	12.66
2009-10	5.87	11.24
Source: Statistical Abstract of Haryana		

Table-11 is representing the input and output growth of registered manufacturing industries of Hissar District of Haryana. The output growth in Hissar is more or less

Figure 4.11: Input-Output Growth of Hissar



stagnant in comparison of other districts. The input and output growth rates are also matching in most of years except few years. Hissar District is showing better results of Manufacturing in comparison with other districts, because it is the only district where the output growth is greater than input growth in maximum years.

4.13 Sirsa District Manufacturing

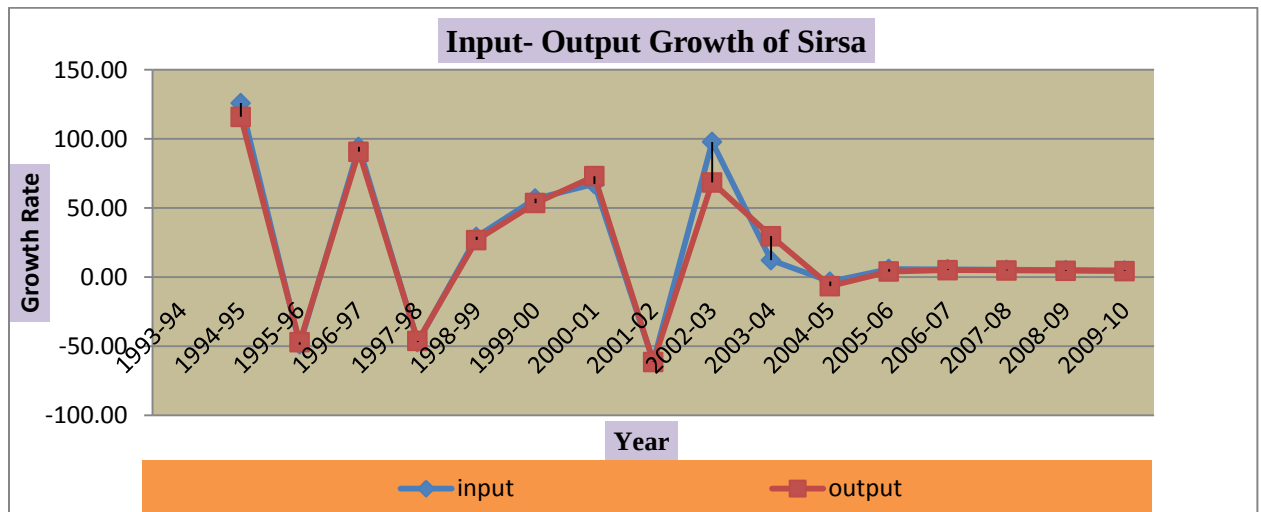
In 2006, the Ministry of Panchayati Raj named Sirsa one of the country's 250 most backward districts. It is one of the two districts in Haryana currently receiving funds from the Backward Regions Grant Fund Programme (BRGF). 80% of the inhabitants are villagers and their main occupation is agriculture. Sirsa is known as the cotton belt of Haryana.

Table 4.12: Growth Rate of Manufacturing Input-Output in Sirsa District		
Year	Input	Output
1993-94		
1994-95	125.92	115.93
1995-96	-48.84	-47.12
1996-97	94.18	90.67
1997-98	-47.05	-46.20
1998-99	29.16	26.83
1999-2000	56.78	53.58
2000-2001	67.33	73.03
2001-02	-60.94	-61.38
2002-03	97.73	68.47
2003-04	12.17	29.61
2004-05	-3.28	-6.51
2005-06	5.89	4.02
2006-07	5.57	5.01
2007-08	5.27	4.77
2008-09	5.01	4.56
2009-10	4.77	4.36
Source: Statistical Abstract of Haryana		

Table-12 is showing the condition of input and output growth rates of Sirsa district in Haryana. Like the above districts, district Sirsa is also showing the same results. From

1994 to 2005, there are large fluctuations in output and input growth, but after this the growth rates are stagnant. The reason behind this is the instability in agriculture production. But the problem is that the input growth is greater than output growth.

Figure 4.12: Input-Output Growth of Sirsa



4.14 Haryana Manufacturing

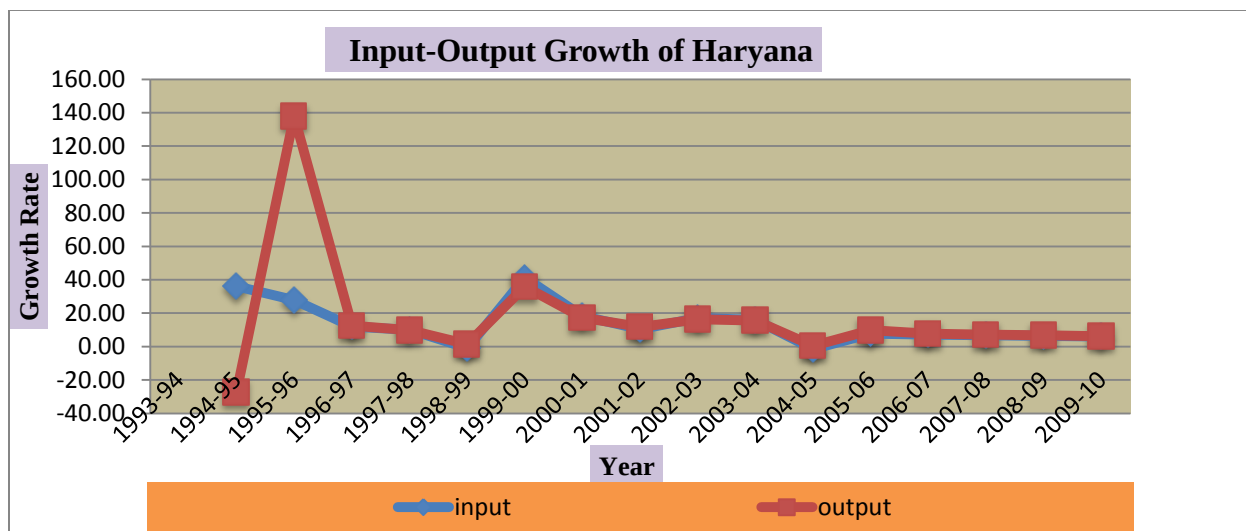
Haryana is leading industrial state of the country.

Table-13 represents the total input and output conditions of total registered manufacturing industries of Haryana. The maximum growth rate in output is in 1995-96, it is at 137.98%. The maximum gap in output and input is also exists in the year 1995-96. After 1995-96 the growth rates are more or less stagnant. Figure-13 is showing the trends of input and output growth of Manufacturing Industries of Haryana.

Table 4.13: Growth Rate of Manufacturing Input-Output in Haryana State		
Year	Input	Output
1993-94		
1994-95	36.07	-27.38
1995-96	27.80	137.98
1996-97	11.85	12.61
1997-98	9.95	9.82
1998-99	-0.89	1.45
1999-2000	41.34	35.96
2000-2001	18.23	17.25
2001-02	10.45	11.77
2002-03	17.08	16.41
2003-04	16.05	15.66
2004-05	-1.38	0.44
2005-06	7.81	9.91
2006-07	7.24	7.72
2007-08	6.75	7.17
2008-09	6.33	6.69
2009-10	5.95	6.27

Source: Statistical Abstract of Haryana

Figure 4.13: Input-Output Growth of Haryana



Trends in Input-Output Growth rate of Five Manufacturing Industries in Haryana

4.15 Food Products industry

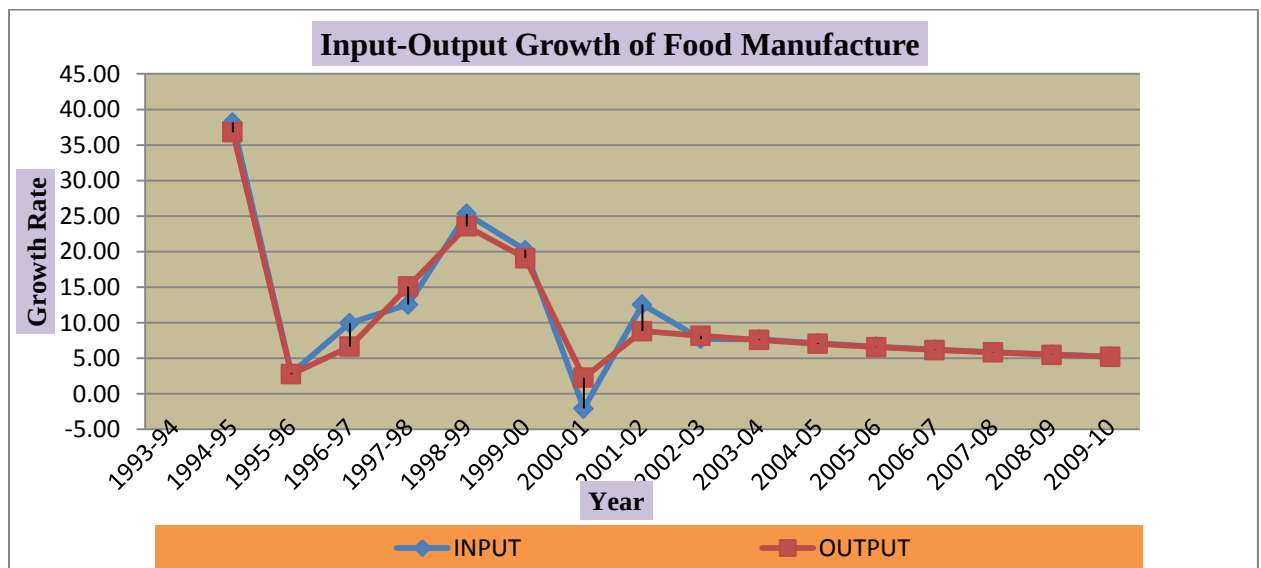
In Haryana food products manufacturing industries are mainly situated in Karnal, Kurukshetra, Ambala and Sonipat. Haryana is primarily a agriculture based state so it has a benefit in this industry. This industry is playing an important role in generating employment in Haryana.

Table 4.14: Growth Rate of Manufacture of food products Industry Input-Output		
Year	Input	Output
1993-94		
1994-95	38.17	36.79
1995-96	2.91	2.76
1996-97	9.95	6.62
1997-98	12.55	15.09
1998-99	25.31	23.56
1999-00	20.20	19.07
2000-01	-2.08	2.27
2001-02	12.55	8.81
2002-03	7.71	8.17
2003-04	7.64	7.57
2004-05	7.10	7.04
2005-06	6.63	6.58
2006-07	6.22	6.17
2007-08	5.85	5.81
2008-09	5.53	5.49
2009-10	5.24	5.21
Source: Statistical Abstract of Haryana		

Table-14 is representing the input and output growth of registered food manufacture industries of Haryana. This is only one time when the input growth of food manufacture industry is negative. The minimum growth rate in input is in the year 2000-01 and the

maximum growth rate is 38.17% in 1994-95. The growth rate of output of food manufacture is maximum in 1994-95, it is 36.79% and the minimum growth is 2.27 in 2000-01. The growth rates of input and output are showing a positiveness. Figure-14 is showing the trend of input and output growth of food manufacture of Haryana.

Figure 4.14: Input-Output Growth of Food Products Manufacture



4.16 Cotton textile industry

At present, cotton textile industry is largest organized modern industry of India. There are at present 1,719 textile mills in the country. In Haryana cotton textile industries are mainly situated in Sonapat, Bhiwani and Panipat. Several factors, like availability of raw cotton, market, transport, etc. play a key role in the localization of the cotton textile industry. This industry is at first position in employment generation in Haryana.

Table 4.15: Growth Rate of Manufacture of cotton textile Industry Input-Output		
Year	input	Output
1993-94		
1994-95	43.62	40.96
1995-96	27.63	28.21
1996-97	13.63	13.34
1997-98	-31.44	-31.78
1998-99	56.51	53.26
1999-00	36.11	34.75
2000-01	11.57	14.37
2001-02	-5.30	0.59
2002-03	12.84	7.81
2003-04	7.95	8.01
2004-05	7.36	7.42s
2005-06	6.86	6.90
2006-07	6.42	6.46
2007-08	6.03	6.07
2008-09	5.69	5.72
2009-10	5.38	5.41
Source: Statistical Abstract of Haryana		

Table-15 is representing the growth rates of input and output of cotton textile industry in Haryana. In 1997-98 and 2000-01 the growth rate of input is negative. The growth rate of input varies from a minimum value -31.44% in 1997-97 to a maximum value 56.51% in 1998-99. The growth rate of output value varies from a minimum value -31.78% in 1997-98 to a maximum value 53.26% in 1998-99. The maximum gap between input and output growth is in the year 2002-03. Figure-15 is showing the trend of input and output growth of cotton textile industry in Haryana.

Figure 4.15: Input-Output Growth of Cotton Textile Manufacture



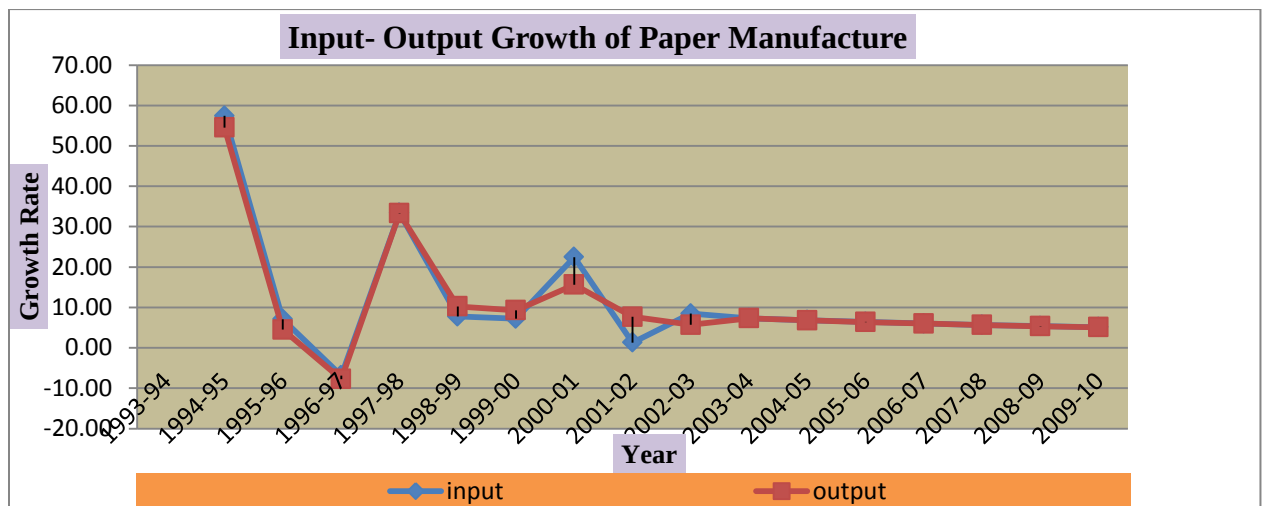
4.17 Paper products industry

Sonipat is known for paper industry.

Year	Input	Output
1993-94		
1994-95	57.44	54.56
1995-96	7.07	4.52
1996-97	-6.86	-7.74
1997-98	33.38	33.30
1998-99	7.75	10.23
1999-00	7.20	9.28
2000-01	22.46	15.64
2001-02	1.32	7.67
2002-03	8.49	5.71
2003-04	7.33	7.32
2004-05	6.83	6.82
2005-06	6.39	6.39
2006-07	6.01	6.00
2007-08	5.67	5.66
2008-09	5.36	5.36
2009-10	5.09	5.09
Source: Statistical Abstract of Haryana		

Table-16 is representing the growth of input and output of paper manufacture in Haryana. Over all input and output growth of paper industry has been continually decreasing since 1994-95 to 2009-10. Input and output growth has declined by 52.35 and 49.47 per cent respectively from 1994-95 to 2009-10. After 1994-95 when input output growth was maximum only two years have noticed with two digit growth rate which are 1997-98 and 2000-01. Minimum growth rate has observed in 1996-97.

Figure 4.16: Input-Output Growth of Paper Manufacture



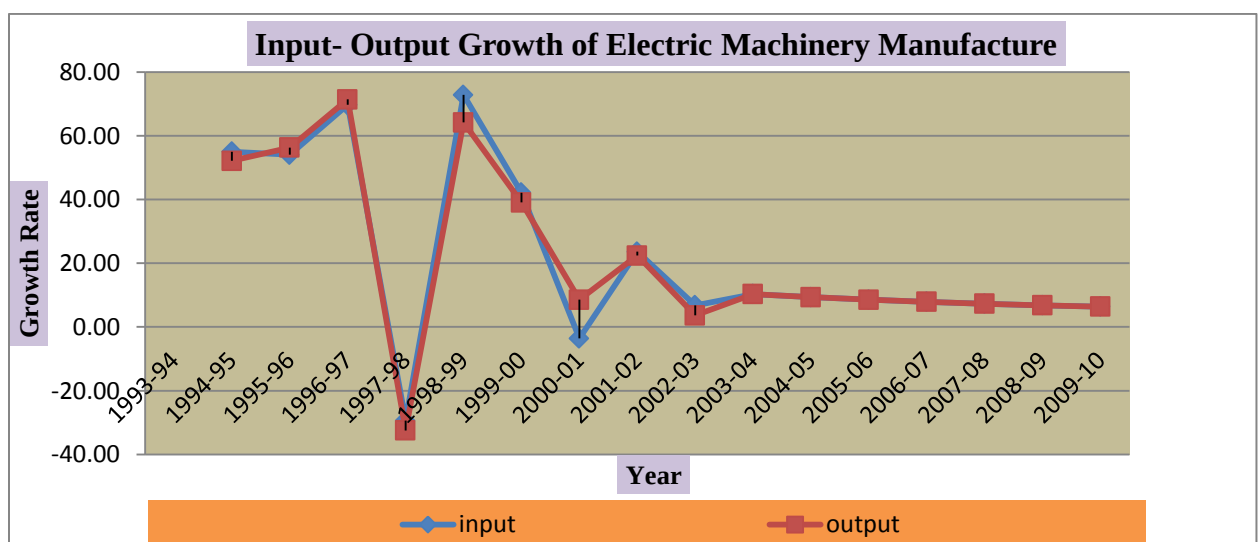
4.18 Electric machinery industry

Faridabad and Ambala is known for electric machinery manufacturing industries.

Table 4.17 represents the input output growth of electricity machinery in Haryana. Input and output growth have declined from 1994-95 to 2009-10. Highest Input and output growth have found in 1998-99 with 72.86 per cent and 64.21 per cent respectively and lowest has found in 1997-98 in both growth either it is input growth and output growth. Negative input growth has also found in 2000-01 but in same year output growth was positive.

Table 4.17: Growth Rate of Manufacture of electric machinery Industry Input-Output		
Year	Input	Output
1993-94		
1994-95	55.03	52.14
1995-96	54.05	56.33
1996-97	69.70	71.45
1997-98	-29.41	-32.49
1998-99	72.86	64.21
1999-00	42.15	39.10
2000-01	-3.58	8.53
2001-02	23.61	22.41
2002-03	6.77	3.62
2003-04	10.32	10.32
2004-05	9.35	9.35
2005-06	8.55	8.55
2006-07	7.88	7.88
2007-08	7.30	7.30
2008-09	6.81	6.81
2009-10	6.37	6.37
Source: Statistical Abstract of Haryana		

Figure 4.17: Input-Output Growth of Electric Machinery Manufacture



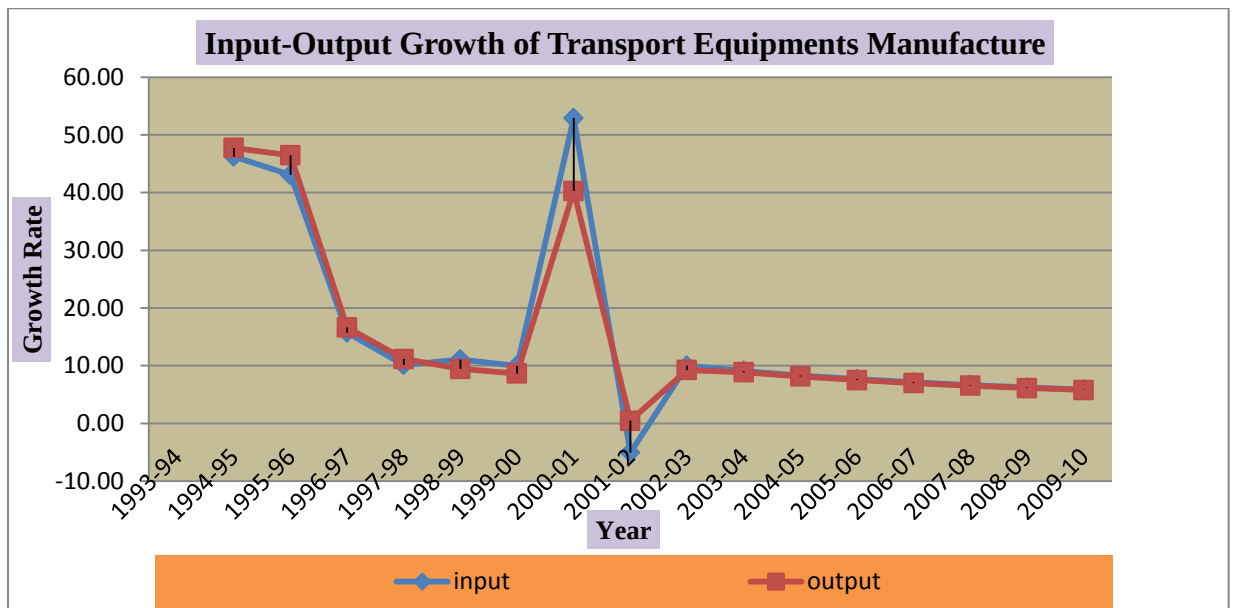
4.19 Transport equipment and parts industry

In Haryana transport equipments industries are mainly situated in Gurgaon and Faridabad.

Table 4.18: Growth Rate of Manufacture of transport equipment and parts Industry Input-Output		
Year	input	Output
1993-94		
1994-95	46.23	47.73
1995-96	43.04	46.47
1996-97	15.74	16.63
1997-98	10.16	11.17
1998-99	11.10	9.47
1999-00	9.99	8.65
2000-01	52.93	40.29
2001-02	-5.04	0.47
2002-03	10.01	9.27
2003-04	9.08	8.86
2004-05	8.33	8.14
2005-06	7.69	7.53
2006-07	7.14	7.00
2007-08	6.66	6.54
2008-09	6.25	6.14
2009-10	5.88	5.78
Source: Statistical Abstract of Haryana		

Table 18 is showing input-output growth of transport equipments industry in Haryana. There are large fluctuations in input-output growth rates. In most of the years the input growth rate is higher than the output growth rate. Maximum output growth is in the year 1994-95 and maximum growth rate of input was in 2000-2001. In 2000-2001 there is large gap between input growth rate and output growth rate. Figure 4.18 is showing the trends in input-output growth rates of transport equipments industry.

Figure 4.18: Input-Output Growth of Transport Equipments Manufacture



CHAPTER 5

CAUSAL RELATIONSHIP BETWEEN GROWTH OF MANUFACTURING SECTOR AND ECONOMIC GROWTH IN HARYANA

5.1 Introduction

This chapter is dedicated to the results and analysis of third objective of this study. As the variables taken in this study for the purpose of causality analysis are time series variables it is essential to examine whether they are stationary. Various researchers have utilized the Augmented Dickey Fuller (ADF) test for examination of stationarity in their studies. This study has also applied Augmented Dickey Fuller (ADF) test to check unit root. One of the purposes of this study is to find out the causality between the indicators. To check the causality and its direction the Granger Causality test has been applied in this study.

5.2 Unit root

It deals with the stationarity of time series variables taken in a study. To make the study free from spurious relationship, it is essential to testify whether taken variables are stationary or not. Stationarity condition is prime assumption for the analysis of time series, which is necessary to be fulfilled a time series analysis. If the data taken in the study is unit root at level zero it is necessary to be stationary at level one. It means that data should be stationary after first difference. In this study I have applied Augmented Dickey Fuller (ADF) Test which has three models such as Intercept, Trend and Intercept and no trend and no intercept. Null hypothesis is there is unit root or non stationary and alternative hypothesis is there is no unit root or stationary. The rejection of null hypothesis is based on the criteria of test statistics and probability value. If test statistics is more than critical value at 5 percent level of significant the null hypothesis will be rejected. On the other hand probability value (p-value) plays a crucial role to check

significance of the model. The p-value is less than 0.05 leads to rejection of the null hypothesis at level of significance. In the following table 5.1 reveals the results of unit root test at level zero.

Table 5.1: ADF Test at level				
Variables	ADF model	t-statistics	Critical value at 5%	p-value
GSDP	Intercept	-0.85	-3.07	0.01
	Trend & Intercept	-3.77	-3.79	0.05
	None	-0.63	-1.97	0.43
MNF	Intercept	-6.29	-3.07	0.00
	Trend & Intercept	-6.99	-3.73	0.00
	None	2.07	-1.97	0.99
Source: Calculated in e-views				

The above table 5.1 depicts the results for unit root test. Here Gross State Domestic Product (GSDP) of Haryana and Manufacturing (MNF) are the two variables which are being checked unit root. The above table states that in the model of intercept for GSDP the t-statistics is -0.85 and critical value at 5 percent level of significance is -3.07. It states that t-statistics is lesser than the critical value at 5 percent. Meanwhile the p-value is 0.01 which is significant. In this model null hypothesis cannot be rejected. It means GSDP is unit root or not stationarity intercept at level zero.

In the model of trend and intercept for GSDP the t-statistics is -3.79 which is less than 5 percent critical value -3.79. On the other hand p-value is 0.00, which indicates that the model is significant. This result shows that the null hypothesis cannot be rejected which means in this model GSDP has unit root.

Further, the model which have no trend and no intercept, the t-statistics -0.63 which is less than 5 percent critical value -1.97. On the other hand p-value is 0.43 which is greater than 0.05. It shows that the null hypothesis cannot be rejected. It means GSDP has unit root in this model also.

Apart from GSDP the other variable is manufacturing (MNF) which is also required to be examined the presence of unit root. For this indicator three models have been adopted which are intercept, trend and intercept and no trend and no intercept. For intercept the t-test of manufacturing is -6.29 and critical value at 5 percent level of significance is -3.07. Here the t-statistic is greater than critical value at 5 percent level of significance. In the model of trend and intercept the t-statistics is -6.99 and the critical value is -3.73 which less than the t-statistics. The p- value is 0.00. In this situation null hypothesis can be rejected. The other model is no trend and no intercept the t-statistics is 2.07 and critical value is -1.97. Here the value of t-statistics is more than critical value at 5 percent level of significance. More over the p- value is 0.99 which is more than 5 percent. The result indicates that the null hypothesis cannot be rejected. It means manufacturing is unit root or not stationary at level zero.

In nut shell it is found that the indicators taken in this study are unit root at level zero which is not full filling the assumption of time series analysis.

Since the variable are unit root at level zero which is not meeting the assumption of time series analysis this study needs to go for the examination of unit root at level one i.e. after first difference.

The table 5.2 indicates the results of unit root for the indicators GSDP and Manufacturing (MNF) at level one. In this test there are three models taken which are intercept, trend and intercept and no trend and no intercept. This table states that in the model of intercept for GSDP the t-statistics is -3.41 and critical value at 5% level of significance is -3.12. It states that the critical value at 5 percent is lesser than the t-statistics. The p- value is 0.03 which is significant. In this model null hypothesis will be rejected, because the critical value is less than t-statistics and p- value is less than 0.05%. It means GSDP is stationary intercept at level one. So null hypothesis can be rejected. In this model of trend and intercept for GSDP the t-statistics is -2.92 which is less than 5

percent critical value -3.83. The p- value is 0.19, which indicates that the model is not significant. Thus the null hypothesis cannot be rejected.

Table 5.2: ADF Test at First Difference				
Variables	ADF model	t-statistics	Critical value at 5%	p-value
GSDP	Intercept	-3.41	-3.12	0.03
	Trend & Intercept	-2.92	-3.83	0.19
	None	-3.52	-1.97	0.00
MNF	Intercept	-3.35	-3.08	0.03
	Trend & Intercept	-1.90	-3.76	0.61
	None	-2.75	-1.97	0.01

In the ADF model of no trend and no intercept, the t-statistics is -3.52 which is greater than 5 percent critical value -1.97. On the other hand p- value is 0.00. The result shows that the null hypothesis can be rejected. It means the model is significant.

Apart from GSDP, for intercept the t-statistics of manufacturing is -3.52 and critical value at 5 percent level of significance -3.08. Here the t-statistics is greater than critical value at 5 percent level of significance. So the null hypothesis can be rejected. In the ADF model which have trend and intercept the t-statistics of manufacturing is -1.90 and critical value at 5 percent level of significance is -3.76. The p- value is 0.61, which means that null hypothesis cannot be rejected.

Further, the model which has no trend and no intercepts t-statistics is -2.75 which is greater than 5 percent critical value -1.97.

In the other model of no trend and no intercept the t-statistics is -2.75 and critical value is -1.97, which is less than the t-statistics. The p- value is 0.01. So the null hypothesis can be rejected. With the above results we can say that the model is stationary and we can proceed. Because only after the stationarity of model, we can check any relationship

between variables. To see the long-run relationship between GSDP and manufacturing sector growth, co-integration test is used.

5.3 Co-integration Test

Through Co-integration Test we will check long-run relationship between variables. This test has adopted trace statistics and max statistics for the examination of relationship between variables. Results of the co-integration test has been depicted in the table 5.3.

Table 5.3 Co-integration Test								
Trace Statistics					Max statistics			
No. of CE	Eigen Value	trace stat	5% critical value	P-value	Eigen Value	Max-Eigen stat	5% critical value	P-value
None	0.73	20.06	15.49	0.01	0.73	17.21	14.26	0.02
At most 1	0.20	2.85	3.84	0.09	0.20	2.85	3.84	0.09
Source: Calculated by Researcher by E-views 9.5								

The above table 5.3 reveals co-integration between economic growth (GSDP) and growth of manufacturing (MNF) sector in Haryana. Here trace statistics and max eigen value have been utilized for determination of relationship. In this test, trace statistics (20.06) for none is greater than 5 percent critical value (15.49) and max eigen statistics (17.21) is more than 5 percent critical value (14.26). In both statistics probability value is significant at 5 percent level of significance. These values lead to reject the null hypothesis which is there is no co-integration between the variables. It means that the variables are co-integrated in the long run.

5.4 Granger Causality Test

It is statistical hypothesis test to determine the causality between the variables. It shows the causality between the indicators. It does not only examine the causality between the variables but also show the direction of causality between the variables. This test is based on f-statistics. To test the hypothesis the probability value (p-value) plays a significant role. If the p-value is less than 0.05 the null hypothesis will be rejected. Results of the Granger causality test have been depicted in the above table 5.4.

Granger causality Test		
Null Hypothesis	F-Statistics	P-value
Ln MNF Does not granger cause LnGSDP	1.56	0.28
LnGSDP Does not granger cause LnMNF	10.31	0.01

The above table 5.4 reveals that the p-value is 0.28 for null hypothesis MNF does not granger cause GSDP which is more than 0.05, so the null hypothesis cannot be rejected at this level of significance. On the other for the null hypothesis GSDP does not granger cause MNF, the p-value is 0.01 which is less than 0.05. This value prompts to rejects the null hypothesis. It means economic growth causes the growth of manufacturing sector in Haryana. The above results indicate that there is unidirectional relationship between GSDP and manufacturing sector in Haryana.

CHAPTER 6

MAJOR FINDINGS, CONCLUSIONS, POLICY IMPLICATIONS AND LIMITATIONS OF THE STUDY

6.1 Major Findings

Major findings of the study can be summarized as follows:

- Manufacturing sector of Haryana is growing with a low growth rate.
- The absolute value of input and output of manufacturing sector is increasing but the annual growth rate in these values is decreasing.
- Large fluctuations have been found in input-output growth of manufacturing industries in Haryana.
- Input-output growth of manufacturing sector varies from district to district.
- Rohtak, Kurukshetra and Karnal districts have more fluctuations in input-output growth rate than others.
- Gurgaon and Hissar have less fluctuation in input-output growth rates of manufacturing.
- Unidirectional relationship has found between economic growth and manufacturing sector growth of Haryana.

6.2 Conclusion

In a developing economy, development dynamics necessitate that the predominant agriculture sector inspires and in turn, gets inspiration from the expanding industrial sector. Despite recent industrial development, Haryana is primarily an agriculture state. Haryana is at second position in food-grain production in the country. Agriculture growth affects the growth of manufacturing sector. There is very high correlation between agriculture production and development of agro-based industries. In Haryana agriculture's role as a supplier of resources to finance the process of industrialization has been acknowledged. So, it becomes necessary to make investment in agriculture sector. Service sector also plays an important role in development of manufacturing sector.

It is found that manufacturing as a strategic component of investment is needed by

Haryana for its sustained economic growth and development. Manufacturing is necessary for creation of jobs, expansion of agriculture and service sector. Without manufacturing we cannot imagine economic growth. The study finds out that the input and output growth of manufacturing industries is varying from district to district. This is due to geographically location of states. In maximum districts the input growth is more than output growth. In industry-wise analysis the study finds out that there are gaps between input and output growth but it is less than district- wise manufacturing industries. It is found that there is a unidirectional relationship between GSDP growth and growth of manufacturing sector in Haryana. The reason behind this is that the input-output of manufacturing industries is not increasing at the same rate. The production of manufacturing sector is less than investment in this sector.

6.3 Policy Implications

- There is a need to make more investment in agriculture sector to promote manufacturing sector.
- The study urges the policy makers to focus more on attracting diverse types of Manufacturing.
- It is necessary for policy makers to design policies where manufacturing can be utilized as means of enhance domestic production, savings and exports; as medium of technological learning and technological diffusion and also in providing access to the external market.
- Speedy improvement of infrastructure sector is required which are important for diversification of business activities.
- Equitable distribution of investment is needed among the states. The central government must give more freedom to states, so that they can attract investment inflows in manufacturing sector at their own level. Additional incentives are also required to foreign investors to invest in states where inflows in manufacturing sector are quite low.

6.4 Limitations of the Study

A study of this kind needs an up-to-date and vast amount of factual data. Some of the data are not available at all, other is inadequate and some are irregular. From 2005-06 to 2009-10, the data is extrapolated. This study has taken only 12 districts from 21 districts of Haryana. The remaining districts also play a vital role in manufacturing sector of Haryana.

As the study has been conducted with only five manufacturing industries of Haryana. It can be extended to other industries. Unregistered manufacturing industries have a prominent place in molding the manufacturing sector of Haryana. But here the study incorporates only registered manufacturing industries. This is yet, another serious limitation of the study.

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Appendices

Appendix 1: Unit root test of ln GSDP at level zero

Null Hypothesis: LN_GSDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.852197	0.0114
Test critical values: 1% level	-3.920350	
5% level	-3.065585	
10% level	-2.673459	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LN_GSDP)

Method: Least Squares

Date: 06/12/16 Time: 14:59

Sample (adjusted): 1995 2010

Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GSDP(-1)	-1.066963	0.276975	-3.852197	0.0018
C	12.74297	3.302873	3.858149	0.0017
R-squared	0.514553	Mean dependent var		0.029819
Adjusted R-squared	0.479879	S.D. dependent var		0.731992
S.E. of regression	0.527909	Akaike info criterion		1.676682
Sum squared resid	3.901628	Schwarz criterion		1.773256
Log likelihood	-11.41346	Hannan-Quinn criter.		1.681628
F-statistic	14.83942	Durbin-Watson stat		1.940833
Prob(F-statistic)	0.001760			

Appendix 2: Unit root test of ln GSDP at level

Null Hypothesis: LN_GSDP has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.774331	0.0513
Test critical values: 1% level	-4.800080	
5% level	-3.791172	
10% level	-3.342253	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LN_GSDP)

Method: Least Squares

Date: 06/12/16 Time: 15:00

Sample (adjusted): 1997 2010

Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GSDP(-1)	-3.767606	0.998218	-3.774331	0.0044
D(LN_GSDP(-1))	2.093846	0.753901	2.777348	0.0215
D(LN_GSDP(-2))	1.189723	0.445981	2.667657	0.0257
C	46.07375	12.30141	3.745403	0.0046
@TREND("1994")	-0.134929	0.056651	-2.381745	0.0411
R-squared	0.742974	Mean dependent var		0.026221
Adjusted R-squared	0.628740	S.D. dependent var		0.786215
S.E. of regression	0.479050	Akaike info criterion		1.638428
Sum squared resid	2.065398	Schwarz criterion		1.866663
Log likelihood	-6.468998	Hannan-Quinn criter.		1.617301
F-statistic	6.503965	Durbin-Watson stat		2.181483
Prob(F-statistic)	0.009610			

Appendix 3: Unit root test of ln GSDP for none at level

Null Hypothesis: LN_GSDP has a unit root

Exogenous: None

Lag Length: 3 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.628971	0.4253
Test critical values: 1% level	-2.754993	
5% level	-1.970978	
10% level	-1.603693	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 13

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LN_GSDP)

Method: Least Squares

Date: 06/12/16 Time: 14:55

Sample (adjusted): 1998 2010

Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_GSDP(-1)	-0.010286	0.016354	-0.628971	0.5450
D(LN_GSDP(-1))	-1.055048	0.332252	-3.175448	0.0113
D(LN_GSDP(-2))	-1.174280	0.490271	-2.395164	0.0402
D(LN_GSDP(-3))	-1.372720	0.642337	-2.137073	0.0613
R-squared	0.529188	Mean dependent var		0.024136
Adjusted R-squared	0.372250	S.D. dependent var		0.818278
S.E. of regression	0.648327	Akaike info criterion		2.218817
Sum squared resid	3.782954	Schwarz criterion		2.392648
Log likelihood	-10.42231	Hannan-Quinn criter.		2.183087
Durbin-Watson stat	2.198632			

Appendix 4: Unit root test of ln MNF for constant at level

Null Hypothesis: LNMNF has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.291944	0.0001
Test critical values: 1% level	-3.920350	
5% level	-3.065585	
10% level	-2.673459	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNMNF)

Method: Least Squares

Date: 06/12/16 Time: 15:02

Sample (adjusted): 1995 2010

Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNMNF(-1)	-0.110688	0.017592	-6.291944	0.0000
C	1.219495	0.176707	6.901235	0.0000
R-squared	0.738750	Mean dependent var		0.108882
Adjusted R-squared	0.720089	S.D. dependent var		0.062474
S.E. of regression	0.033053	Akaike info criterion		-3.864942
Sum squared resid	0.015295	Schwarz criterion		-3.768368
Log likelihood	32.91953	Hannan-Quinn criter.		-3.859996
F-statistic	39.58856	Durbin-Watson stat		0.820792
Prob(F-statistic)	0.000020			

Appendix 5: Unit root test of ln MNF for constant, linear trend at level

Null Hypothesis: LNMNF has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.987183	0.0002
Test critical values: 1% level	-4.667883	
5% level	-3.733200	
10% level	-3.310349	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNMNF)

Method: Least Squares

Date: 06/12/16 Time: 15:06

Sample (adjusted): 1995 2010

Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNMNF(-1)	-0.336574	0.048170	-6.987183	0.0000
C	3.285080	0.442828	7.418414	0.0000
@TREND("1994")	0.023635	0.004908	4.815214	0.0003
R-squared	0.906145	Mean dependent var		0.108882
Adjusted R-squared	0.891706	S.D. dependent var		0.062474
S.E. of regression	0.020559	Akaike info criterion		-4.763672
Sum squared resid	0.005495	Schwarz criterion		-4.618812
Log likelihood	41.10938	Hannan-Quinn criter.		-4.756254
F-statistic	62.75610	Durbin-Watson stat		1.632711
Prob(F-statistic)	0.000000			

Appendix 6: Unit root test of ln MNF for none at level

Null Hypothesis: LNMNF has a unit root

Exogenous: None

Lag Length: 1 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	2.073426	0.9862
Test critical values: 1% level	-2.728252	
5% level	-1.966270	
10% level	-1.605026	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNMNF)

Method: Least Squares

Date: 06/12/16 Time: 15:43

Sample (adjusted): 1996 2010

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNMNF(-1)	0.002640	0.001273	2.073426	0.0586
D(LNMNF(-1))	0.655734	0.102178	6.417560	0.0000
R-squared	0.727108	Mean dependent var		0.098506
Adjusted R-squared	0.706116	S.D. dependent var		0.048333
S.E. of regression	0.026202	Akaike info criterion		-4.322390
Sum squared resid	0.008925	Schwarz criterion		-4.227983
Log likelihood	34.41792	Hannan-Quinn criter.		-4.323395
Durbin-Watson stat	2.046192			

Appendix 7: Unit root test of ln GSDP for constant at level 1

Null Hypothesis: D(LNGSDP) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.409191	0.0306
Test critical values: 1% level	-4.057910	
5% level	-3.119910	
10% level	-2.701103	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 13

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNGSDP,2)

Method: Least Squares

Date: 06/12/16 Time: 16:06

Sample (adjusted): 1998 2010

Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGSDP(-1))	-4.617654	1.354472	-3.409191	0.0078
D(LNGSDP(-1),2)	2.554671	1.098574	2.325443	0.0451
D(LNGSDP(-2),2)	1.375052	0.646986	2.125319	0.0625
C	-0.119588	0.195482	-0.611756	0.5558
R-squared	0.840239	Mean dependent var		0.004424
Adjusted R-squared	0.786985	S.D. dependent var		1.406317
S.E. of regression	0.649065	Akaike info criterion		2.221093
Sum squared resid	3.791573	Schwarz criterion		2.394924
Log likelihood	-10.43711	Hannan-Quinn criter.		2.185363
F-statistic	15.77800	Durbin-Watson stat		2.198520
Prob(F-statistic)	0.000628			

Appendix 8: Unit root test of ln GSDP for constant and trend at level 1

Null Hypothesis: D(LNGSDP) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.920372	0.1882
Test critical values: 1% level	-4.886426	
5% level	-3.828975	
10% level	-3.362984	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 13

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNGSDP,2)

Method: Least Squares

Date: 06/12/16 Time: 16:09

Sample (adjusted): 1998 2010

Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGSDP(-1))	-4.570975	1.565203	-2.920372	0.0193
D(LNGSDP(-1),2)	2.512513	1.293352	1.942636	0.0880
D(LNGSDP(-2),2)	1.346789	0.782692	1.720714	0.1236
C	-0.160851	0.587934	-0.273586	0.7913
@TREND("1994")	0.004474	0.059660	0.074998	0.9421
R-squared	0.840351	Mean dependent var		0.004424
Adjusted R-squared	0.760526	S.D. dependent var		1.406317
S.E. of regression	0.688196	Akaike info criterion		2.374237
Sum squared resid	3.788909	Schwarz criterion		2.591525
Log likelihood	-10.43254	Hannan-Quinn criter.		2.329574
F-statistic	10.52747	Durbin-Watson stat		2.198731
Prob(F-statistic)	0.002833			

Appendix 9: Unit root test of ln GSDP for none at level 1

Null Hypothesis: D(LNGSDP) has a unit root

Exogenous: None

Lag Length: 2 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.523760	0.0020
Test critical values: 1% level	-2.754993	
5% level	-1.970978	
10% level	-1.603693	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 13

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNGSDP,2)

Method: Least Squares

Date: 06/12/16 Time: 16:13

Sample (adjusted): 1998 2010

Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGSDP(-1))	-4.326573	1.227829	-3.523760	0.0055
D(LNGSDP(-1),2)	2.307558	0.989134	2.332907	0.0418
D(LNGSDP(-2),2)	1.221711	0.577495	2.115536	0.0605
R-squared	0.833595	Mean dependent var		0.004424
Adjusted R-squared	0.800314	S.D. dependent var		1.406317
S.E. of regression	0.628430	Akaike info criterion		2.107989
Sum squared resid	3.949237	Schwarz criterion		2.238362
Log likelihood	-10.70193	Hannan-Quinn criter.		2.081191
Durbin-Watson stat	2.146174			

Appendix 10: Unit root test of ln MNF for constant at level 1

Null Hypothesis: D(LNMNF) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
<u>Augmented Dickey-Fuller test statistic</u>	-3.347845	0.0309
Test critical values: 1% level	-3.959148	
5% level	-3.081002	
10% level	-2.681330	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNMNF,2)

Method: Least Squares

Date: 06/12/16 Time: 16:03

Sample (adjusted): 1996 2010

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNMNF(-1))	-0.361381	0.107944	-3.347845	0.0052
C	0.028626	0.013599	2.104999	0.0553
R-squared	0.462989	Mean dependent var		-0.010917
Adjusted R-squared	0.421680	S.D. dependent var		0.034324
S.E. of regression	0.026103	Akaike info criterion		-4.329987
Sum squared resid	0.008858	Schwarz criterion		-4.235580
Log likelihood	34.47490	Hannan-Quinn criter.		-4.330993
F-statistic	11.20806	Durbin-Watson stat		2.033664
Prob(F-statistic)	0.005242			

Appendix 11: Unit root test of ln MNF for constant and trend at level 1

Null Hypothesis: D(LNMNF) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.899096	0.6054
Test critical values: 1% level	-4.728363	
5% level	-3.759743	
10% level	-3.324976	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNMNF,2)

Method: Least Squares

Date: 06/12/16 Time: 15:59

Sample (adjusted): 1996 2010

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNMNF(-1))	-0.359150	0.189117	-1.899096	0.0819
C	0.028022	0.043604	0.642633	0.5325
@TREND("1994")	4.01E-05	0.002733	0.014664	0.9885
R-squared	0.462998	Mean dependent var		-0.010917
Adjusted R-squared	0.373498	S.D. dependent var		0.034324
S.E. of regression	0.027168	Akaike info criterion		-4.196671
Sum squared resid	0.008857	Schwarz criterion		-4.055061
Log likelihood	34.47504	Hannan-Quinn criter.		-4.198180
F-statistic	5.173153	Durbin-Watson stat		2.036444
Prob(F-statistic)	0.023980			

Appendix 12: Unit root test of ln MNF for none at level 1

Null Hypothesis: D(LNMNF) has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.747815	0.0096
Test critical values: 1% level	-2.728252	
5% level	-1.966270	
10% level	-1.605026	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNMNF,2)

Method: Least Squares

Date: 06/12/16 Time: 15:57

Sample (adjusted): 1996 2010

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNMNF(-1))	-0.164026	0.059693	-2.747815	0.0157
R-squared	0.279950	Mean dependent var		-0.010917
Adjusted R-squared	0.279950	S.D. dependent var		0.034324
S.E. of regression	0.029126	Akaike info criterion		-4.170018
Sum squared resid	0.011877	Schwarz criterion		-4.122815
Log likelihood	32.27514	Hannan-Quinn criter.		-4.170521
Durbin-Watson stat	1.765091			

Appendix 13: Co-integration Test for GSDP and MNF

Date: 07/06/16 Time: 13:43
Sample (adjusted): 5 17
Included observations: 13 after adjustments
Trend assumption: Linear deterministic trend
Series: LN_GSDP LN_MNF
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.733907	20.06304	15.49471	0.0095
At most 1	0.197000	2.852210	3.841466	0.0912

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.733907	17.21083	14.26460	0.0166
At most 1	0.197000	2.852210	3.841466	0.0912

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b*S11*b=I):

LN_GSDP	LN_MNF
-17.12298	-6.881424
0.778266	-7.484493

Unrestricted Adjustment Coefficients (alpha):

D(LN_GSDP)	0.277816	0.095751
D(LN_MNF)	0.004371	-0.003192

1 Cointegrating Equation(s): Log likelihood 45.48044

Normalized cointegrating coefficients (standard error in parentheses)

LN_GSDP	LN_MNF
1.000000	0.401882
	(0.12250)

Adjustment coefficients (standard error in parentheses)

D(LN_GSDP)	-4.757040
	(2.09045)
D(LN_MNF)	-0.074841
	(0.05864)

Appendix 14: Granger causality test

Pairwise Granger Causality Tests

Date: 07/06/16 Time: 13:42

Sample: 1 17

Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
LN MNF does not Granger Cause LN GSDP	14	1.55568	0.2831
LN GSDP does not Granger Cause LN MNF		10.3081	0.0058