

Chapter 1

Introduction

“Movement of productivity” has been both curiosity and concern for development economists and policy makers. The realization of productivity growth in the industrial sector continues to drive the overall economic performance of the Indian economy. The Indian economy has witnessed more than two decades of wide ranging economic liberalization surrounding many sectors. In order to make India’s industrial sectors; both, internally efficient and globally competitive, liberalization of international trade and industrial policies was endeavored. Encouraging results have been seen in the industrial productivity performance; from a turnaround in the mid-1980s to improved performance in the 1990s (Alhuwalia, 1991). Cost and price-competitiveness of companies and industries of a country are determined by productivity, among other major factors. This subsequently influences the competitive strength of global market exports by these companies and industries. As per this concern, to make the manufacturing sector vigorous, every effort is put into enhancing India’s productivity performance in broad industrial sectors. Monetary and exchange rate policy behaviors cannot be decided independent of the economy’s productivity performance. Magnitude and direction related questions still exist within estimates of productivity growth. For the aforementioned reasons, it is important to measure both, the levels of productivity and its growth rate.

However comparison of productivity is a challenging undertaking as there is not much consensus among researchers about the magnitude levels and growth rates of productivity obtained. This difficulty arises mostly due to variety of methodology utilized, product quality, and difference in product-mix and cross-country comparisons.

Measurement and analysis of productivity is being researched more and more along with growth due to increased application of factor inputs, within the foundation pioneered by Solow (1957). Once this framework was laid, much research was submitted to emphasize the importance of productivity in the growth process which also included studies stressing viewpoint of developing

countries. Factors such as imported intermediate inputs and sophisticated technology must be available in order to maintain variation in productivity and also for manufacturing industries in developing countries.

Before the trade liberalization policies of 1991, Indian industries failed to compete in the global market due to uneven resource allocation by government policies such as high custom tariff rates, domestic trade tax and excise duty structure, reservation of production etc. These misleading trade policies and tax strategies of the Government caused shutting down of India's industries through limitation of productivity in Indian manufacturing sector and buckling under pressure of normal competitive market forces.

The relationship between trade policy and economic performance is one of the oldest controversies in economic development. The phase of industrialization starting after Indian Government's 1991 policy of trade liberalization; has changed the situation, slowly boosting productivity. In order to make the Indian industrial sector a strong competitor in the international market, various positive alterations have been made in technology-import policy and foreign direct investment policy. Compared to earlier years (before introduction of 1991 policies), lowering of custom tariff and removal of quantitative restrictions on imported goods to a great degree, have made the performance of Indian industries more competitive, efficient, productive as well as ready to face the world market.

Earlier years, laid a stronger emphasis on capital accumulation as major factor running the process of development. Along with the effect of technical progress, Total Factor Productivity Growth (TFPG) also accounts for the effect of better capacity utilization, improved labour skills, learning-by-doing etc., making it a combined measure of technological change and change of the efficiency with known technology. Over the years, productivity growth has achieved equal importance as capital accumulation for development and structural transformation.

Income elasticity of demand for industrial goods was comparatively higher which accelerated the demand for industrial goods. Competitive pricing also led to a comparative decline in the price of industrial goods and demand side factors strengthened the growth process in industry. As a result

of high price-elasticity of demand, the factors shifted from agriculture to industry and rapid growth in industrial productivity ensured development and structural transformation of the currently developed economies (Kuznets, 1996).

The liberalization of import policy has been accompanied by a substantial depreciation of the exchange rate. The nominal exchange rate depreciated by about 50 per cent between 1990 and 1995 and the real effective exchange rate depreciated by about 24 per cent in this period. The depreciation of exchange rate made imported manufactured goods costlier. It neutralized to some extent the potential effects of lowering of tariff rates and relaxation of quantitative restrictions on imports. There are two mechanism of movements in the exchange rate can have an impact on productivity, one mechanism which focuses on demand side effects, often referred to as the competitiveness¹ approach, emphasizes the export growth impact of exchange rate depreciation and the productivity consequences of that growth. Another heterodox stream of literature focuses on the supply side consequences of a sustained real exchange rate depreciation arguing that it can contribute to lower productivity growth and a larger productivity gap between the depreciating country and the leading countries.

Harris (2000) provided support to include productivity in endogenous factors within a macroeconomic outline where exchange rate period is either fixed or floating. As per theory stated in various studies on the pro-cyclical productivity effects of demand shocks such as the macro models of the New Keynesian variety with nominal rigidities state that increased utilization, learning-by-doing effects or increasing returns to scale, subsequently giving a higher measured productivity growth. The demand for commodities of trade increases with a real exchange rate depreciation and such depreciation would be inclined to have similar effects. These are among the situations which make productivity growth faster during real exchange rate depreciations as emphasized by competitiveness approach.

The chapter is structured as follows:-

¹ OECD defines competitiveness as the degree to which a nation can, under free trade and fair market conditions, produce goods and services, which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the long-term.

- 1.1 Background
- 1.2 Rationale/Need for study
- 1.3 Central Theme of the study
- 1.4 Objectives of the Study
- 1.5 Hypothesis
- 1.6 Methodology
- 1.7 Sources of data

1.1 Background

Industrialization and Economic Development

Development of manufacturing industries, productivity and industrialization work hand in hand and are inter-dependent. The process of industrialization not only widens the capital but also deepens it wherein high productivity propels industrialization and vice versa. The process involves building new markets and industries, making an existing enterprise mechanically sound, exploring different territories, among other factors. A developing country often depends on other super powers for technology, trade income, investment etc. These issues of dependence especially technological inadequacy and social problems such as unemployment, lack of opportunities, appropriate labour utilization as well as poverty, can be met by steady and quick industrial growth. Industrialization can be the major solution for economic as well as related socio-economic problems for developing economies (Paltasingh and Senapati, 2011).

Importance of the Manufacturing sectors in India

There are various ways in which manufacturing sectors in developing countries can bring about all-encompassing changes in the economy as well as societal issues. Development of manufacturing sectors can help meet problems in a variety of areas such as productivity, agricultural sector, unemployment, defense, natural resources and promotes trade. Manufacturing sectors help to improve the economic productivity and productivity in agricultural sector through technology and organization, and through scientific inputs respectively. It also curbs unemployment through creating potential working areas for the additional labour of the country.

A successful manufacturing sector can produce better ammunition to strengthen the defense systems and lead to balanced use of natural resources through practice of modern methodologies. Over all, it leads to income generation by increasing profit margins ensued by savings and investments through promotion of trade and foreign exchange. As a consequence, balance of payments becomes favourable and employment as well as capital formation is endorsed.

Productivity in Historical Perspective

Historically, terms such as 'product net', 'production', and 'rate of production' were used to describe what modern economists now refer to as 'productivity'. In the 18th century, classical French economists were under the impression that if same amount of labour was applied in agricultural and manufacturing sectors, the latter would not yield any 'product net' on surplus. The Physiocrats School in France broadly classified economic activities under two classes; productive and sterile of which manufacturing services, primarily Government activities fell under the latter category.

Trade has been directly or indirectly favored as an important determinant of growth since the times of Adam Smith. Adam Smith gave a classic expression to the role of productivity advances in national economic growth:

“The annual produce of the land and labour of any nation can be increased in its value by no other means, but by increasing either the number of its productive labourers, or the productive powers of those labourers who had before been employed... in consequence either of some addition and improvement to those machines and instruments which facilitate and abridge labour; or of a more proper division and distribution of employment.”²

The curiosity of economists in productivity growth is admirable. John Stuart Mill and Karl Marx was a growth theorist. Long run economic change interested Alfred Marshall. As mentioned in the classical growth theory and neoclassical growth theory, the firms were regarded as profit seeking

² Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, New York, Random House, 1937, P.326. see Kendrick, J.W., *Productivity Trends in the United States*, Princeton University Press, Princeton, 1961

and industries as competitive. But the implication was more malleable than that of present-day but orthodox theory of price. Growth was beheld as a developmental process, in verbal discussions. The micro-economic formations underlying the experiential analysis of productivity growth appears to be closer to the older theoretical tradition than to newer one, in the post war era (Pendse and Baghel, 2008).

Robert Solow's (1956) theoretical article was largely addressed to the pessimism about full employment growth built into the Harrod-Dourer model. He pointed out that the Razor's edge property of that model was due largely to the assumption of fixed coefficients. With flexible factor coefficients the capital-labour ratio could adjust so that for any savings rate demand for any supply of labour could grow at the same rate. He went on to develop what has come to be called the neoclassical model of economic growth. In that model he admitted the possibility of technological advance, which shifted the production function. In his empirical article Solow (1957) showed how to attribute growth to various sources and how to measure technological advance, consistent with theoretical formulation.

In 1959, Fabricant found the subject of 'productivity' to be covered in confusion as economists both classical and modern associate the term with different parameters and situations. Some use the term in relation to industrial efficiency. For example, Ewan Clague says 'productivity' is a broad measurement of industrial performance efficiency. Dillon (1983) defined the same term as a composite combination of all inputs or interlink between the output and input or an amalgamation of efficiency in general. Utilization of resources in an all-encompassing manner fits the definition of productivity for Mukherji (1962). It accounts for how various resources such as human incentives, modern techniques, appropriate use of technology, development of scientific means and efforts; are economically managed. He elaborated with a formula to express productivity as a ratio of output and individual or all resources or production essential to obtain result. Along similar lines, Peter Drucker (1973) defined productivity as the smallest effort required to give the greatest production wherein all factors of production maintain balance. He further states that a business cannot have direction and control without productivity objectives and productivity respectively (Pendse and Baghel, 2008).

Productivity growth is important for development and structural transformation and also a crucial factor to measure long-run economic performance as per neo classical growth model. Policy makers and economic analysts have given Total Factor Productivity (TFP) a higher acknowledgement, for theoretical relevance as well its distinct status.

It has been well-documented in traditional models of trade that more trade leads to an improvement in efficiency and increase in competition. Foreign trade is as important as domestic trade because markets expand subsequent to increase in domestic and external demand. As the market grows, foreign competition and subsequently foreign investments also become important. Introduction of new capital goods, increasing entrepreneurial effort, improving competition, introducing new technology, improving technical ground by way encouraging an increase in skilled workers and a positive effect on economies of scale are just some ways by which foreign firms and competition can lead to a rise in productivity. In turn this can benefit domestic firms as international markets make introduction of new products or processes and technology transfer faster towards the domestic markets (Ray, 2012).

As important as the external markets are to growth, Indian industries also face hard competition from these markets. Market force in the economy has increased with the 1991 liberalization of Indian industries. These economic reforms of the 90's are also aimed to increase industrial productivity and input-use efficiency. This was brought about changes in basic factors governing the structure and functioning of Indian industries such as price decontrol, greater and cheaper access to imported know-how, capital goods, intermediate goods and world capital, rationalization of customs and excise duty, relaxing of licensing rule and constraints on various input use and technology choices, extending the limit of foreign equity participation, lowering of tariff rates and removal of restriction on import of raw materials and technology. With these changes, introduction of technological dynamism in industries and increase in competitive pressure by national and world markets, the more efficient firms grow and inefficient ones shut down.

In the long-run TFP growth enhances output growth unlike continuous input growth which shows diminishing returns for input use. Efficient and coherent use of limited resources of the firm decides its growth. Sustainability of the firm depends on the actual output or productivity of the

parameters of production. TFP growth reflects the potential for growth and its measure is now equal to long-term growth for continued output growth.

The 1991 liberalization of India's industrial sector led to removal of import restrictions, liberalized the FDI regime, bettering of the infrastructure, privatization of some government owned public sector industries and expansion in production of fast moving consumer goods. As the economic reforms increased foreign and domestic competition, the Indian private sector started to cut costs, changing the face of management, depending more on cheap labour and new technology. One of fierce competitors in the market were cheaper Chinese imports and in trying to handle the competition, employment generation reduced even by smaller manufacturers who had depended on comparatively labour-intensive processes in the past.

Many years ago, while India started its journey towards planned economic development, many objectives were set to be achieved. Industrialization was planned as a powerful dynamic factor which would stimulate the Indian economy for years to come. Under this assigned role, many aims were to be fulfilled and it is this wide array of aims that makes assessment of Indian industrialization very difficult. Much literature has been published to study different facets of the course of industrialization in India. Among all the facets that have been studied to assess Indian industrialization process in the grand scheme of things, productivity performance of Indian industry remains one of the crucial factors.

India's poor TFP growth contribution before the industrial liberalization of 1991, was somewhat blamed on the un-relaxed economic policies and weak tax structure. Even the earlier studies on the Indian industry did not convey TFP growth performance satisfactorily. However, the TFP growth situation is expected to change significantly now that new economic reforms have been introduced for a several years.

In economic theory, if increased competition it always leads to lower the supernormal profits measures as the price over additional cost³. The relationship between productivity growth and

³ Benefits from trade to a country's manufacturing sector arise from two sources: The first source is from greater efficiency in production through increased competition and specialization. The second source is from the opportunities

liberalisation is not smile rather it is unclear. We cannot say that free trade regime is not always leads to productivity growth. X-inefficiency focuses on productive efficiency and minimising costs rather than allocative efficiency and maximising welfare. Competition, whether induced by trade or industrial policy liberalization, is expected to affect the incentive to work, thus eliminating X-inefficiency and consequently raising productivity.

Advocates of trade liberalization leads to stimulate productivity gains with the exposure of industries to simple international competition and facilitating access to the international marketplace. He argue that manufacturing units which face foreign competition are forced to adjust. In particular, firms are encouraged to produce nearer to the production possibility frontier. Evidence indicates that manufacturing sector concerns exposed to trade pay higher wages, function at a higher scale, produce with more capital and accomplish higher productivity levels (Biesebroeck, 2003).

Exchange Rate in Historical Perspective

The rupee was pegged to the pound sterling during 1947–71. There was a switch back to a sterling peg from December 1971 subsequently a short-term period when the rupee was pegged to the US dollar. Notwithstanding the oil shock of 1973 and the severe droughts of 1972 and 1974, when the sterling fell in value in relation to other currencies in the early 1970s, the rupee effectively devalued in real terms during the period. The peg was altered to a basket of currencies with undisclosed weights in September 1975, retaining sterling as the currency of designation and intervention. Owing to weak dollar, for the first two years from September 1975, the nominal exchange rate (NER) remained fixed, but allowed to fall in 1978 and 1979 (Joshi and Little 1994). From 1980 to 1982, the NER was again kept fixed which led to an appreciation of the RER, combined with a high rate of inflation in India. During 1983–85, the NER was made more flexible in order to keep the RER at its 1982 level. The Indian rupee steadily devalued from mid-1980s

that arise to exploit economies of scale in a large market. Reduction in average cost is possible with the access to a large market that encourages larger production runs in the industry. Trade expansion induces firms to increase in size and engage in more plant specialization. In an environment of increased trade, consumers' demand for variety of products can be fulfilled through imports. Access to the world market also means that more products can be produced profitably and this should generate gains from increased product diversity and improve customer welfare (Ray and Pal 2010).

owning to the emphasis on export promotion during the period. India effectively operated an 'active' crawling peg from 1986 onwards providing a sharp real depreciation of the rupee during the period 1986–90.

India presents a unique case in the study of the impact of exchange rate movements. Before the Balance of Payments crisis in 1991, the Indian Rupee was pegged to a basket of currencies dominated by the US Dollar. As a part of its stabilization package, India devalued the rupee against the dollar by 18 percent in 1991. Following the external payment crisis of 1991, the Reserve Bank of India (RBI) was forced to implement a set of market-oriented financial sector reforms. A paradigm shift from fixed to market-based exchange rate regime was initiated in March 1993. Prior to this, a dual exchange rate system prevailed, under which exporters were permitted to sell 60 percent of their export earnings at market determined rate selling the remaining 40 percent at the official exchange rate. A gradual liberalization of Capital Account from August 1994 onwards combined with along with other trade and financial liberalization measures resulted in a rise in total turnover in the foreign exchange market by more than 150% from USD 73.2 billion in 1996 to USD 130 billion in 2002-03 and further to USD 1100 billion in 2011-12.

RBI exchange rate management policy has targeted at maintaining orderly conditions in the foreign exchange market by eliminating uneven demand and supply and preventing speculative activities, without setting a particular exchange rate target. Reserve Bank of India used a combination of tools which including sales and purchase of currency in both the forward and the spot segments of the foreign exchange market, domestic liquidity adjustment through the use of Bank Rate, CRR, Repo rate etc. Movements in exchange rate may have an effect on firm performance through a variety of channels, like price of exports relative to foreign competitors, the cost of imported inputs relative to other factors of production, or the cost of external borrowing. Though the impact on the performance of firms is only one element determining how exchange rate changes affect aggregate economic growth, it can be a crucial and important determinant of the same.

However, studies which have tested the impact of currency intervention for trade welfares have found very mixed results. Since the influential work of Bahmani-Oskooee and Ardalani (2006),

there has been a strand of literature that contends that the traditional studies may suffer from the aggregation bias problem, because insignificant exchange rate impacts with some industries in a country could be more than offset by significant exchange rate effects with others, thereby resulting in an significant exchange rate impact overall and vice versa. Additionally, to decode the underlying linkage in this background, it is also important to know the interdependency of exports and imports. Because in several emerging economies exports are heavily dependent of imported inputs (Sharma, 2011).

The import and exchange rate regime that Indian policy-makers followed since independence was aimed at the comprehensive, restriction over utilization of foreign exchange, with an excessive reliance on quotas instead of tariffs. Import licences allocated reflected two major criteria: (1) the principle of ‘essentiality’; and (2) the principle of ‘indigenous non-availability’. So imports, in terms of both magnitude and composition, would be permitted provided the firm in question certified to the government that they were ‘essential’ (Kunal Sen, 2009). At the same time, the government had to clear the imports from the point of view indigenous obtainability: if it could be shown that there was domestic production of the imports demanded, then the imports were not permitted.

In the same line of the study of the relationship between growth and business cycle, recently study by Daillo (2012) considered the link between volatility in exchange rate and growth in common and between exchange rate volatility and productivity in particular. Relationship between exchange rate volatility and growth can be either negative or positive. First place, volatility in exchange rate acts positively on growth by allowing the use of very flexible monetary policy instruments in case of irregular shocks. Second place, a negative relationship can occur due to the inefficient foreign exchange markets in developing countries and to the uncertainty introduced by the volatility of the macroeconomic environment. Instability in exchange rate can have a vague effect on growth by changing the relative costs of production. Instability in exchange rate can also have a vague impact on investment, employment and inventories by decreasing the credit available from the banking sector. Instability in exchange rate can have a negative effect on growth by increasing inflation instability and raising rate of interest. Uncertainty in exchange rate can hurt trade and consequently growth by increasing risk. In developing countries, a number of authors discuss that, variability in real exchange rate could have a more bad impact on growth because of

the presence of dollarization and low financial development. Variations in real exchange rate alter market signals and lead to an inefficient allocation of investment. Variations in exchange rate can also act negatively on investment by the uncertain environment it generates. An uneven economic situation created by volatility in exchange rate can push economic agents to lose confidence in government policies which could damage the expected return on investment and thus reduce growth.

Exchange Rate and Productivity in Historical Perspective

Balassa (1964) and Samuelson (1964) have shown that real exchange rate will appreciate in countries where productivity growth is faster compared to the rest of the world. However, for developing countries one cannot generalize the hypothesis that a real appreciation of one currency will positively impact productivity. An overvaluation of currency, according to most authors, will negatively affect productivity growth by reducing the competitiveness of tradable goods sectors. Since the past two decades, the productivity issue has become central to the debate in India on the causes and consequences of the significant real depreciation of the Indian Rupee after the post-liberalization period.

Amongst other things, export growth has been robust since 1990 and the share of tradables in aggregate output has expanded to almost 30 percent in 2004–05 as against 19 percent in 1980. Productivity in the tradable sector has increased after 1991 and real per capita income growth has accelerated to 4.1 percent and 6.1 percent in 2000–05 and 2013–14 from 3.8 percent and 3.7 percent respectively in the 1980s and 1990s (Renu and Sudip, 2007 and World Bank). Inevitably, India has been catching up with the rest of the world in terms of productivity growth in the tradable sector which is leading to resource shifts away from non-tradable sectors and increased inflation rate for non-tradables leading to a real appreciation of the exchange rate.

In traditional models, exchange rate depreciations lift imports and export-competing output. Dynamics scale economies and increased capacity utilization of fixed inputs would result in positive productivity consequences of short run output effects. In many macro models of the New-

Keynesian variety with nominal inflexibilities, a positive demand shock can increase measured productivity growth through learning-by-doing effects, increased factor utilization or increasing returns to scale. Real exchange rate depreciation, while increasing the demand for tradables, is likely to exhibit parallel effects in that sector.

A positive domestic supply shock in the traded sector decreases the costs of domestic exports which lowers export prices. This translates into a terms-of-trade worsening and tends to depreciate real exchange rate. At the same time, productivity in the higher traded sector leads through the standard HBS effect to an increase in the relative price of nontradable goods and hence an appreciation of the real exchange rate (Engels, Konstantinou and Sondergaard, 2007).

In case of potential growth-enhancing effect of undervaluation, a depreciated real exchange rate, implying an increase in the price of tradable goods relative to non-tradables, improves the profitability of the tradable sector. As production responds to the price incentive and moves from the non-tradable to the tradable sector -characterized by a higher productivity which increase the overall productivity of the economy. Such improvement in productivity over the entire economy ultimately fosters growth.

In the era of globalisation, recently emerging market economies among most of the economies, adopted an export-led growth strategy which was considered to be more efficient strategy in enhancing an improve productivity in non-exporting sectors through its spillover effects as well as the growth potential of the domestic economy. This strategy appears to have lifted many economies at least until the on-set of recent global crisis from low growth regimes to rationally high growth path. This is noticeably visible in the countries such as China and India, which continued to be top two fastest growing countries in the world. However, similar policy attempted by a large number of countries but the results have not been very encouraging. The “learning by doing effect” (LBD) refers to the competence of firms to expand their productivity as they accumulate knowledge on production. Productivity advantages are typically achieved through practice and self-perfection. This is associated with capital and production: firms improve their productivity either by investing or by producing. A shift of production towards tradables can

promote productivity growth if such LBD effects are more evident in the tradable sector than the non-tradeable sector.

1.1.1. Indian Manufacturing Sector: An Overview

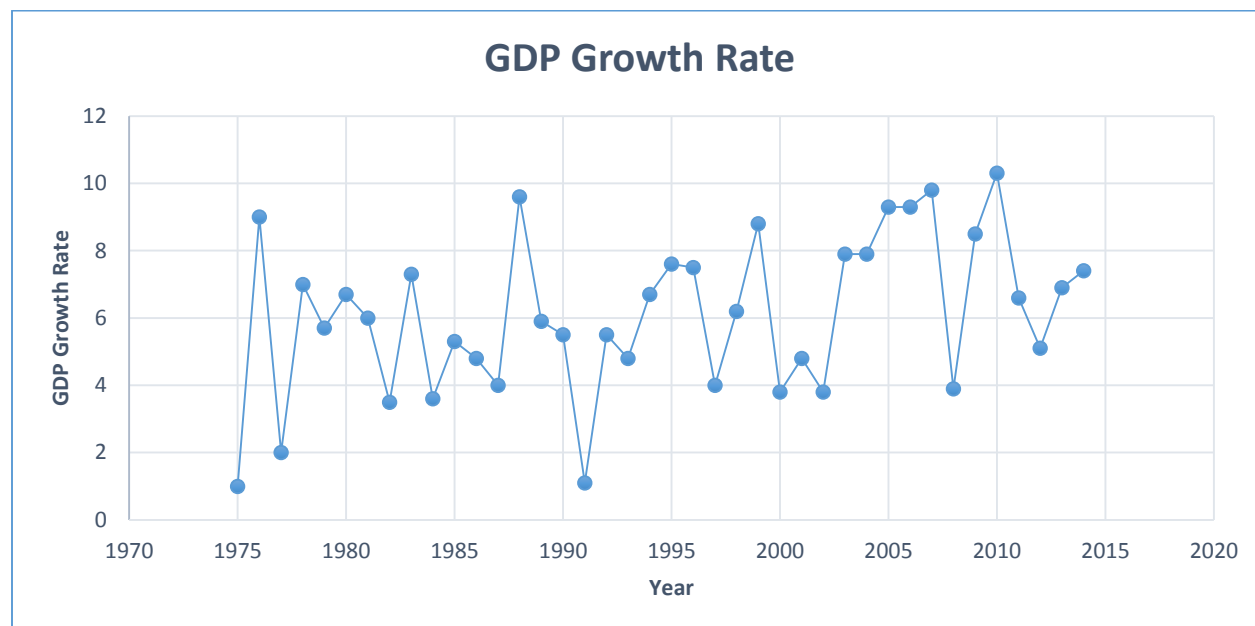
The average share of manufacturing sector in real GDP increased from about 13 per cent during 1970-75 to about 15.1 per cent during 2002-07, i.e., approximately by just about 2 percentage points over a period of more than three decades. Even in the year 2009-10, the share of manufacturing sector in India's real GDP is just about 16.1 percent. Indian industry accounts for 26% of GDP and employs 22% of the total workforce⁴. According to the World Bank, India's industrial manufacturing GDP output in 2012 was 10th largest in the world on current US dollar basis (\$239.5 billion), and 9th largest on inflation adjusted constant 2005 US dollar basis (\$197.1 billion).

Following graph of GDP growth rate starting from 1975-76 to 2011-12 shows in Figure 1.1. However, there is a strong rise within the trend rate of growth of output in the 1990s as compared to the earlier period. Initial three years of 2000s decade, GDP growth rate continuously increase until 2007, after than due to worldwide recession, decline in growth rate of GDP. Economy where climactic factors play a very important role in determining total output, evidently of output growth shows a variation from year to year. Additionally, it is clear that due to manufacturing sector there was a higher economic growth of the 1990s, which was the fastest developing sector. The high growth of the manufacturing sector was predominantly as a result of the registered manufacturing sector. The manufacturing sector contribution within the country's GDP were mostly on expected lines, although it has been a little down. The reasons attributed for this depressed growth are the worldwide economic recession, dynamical pattern of consumer consumption and a rigorous liquidity policy. Even today, India's share of global manufacturing stands at little over 2 percent. The policymaking focus has now finally shifted to the manufacturing sector, with the constitution of a National Manufacturing Policy in 2011. The policy lays out plans to improvement in the

⁴ See Krishna and Mitra (1996) for a more detailed description of the economic and political factors that led to the undertaking of the reforms by the Indian government.

manufacturing sector by raising its contribution to GDP to 25 percent and creating 100 million new jobs by 2025.

Figure 1.1: Growth Rate of Gross Domestic Product during the period of 1975-76 to 2014-15



Source: World Bank

Following the reforms of 1990s, the Indian economy has enjoyed a strong growth with the average annual growth exceeding 8 per cent since 2003. Even amidst the global slowdown, its real GDP grew by 8.8 percent in 2010. Unlike the experience of other developing countries, the industrial sector does not appear to be the core of India's growth dynamics. Although the industrial sector's contribution to total output remained more or less the same, this does not imply that the sector did not contribute to the growth process. In fact, it grew fast but not as fast as the services sector. From 2000-01 to 2010-11, agriculture grew on an average 2.2 per cent annually, industrial sector at a rate of 7.7 per cent and services sector at a rate of 8.7 per cent (Banga and Das 2012).

Over the years, composition of GDP in India has significantly changed and looking at the historical transition processes, it is surprising that increase in reliance of workforce on manufacturing sector still remain insignificant. In the past, when agricultural sector would let go of its masses of unskilled labour, they would mainly be absorbed by the manufacturing sector. However, India's manufacturing sector was unsuccessful in drawing employment from agricultural sector, in any major proportion, in contrast to the East Asian economies (Kochhar et al, 2006).

Industrial sector declined during 2013-14. Growth in the eight core industries slowed down to 3.1 per cent during 2013-14, compared to 6.5 per cent in the previous year. This was only the third instance after 1951-52, when the Indian manufacturing sector recorded contraction, the former instances being 1979-80 (during the second international oil crisis) and 1991-92 (fallout of the Gulf war and the external payments crisis). Rising input costs and moderation in demand adversely affected industrial performance during 2013-14. Growth in the eight core industries, however, improved during 2014-15 to 4.6 per cent from 3.7 per cent in the corresponding period in the previous year. The turnaround was caused by growth acceleration in the production of coal, fertilizers, cement and electricity, as also noticeably lower contraction in natural gas output. Slowdown of growth in steel and refinery products (Annual Report of RBI, 2014).

In early phases of development of the industrial sector, the performance of Indian manufacturing sector was inadequate by the Government policies, e.g., prohibiting Indian industry's ability to compete in international market, high customs tariff distorting resource allocation, the reservation of production - a large amount of production items for small-scale sector, closing down of industries in response to average competitive market forces and various types of domestic trade taxes and excise duties (Biswas and Ghose, 2012). However, since 1991, the situation gradually changes due to the introduction of liberalization policies. A number of actions were undertaken by the Government of India for boosting-up industrial productivity and efficiency. One of the core aims of economic reform through trade-liberalization was to make stronger competition among firms of different industries. Open market competition creates challenges for different domestic firms in terms of their strength. Hence, in order to achieve growth in production, a producing unit has to operate competently. It will thus be interesting to analyze the effect of policy changes on efficiencies of different industries. The economic reform policies adopted by the Government, since 1991, became less friendly to the less efficient industries.

1.1.2. Theories of Economic Growth

Many economists believe that trade is an engine of growth and has dynamic effects on the economy. Theory suggests that trade has either a positive wherein growth accelerating factors are

generated or negative; growth decelerating forces are generated. However, the dynamic effects of trade may be vague as per the theoretical literature. Trade brings about technical information exchange at the global level and make international learning more effective through sharing; leading to improved industrial learning and avoiding of multiple countries researching on similar subjects. Depending on; the global comparativeness of the effectiveness of a country in R & D and how rich the country is in terms of skilled labour, trade can have severe effects on research by either taking resources away or pooling resources into R & D. However, both theories; whether trade causes growth or growth causes trade, support that rate of economic growth will increase with lowering of trade policies. The connection between growth and productivity levels are very well explained by two central theories of economic growth, namely 'Classical growth theory', 'Neoclassical growth theory' and 'New growth theory'.

- ❖ In classical economics (Ricardian), the theory of production and the theory of growth are based on the law of variable proportions, whereby increasing the input of factors of production either of labour or capital, while keeping other factors constant and assuming there is technological change, will increase output at a diminishing rate such that eventually output will become zero. These concepts have their origins in Thomas Malthus's theorizing about agriculture. Malthus's theories included the examples of the number of seeds harvested relative to the number of seeds planted (capital) on a plot of land and the size of the harvest from a plot of land versus the number of employed workers. A major criticisms of the classical growth theory is that technology, one of the most important factors in economic growth, is assumed constant. It also ignores the economies of scale. In fact, though these predictions may have seemed plausible during the 18th and early 19th centuries, when the theory was developed, the actual growth experiences of mordent industrial economies do not bear consistencies.
- ❖ Neoclassical growth theory – Gaining importance from the 19th to mid-20th centuries, this theory is also known to economists as the exogenous growth model. Focusing primarily on productivity growth, exogenous growth refers to a change that happens, external to the system. This exogenous technological growth is not affected by nation's trade policies. Improvement of a country's human capital, capital accumulation, its technological prowess and savings are

major parameters influencing economic growth as well as more effective means of production (Solow 1957, Brinkman 2001).

- ❖ New growth theory – New growth theory does not support trade for creation or sustainability of growth, instead endogenous growth refers to change that happens, within the system. It is based on the idea productivity growth is due to industrial efficiency and technological progress. It is assumed that a nation does not need to depend on foreign collaborations and internal factors such as research and design, education, and human capital leads to sustained output growth per capita. This established the fact that factor accumulation and industrial efficiency are led by trade policies via technology transfer. The foundation for a positive relationship between the growth of an economic system and free trade policies, has been laid and laboriously backed up, by a decade worth of strong literature support provided by Lucas and Romer through various studies (Lucas 1988 and Romer 1986, 1990). The endogenous growth theories identify several mechanisms by which trade reforms may have a sustained impact on economic growth. First, trade liberalisation increases the variety of goods and raises productivity by providing higher-quality intermediate and capital goods. Second, trade liberalisation leads to the exploitation of scale economies as firms in the reforming economy expand into world markets. Finally, trade reforms may lead to greater technological progress in the reforming economy as firms in this economy are able increasingly to capture new ideas being generated in the rest of the world.

There are different schools of thought regarding growth models of economics. Around 1980s, economists in disagreement of the Neo-classical theory, formed an endogenous growth model also known as the New-growth theory. While the economists for former theory endorse a positive relationship between trade and growth; the ones for the latter theory argue the opposite. In the researching 'orientation of trade policies and economic growth', economists advocate for 'trade led growth' or 'growth led trade' and this old debate still continues.

It is well acknowledged that economic growth depends both on the use of factors of production - labour and capital – efficient use of resources and technical progress. This efficiency in resource use is often referred to as productivity. It has been noted by many researchers that growth in

productivity is the only plausible route to increase the standard of living (see for example: Balakrishnan and Pushpangadan, 1998) which is taken as a measure of welfare (Krugman, 1990). The relevance of economic growth is less meaningful if it has not affected productivity growth and hence the standard of living. This improvement in productivity can be caused by several factors including investment in human capital, infrastructure, research and development (R&D), and a healthy business environment.

1.1.3. Trade Policy in India

Public sector allotted the major role in developing heavy industries as compared to which private sector only carried out additional roles. Major instruments; for rapid industrial growth and planning were import substitution and trade policy respectively, as a part of the policy regime from 1950 to the end of 1970s. Even though the manufacturing sector has shown a slow laborious growth rate over the years and constantly low contribution to total output and employment in the economy, compared to the other sectors, it has been the major focus of liberalization policies. From 1950s import substitution policies to 1980s export promotion policies; a huge array of policy interventions, have been made to the manufacturing sector.

Government trading organizations held a monopoly over import of commodities through subjecting almost every import to restricted licensing. The commodities were 'canalized' under trade regime that was limiting rather than modernizing. In the beginning of 1970s, only few commodities were exempted from discretionary import licensing; those listen under the Open General License (OGL) category. In 1977-78, some changes were made in the trade policies which led to shifting of some capital goods to the OGL category with a steady relaxation of import restrictions. As the number of capital goods and parts and accessories receiving OGL status increased from 79 in 1976 to 1170 in April 1988, usually the custom tariff rates for these goods were also reduced. Hence their import was made easier by exemption of import licensing which encouraged modernization and strengthening of domestic industries.

India's customs tariff rates have been declining since 1991. The "peak" rate (applicable to all manufactured and mineral products except alcoholic beverages and automobiles) was 150% in

1991-92 and came down to 40% in 1997-98. The downward momentum was reversed the next year with the imposition of a surcharge (Virmani and Hashim, 2011). This momentum resumed with the reduction of the “peak” rate to 35% in 2001-02 and 30% in 2002-03. “Peak” rate was reduced to 20% at the end of 2003-04. Further it reduced from 20% to 10% at the end of 2011-12.

Several changes were also made in the export policies in terms of provision of incentives and introduction of schemes. Export promotion of manufacturing products was emphasized through the reforms of 1985. Some of the changes included supporting the exporters to source raw materials and to market products through provision of export-processing zones, profits of exports were exempted of income tax and introduction of duty drawback, duty free licenses, cash compensatory support and replenishment import licenses. The import of capital goods and parts and accessories was made easier by exempting them from import licensing and lowering their import tariffs.

A number of empirical studies examine the impact of India’s trade reforms, particularly tariff reforms, on domestic industry. Goldar and Kumari (2003), Topalova (2003) and Virmani, Goldar, Veermani and Bhatt (2004) find a significant favourable effect of tariff reforms on industrial productivity. Das (2003) finds that, on an average, the import penetration ratio in Indian industries did not increase in the period 1991-95 as compared to the period 1986- 90, and there was only a marginal increase in the import penetration ratio in the period 1996-2000 despite marked reduction in the tariff and non-tariff barriers.

Rodrick and Subramaniam (2004) describe the reforms of 1980s, primarily focused on fiscal and industrial sectors as ‘pro-business’; a period when the capacity restrictions were relaxed and corporate taxes were reduced, leading to a policy shift towards an open and less regulatory trade regime followed by an increase in profitability of the existing firms. The reforms of 1990s, focused on broad macro-economic issues, were described as ‘pro-market’, a period when new domestic firms and MNCs found a path to enter Indian industries and gave way to competition with the advent of trade liberalization. Feasible balance of payments and quest for growth was the central aim of nineties reforms and maintenance of equilibrium and structural foundation changes remained at their heart (Kohli 2001).

The economic reforms of 1991 were designed to tackle a wide array of problems; mainly macroeconomic crisis. This crisis was handled through macro-economic stabilization mechanism which met the current-account as well as fiscal imbalances and exchange rate regime. The former model was biased towards amassing an excessive capital as opposed to the reforms which were in favour of employment-focused industrialization as they re-structured the trade and industry policies. The new industrial policies of 24th July 1991 gave a second birth to the industrial sectors through removal of license. De-regulation and de-licensing of industry led to an enhanced, competitive and growth effective industry. Since then, smoothening of reforms in economic and institutional realms is continuing depending on the circumstances encountered at domestic and global levels.

The economic reforms of 1980s lead to a typical steady positive effect on productivity and growth following what is known to economists as the S-curve of productivity and growth. However, in Indian manufacturing sector, post liberalization, the productivity and growth pattern was initially slower than expected which could be due to strict labour laws that led to failure of businesses to grasp the instant profits through relocation of resources from one sector to another. Before liberalization, the foundation was internationally inept but structural transformation changed the face of economy to a more efficient stronger foundation. The width of this change covered domestic sectors as well as global fronts; with capacity building, sounder technology and newer markets being some of the major steps. Capacity building would require more capital as the product lines being used then, were outdated and modernization was required; introduced new technology would have to be learned and adopted and more human resources would be spent in learning new skills, running the equipment and to understand the new market ventures. The phase of adoption instantly after introduction of reforms, would lead to an initial decline in productivity and output growth. However, this situation wouldn't last as after the early slowdown, the firms would emerge with increasing productivity and output growth as soon as the firms would adjust with the drastic change in reforms. Once skilled labour would return, research and development would strengthen; capacity and capital utilization would be optimized with modern technology becoming a part of the businesses which would now be able to exploit new markets and economies. This sort of pattern is known to economists as the 'J-curve of productivity and growth' which was first proposed by Virmani in 2005 (Virmani and Hashim 2011).

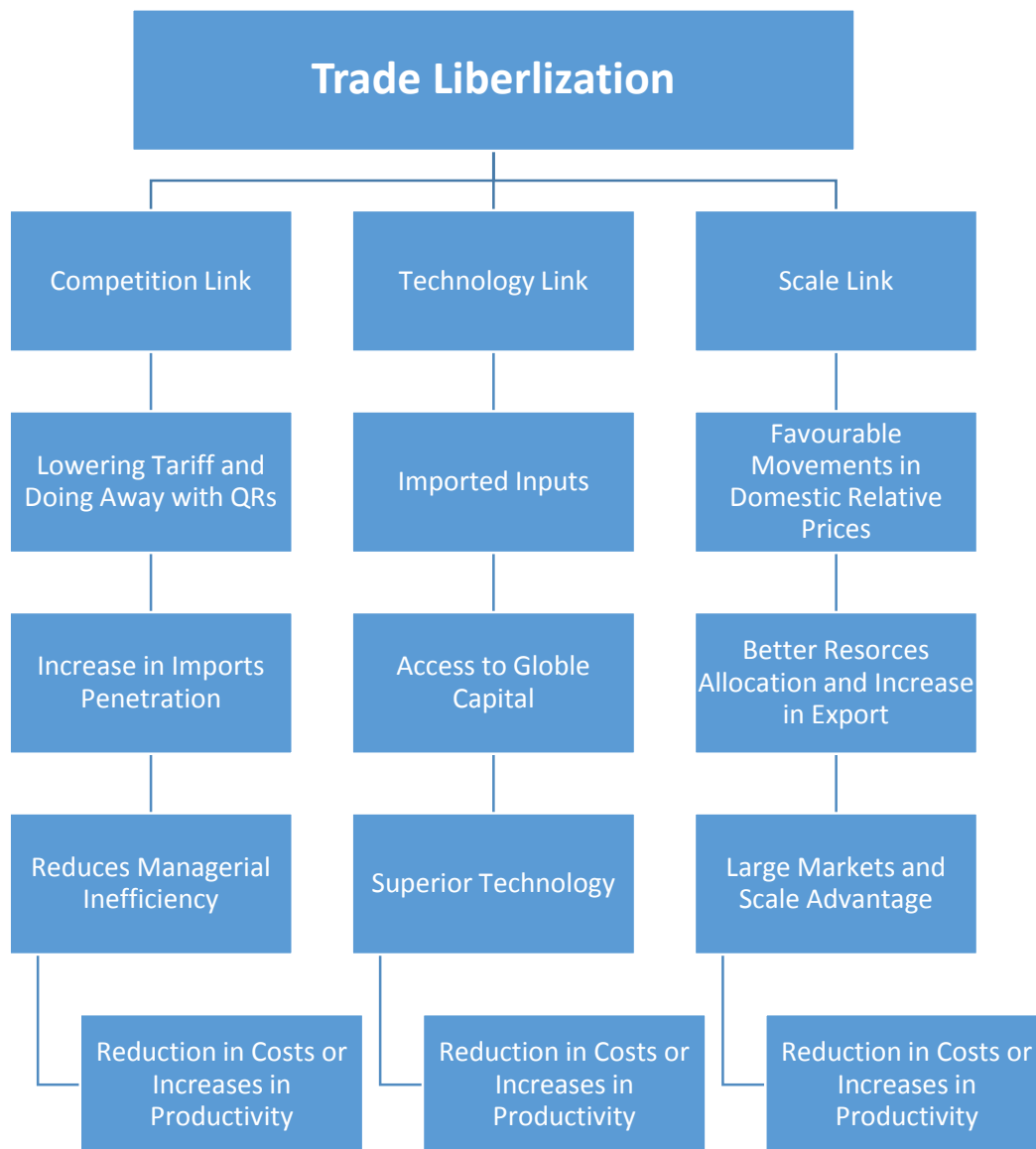
Privatization, Liberalization, and Globalization are affecting a transition within the world economy as well as Indian Manufacturing too. The last two decade following the liberalization has seen revolutionary changes in the state of manufacturing sector in India. In the face of intensified global competition and liberalized trade environment, productivity has emerged as a key indicator of successful restructuring and upgrading by firms and industries. Policy regime, in India has undergone a U-turn during the decade of 1990's. At the same time mega change industry was in developing stage, which was to be followed by the matching growth of service sector. The industries former supported in a subsidized and protected environment have been suddenly opened to face market and the global competitors. The period associated with privatization, liberalisation and globalisation has seen Indian companies developing main competencies in terms of technologies and managing the dynamism and opportunities that have come by over the years. These reforms were aimed at making Indian industry more efficient, technologically modern. This enhancement of competitiveness, technological up-gradation and efficiency improvement was expected to enable Indian industry to achieve rapid growth. Productivity in turn reduces unit cost, enhance product quality, increase workers wage and offers returns on investment. Productivity is the prime determinant of a country's level of competitiveness, higher standard of living and sustained growth in the long run (Kaur and Kiran, 2006).

Liberalization of trade and industrial policies were the two major elements of the policy reform. The liberalization policy aimed to enhance the role of market forces and private sector and greater international integration of Indian economy, which in turn was expected to enhance the productivity of Indian manufacturing industry. Since the main objective of reforms was to improve industrial productivity, it is important to examine how far the reforms have contributed to the productivity performance of the Indian manufacturing sector. In the last 20 years or so, there have been a large number of papers that dealt with productivity in Indian manufacturing in the reforms period. Some of these studies analyzed trends in productivity in Indian manufacturing in the post-reform period at the aggregate level or at industry level or both, drawing comparisons with the pre-reform period performance, while some others examined the effect of economic policy reforms on productivity or investigated the influence of other factors on productivity.

Another essential way that trade reforms can enhance efficiency within the liberalising economy is by exerting a pro-competitive impact on domestic market power. Protection usually permits companies to enjoy super-normal profits and market structures in developing countries considerably depart from perfect competition. Therefore, it is an open question whether the reduction in protection will make firms in the domestic industry reduce their market power and, by doing so, the prices they charge their customers. Here, the significance of imperfect competition for investigating the relationship between international trade and domestic market structure has received increased attention in recent years. Theoretical studies of trade policy under imperfect competition predict that exposure to international trade can exert competitive pressures on hitherto-protected firms within the domestic market (Helpman and Krugman 1989). Developing country context, where widespread government controls can lead to highly non-competitive conditions among domestic producers, such that a sustained episode of trade liberalisation may exert significant competitive pressures on domestic firms, bringing about a decline in market power in several industries.

In India, trade reforms have been supplemented by industrial deregulation. Reforms in industrial policies have aimed at making Indian industries competitive in the technology efficient and external markets. Further, a proper assessment of the impact of trade liberalization and industrial deregulations on productivity requires an understanding of the macroeconomic environment in which these reforms take place as an uncertain macroeconomic environment leads to a fall in investment and productivity growth worsens. In India, fluctuations in exchange rate and growing inflation have been important macroeconomic issues in the Indian economy in the 1980s, 1990s and 2000s. Thus, a proper assessment of the impact of trade liberalization requires an understanding of the macroeconomic environment in which these reforms occur. The arguments look forward in support of the view that open trade regimes lead to enhancement in productivity growth in Indian manufacturing are summarized in a schematic Figure 1.2.

Figure 1.2.: Trade Liberalization and Productivity Growth: Theoretical Link



Sources: Mukhopadhyay Hiranya, 2006

It can be seen from the above that trade liberalization creates the imperative for increasing productivity. Figure 1.2 highlights a number of links through which trade liberalization leads to productivity growth. The first link helps to control for managerial negligence and in turn bring about competition. The second relates exports to the large markets and the scale arguments for lowering costs and increasing productivity. The final mechanism emphasizes the trade-technology links.

1.1.4. Effect of Trade Liberalization on Industrial Productivity

Positive effect of trade liberalization on industrial productivity can occur through various means:

1. Trade liberalization leads to cheaper imported capital goods which helps enhance technology and also allow allocation of labour compared to invested capital. The firms will have better opportunity for utilizing imported goods as well as intermediate inputs. Improved TFPG will lead to improvement of productivity performance of the industrial firms;
2. Lowering of tariffs will provide industrial firms cheaper availability of intermediate inputs, which will enable them to improve their productivity performance;
3. Greater availability of imported intermediate goods will enable the firms to exploit better the productivity enhancing potential of imported technology;
4. Effective use of resources will be encouraged with the advent of domestic and global competition. As a consequence, efficient management, labour utilization, capacity building and organized production will result.
5. Competition will also lead to shutting down of inefficient industries giving way to the firms that use their resources appropriately.
6. As the competitive business environment forces inefficient firms to close down, the average level of efficiency of various industries should improve;
7. Imported inputs and reform in real effective exchange rate along with different trade policies under liberalization help industrial sector to compete in export markets more effectively through increase in sales and gain in economies of scale which in turn resulted to growth in TFP;
8. Greater access to imported inputs and a more realistic exchange rate associated with a liberalized trade regime would enable industrial firms compete more effectively in export markets. This would allow them to increase their sales and reap economies of scale with concomitant gains in productivity⁵.

⁵ For complete list and discussion, see, Goldar and Kumari(2000), Unel (2003) and Ray(2012)

Productivity primarily involves three basic areas of the economic system in which favourable changes can be made to improve this efficiency relationship. These three areas are: firstly, inputs for production; secondly, outputs from production; and thirdly, effective distribution of the items produced along with the distribution of the gains emanating from the surplus of outputs over inputs as to sustain productivity efforts on a continuing and a progressive basis.

In economic literature, 'real exchange rate' is broadly represented by the nominal exchange rate adjusted for price level differences between nations while considering the external scenario and it is the ratio of the domestic price of tradable to non-tradable goods domestically where internal scenarios are concerned. The real exchange rate (RER) is measured as the ratio of the foreign to the domestic values of some broad based price index such as the consumer price index (CPI) or the deflator for gross domestic product (GDP), expressed in common currency by using nominal exchange rate to convert the price level of one country into the currency of the other.

The first and most important model of long-run deviations of the real exchange rate from the Purchasing Power Parity (PPP) was advanced more than 50 years ago by Balassa (1964) and Samuelson (1964). They argued that when all countries' price levels are translated to dollars at prevailing nominal exchange rates, rich countries tendency to have higher price levels than the poor countries. The reason for this phenomenon has not been merely that rich countries have higher absolute productivity levels than the poor countries, but the traded goods sector exhibit relatively more productivity in the rich countries. This also leads to the wage level moving upwards. In fact, if there has been no corresponding increase of productivity in the non-traded sector in order to match the higher wages in the production of tradables, the producers of non-traded goods will need to raise their prices. With one component of the general price level being constant while the other is higher, the overall price level would naturally increase. To sum up, the Balassa-Samuelson hypothesis suggests that a positive innovation in the traded productivity leads to an increase in the relative price of non-traded productivity leads to an increase in the relative price of non-tradables, which in turn would cause an increase of the general price level and appreciation of both external as well as internal real exchange rates (Parida et al. 2001).

The role of international trade in the economic growth and development of an economy has always been a topic of debate and controversy. However, empirical evidence in the recent times has failed to unanimously support it as an ideal growth strategy for the newly developing countries. On the one hand, real appreciation decreases the relative cost of imported capital goods and then induces a rise of the capital-labour ratio. It is possible that this rise supports technical progress but simultaneously induces a lesser efficiency due to the drawbacks in the management of more capitalistic and sophisticated technologies. On the other hand a real appreciation means an increase in the real labour remuneration which may induce an improvement of workers' productivity particularly in a country where the wages of unskilled workers are still very low. Real exchange rate appreciation exerts a negative impact on exports. However, the tradable goods sector to which exports belong is more competitive than that of the non-tradable goods since it faces international competition. A redistribution of production factors in direction of the tradable goods will consequentially increase productivity. Hence, real exchange rate appreciation involves a fall of technical efficiency insofar as it generates reallocation of production factors towards the non-tradable goods to the loss of the tradable goods.

H. Leibenstein (1957) emphasised that a very weak remuneration of labour in developing countries may adversely affect worker health and their working capacity. He argued that the motivation of worker response to efficiency which he calls the "X-efficiency". At same time, skilled workers are also concerned with remuneration increases consequent to a real appreciation of the exchange rate (Harris, 2001). An appreciation of the local currency increases the level of competition in the domestic market as export opportunities shrink and import competition intensifies, pushing less productive plants from the market and compelling new entrants to be more competitive. Devaluations have the opposite effect, as new export opportunities arise and import competition weakens, less economical plants are able to continue to operate in the market and crowd out new, more productive entrants (Ben, 2010).

Both overvaluation and undervaluation are argued to be harmful to growth, though avoiding overvaluation is associated with losses of competitiveness on the tradable sector and increasing the balance of payments and currency crises. Further, undervaluation is discredited on the grounds that it could create unnecessary inflationary pressures and also limit the resources available for

national investment and therefore limiting to the growth of supply-side potential. Exchange rate misalignments which reflect the divergence of exchange rate from equilibrium level, are related to certain macroeconomic disequilibrium notwithstanding the direction of the misalignment.

There is one instrument through which continuous and persistent undervalued exchange rate might increase the productivity growth. For instance, if the real exchange rate remains persistently undervalued giving sustain cost advantage, this could lead to a superior export performance in the long period. There are a variety of dynamic theories, which can be used to link this superior export performance to a superior productivity performance. Therefore, from a theoretical perspective, a trend depreciation that gives rise to a sustained undervalued exchange rate, may have positive or negative productivity consequences (Richard, 2001).

For the growth of any sector, exports are as crucial as the imports. In order to make forthcoming policy decisions, it is important to know the direction of causality of the relationship between export/import growth and growth of the sector. Wide range of research has been done on the subject of Export-led growth. Most economists have based their work on Keynes theory which states that in a specific economic system, demand drives the system while supply adjustments are made accordingly. This theory is different from Say's law which states that supply creates its own demand. In developing countries, long term growth requires demand but a lack of demand is noticed. In situations where in developing nations produce below their productive capacity compared to the availability of labour, then the growth of external demand will be decided by the growth of economy (Banga and Das 2012).

Grossman and Helpman (1991) argue that technological change can be influenced by a country's openness to trade. Openness to trade provides access to imported inputs which embody new technology and increases the size of the markets facing producers which in turn raises return to innovation and affects a countries research intensive production. Thus, a countries openness leads to improvement in domestic technology helping the production process and becomes more efficient, improves productivity growth (Ray and Pal 2010).

The arguments so far link trade and the level of productivity. However, there have been theoretical efforts to link trade to the rate of technological diffusion, and via innovation, to productivity growth. Rodrik (1988) argues that a firm's market share can affect its payoff from innovation. Now, the impact of trade reform would be ambiguous, for productivity growth is as likely to slow down in the import competing sector, as it is likely to accelerate within the export-oriented ones as their respective markets shrink and expand. A general equilibrium representation of the link between trade, innovation, and growth appears in the work of Grossman and Helpman, 1991 (Balakrishnan et al. 2006).

Dansk Økonomi (2010) sets up a framework where growth in per capita real income can come from three different sources; improved terms of trade, increased labour productivity and/or increased supply of labour. Improving the terms of trade – the price of exports relative to the price of imports – is one way to increase economic growth. However, it might be difficult to actively improve the terms of trade because factors that influence terms of trade are difficult to control, since they rely heavily on the development of global economic forces (Productivity Commission, 2008)

1.2 Rationale/Need for study

The present study makes significant contribution to the text on the base of the economic growth of India. Firstly, it presents a comprehensive and detailed sector wise analysis encompassing the Indian economy on the whole. Present study investigates the Indian manufacturing sector and the developments in total factor productivity (TFP) within the same. Twenty two industries are scrutinized for identifying industry level differences in the development in TFP.

The average annual growth rate of manufacturing real exports surged from 5 per cent in the 1980-81 to 1989-90 to 9.7 per cent in the 1990-91 to 1999-2000 and increased further to 12 per cent in 2000-01 to 2009-2010. The average annual growth rate of real imports increased from 5.4 per cent in the 1980-81 to 1989-90 to 11 per cent in the 1990-91 to 1999-2000 but then gushed to around 16 per cent in the 2000-01 to 2009-10. The last 20 years brought about a surge in the manufacturing sector. Present study endeavors to observe if trade liberalization plays a noteworthy role in the area

of international trade or not. Boosting industrial productivity was the main agenda import liberalization. Hence it is apt to inquire that how far import liberalization has added to the superior productivity performance of Indian production industry in the post-reform period. Present study will deal with this issue.

How does trade liberalization on productivity growth affects the manufacturing sectors of developing countries is a topic of constant debate. Traditionally, it was believed that trade liberalization has a very positive impact on the productivity growth. But this point of view is defied often by the new theories of endogenous growth. As said by Chand and Sen (1996), it is considered by these new growth theories that trade reforms may bring about a change that is steady in nature in productivity growth. But, the hypothetical text gives an ambiguous prediction on the direction in which this change occurs. Due to this ambiguity, the level till which these trade policies affect productivity growth is eventually an experimental question.

A chain of certain reforms was put into practice by the Indian Authorities. These reforms were intended to expose our economy to larger competition and also wanted to liberalize the main features of economic activity in India. The present study explores productivity trends in India's organized manufacturing sectors during the period from 1975-76 to 2011-12 onwards. It also wishes to investigate the relative contributions of factor accumulation and productivity growth in the various sectors of the economy of our nation.

Obviously, a series of persuasive theoretical arguments for us to consider a positive effect of import liberalization on the productivity in the industrial sector. But this view or proposition lacks a powerful pragmatic proof. Many practical studies for all developing countries, where econometric models have been anticipated to evaluate the effect of import liberalization on productivity in industries. Various theories have yielded varying results. Some say the effect is positive while others say the effect is adverse. There are studies which insist that there is no relationship between the two. Thus, in the words of Goldar and Kumari (2002), the empirical evidence on the relationship between import liberalization and industrial productivity in developing countries is mixed and no specific conclusion can be closed upon.

The need for studying productivity growth arises due to intimate link between productivity growth and exchange rate. Paul Krugman (1989) recommended that the large appreciation of the dollar between 1979 and 1985 have induced the acceleration of industrial productivity growth in the United States because the rise of the dollar would have pressed firms to increase their productivity. Porter (1990) also argued that an exchange rate overvaluation might contribute to increased productivity. Richard (2001) focuses on the idea that the major source of productivity is output growth or increases in market shares. To the extent that both of these are driven by price competition, theory predicts that exchange rate depreciation contributes to an increase in “international price competitiveness,” which increases output growth and improves productivity. Growth in productivity has a direct relationship with development of each and every section. Productivity growth is a direct reflection of the standard of living of a country. A nation where productivity growth is rising rapidly is believed to have employed, well-fed, well-clothed and well-educated citizens. The quality of life goes hand in hand with productivity growth rates. So public policy makers consider productivity growth rates to be a mirror of the society of that nation. Education, environment, means of sustainability, medical care, supporting cultural and sports activities are directly or indirectly related to productivity and its performance. Moreover, problems like unemployment and poverty can also be tackled effectively if productivity performance is positive. Wholesome well-being of the society depends on its well-being and the facilities they are provided with. For this purpose, optimum release and utilization of resources is necessary. Therefore increase in output, production and income is inevitably the result of productivity growth. Failure of productivity to grow leads to the downfall in the income level such that the desired quality of life cannot be attained.

Economic welfare and achievement of many targets of economic growth directly relate with productivity. It is actually very important in terms of industrial development. If the same available resources are used more efficiently by industries, the net national product will be much higher. This will result in industrial growth. Increased in productivity thus become a requisite incentive to the outcome of a multifaceted social and economic development. Since the purpose of rise in productivity and economic growth is to fulfill the substantial needs of people and the society on

the whole to the maximum possible scope, economic growth is absolutely interrelated with productivity increment.

It has been known that the growth over long term is achievable only through progress in the technical sector or the other way to say it is gradual rise in productivity. In words of Paltasingh and Senapati (2011), if growth is grounded on factor accumulation (labour and capital), it causes to undergo diminishing marginal productivity. The growth of output due to factor accumulation inevitably stops factor finally stops and the progression becomes untenable in the long term. Thus, productivity is a very critical factor for sustainable growth in industrial sector of an economy.

India, presently, is increasingly being considered as one of the fastest growing free market economies. India's growth has been the result of industrial reforms and trade liberalization initiated in the early 1990s and continuing so far. However, in terms of its distributional effects, employment growth, labour productivity and real wage growth remains questionable. Of particular interest is to investigate the distributional impact of trade since a large section of the population suffers from income disparities. Any benefit derived from trade liberalization could be offset by high social cost if such liberalization exacerbates poverty and inequality in a developing country like India. A critical policy implications would be to necessitate additional domestic and external policies along with trade liberalization so has to redistribute some of the gains from trade liberalization and compensate the poor.

1.3 Central Theme of the Study

The central focus of the study is to analyse the factors responsible for productivity growth in the Indian manufacturing sector and to determine the causality between productivity growth and exchange rate.

Given the complex linkages between manufacturing growth, trade liberalization, productivity growth and exchange rate fluctuation, it becomes important to empirically examine the relationship and determine whether the manufacturing sectors have been impacted by the economic reforms of

1990-91 and if so in what way. The aim of this research is to undertake the technique of computing total factor productivity growth using industry level productivity estimates.

1.3.1 Linkage between Trade Liberalization and TFPG

Benefits from trade liberalization to a country's manufacturing sector arise from two sources: The first source is from greater efficiency in production through increased competition and specialization. The second source is from the opportunities that arise to exploit economies of scale in a large market. Reduction in average cost is possible with the access to a large market that encourages larger production runs in the industry. Trade expansion induces firms to increase in size and engage in more plant specialization. In an environment of increased trade, consumers' demand for variety of products can be fulfilled through imports. Access to the world market also means that more products can be produced profitably and this should generate gains from increased product diversity and improve customer welfare (Petersson, 2002).

Although there exists voluminous empirical research work regarding nexus between trade liberalization and factor productivity growth, overviews on the link between liberalization and TFPG find inadequate evidence on this issue, it is as yet a controversial issue and debate is still unsettled. The controversy on the impact of liberalization on TFPG and diverse conclusions resulting from empirical investigations are probably due to differing interpretations of liberalization and openness. These varied empirical results need further investigation into the links between liberalization and productivity growth of Indian industry (Ray and Pal 2010).

If various studies are explored then present study find few links between trade liberalization and economic growth. In fact, there is no way according to which factors leading to higher economic growth can be concluded. So the relationship between trade policy, industry performance and economic growth has to be tested practically. Present study inquires about the proof for the association between trade policy and industry performance for our country during the 1975-76 to 2011-12. It aims at assessing whether transformations in the trade policy has affected industry performance and productivity notably or not.

1.3.2 Linkage between Exchange Rate and Productivity

Industrialized countries have experienced large fluctuations of real exchange rates during the last sixty years so that many authors have taken an interest in the link between the level of real exchange rates and productivity growth in these economies. Paul Krugman (1989) recommended that the large appreciation of the dollar between 1979 and 1985 have induced the acceleration of industrial productivity growth in the United States because the rise of the dollar would have pressed firms to increase their productivity. Porter (1990) also argued that an exchange rate overvaluation might contribute to increased productivity. On the contrary the widening productivity gap between US and Canada can lightly be explained by the large real depreciation of the Canadian dollar during the 1990s (Jeanneney and Ping, 2003).

It is frequently argued that exchange rate movements can impact productivity. Nonetheless, the negative potential impact of the real exchange rate appreciation on productivity growth may not be linked exclusively to a reduced export growth or foreign direct investments. Infact, real appreciation hinders import competing products and exports. The competitiveness approach which focuses on demand side effects emphasizes the effect of exchange rate depreciation on export growth and the resultant consequences on productivity. An opposite stream of literature, focusing on the supply-side consequences of persistent real exchange rate depreciation argues that it contributes to reduced productivity growth and increased productivity gap between the depreciating country and the leading countries.

Richard (2001) focuses on the idea that the major source of productivity is output growth or increases in market shares. To the extent that both of these are driven by price competition, theory predicts that exchange rate depreciation contributes to an increase in “international price competitiveness,” which increases output growth and improves productivity. The second set of effects emanates from a relatively permanent or long-lived departure of the exchange rate from its equilibrium value as measured by the level of the exchange rate relative to a long-run equilibrium real exchange rate. A range of supply-side effects come into play from a seriously misaligned exchange rate that could have a negative or positive effect on productivity growth.

1.3.3 Why Study and Measure Productivity Growth

Productivity growth needs to be studied because it is the only plausible route to an increase in the standard of living. Productivity increases have also been recognised to contribute to economic growth. But when it is also recognized that economic growth without productivity increases can do little for raising the standard of living, we must become less interested in growth per se and return to focusing on productivity change (Balakrishnan, et al. 1998).

Productivity growth also comes in handy in the attempt to enhance the competitiveness of a country's exports. Productivity growth lowers labour costs and thus, ceteris paribus, the international price of the good concerned. This mediation of the exchange rate, however, ensures that the relationship does not hold in reverse, that is, an increase in competitiveness does not by itself translate into a productivity increase. It must alert us to the associated fact that increasing the competitiveness of a country's exports need not raise the standard of living even when it improves the balance of trade. (Balakrishnan, et al. 1998)

Measurement of productivity promotes understanding of many important features of the modern economy. The question is whether these estimates can be used practically or not? New and statistically helpful uses exist and shall continue to evolve. Yet, present study shall put forward some of the foremost types of applications of productivity measures.

Productivity growth can be used as-

1. Measures of performance and thus as a way of encouraging enhanced efficiency;
2. A method for analysis of factors that encourage productivity progress as a basis for forecast and formation of various policies;
3. A way for analysis of dynamic relationships among various economic variables,
4. A set up for predicting and making various strategic decisions.

Thus it can be concluded that, productivity estimates are being used increasingly, at the industry level, at the basic company level and at the total larger level of the nation's/world's economy (Kendrick, 1961).

Accepting the inter association between productivity and causal variables is essential to demonstrate productivity change and to take suitable measures to manipulate it. Quantitative analysis has limited use in this area, but it can be used as a useful add-on to qualitative analysis. Thus far, productivity projections have mostly been made by widening past trends, with practically good results. However, the analyst should at least be attentive to the fact that multifaceted factors whose net effect is assumed to be the same in the future as in the past is subject to change. He should also be prepared for possible signals that show considerable changes in important fundamental factors (as observed by Kendrick, 1961).

1.3.4 Productivity Growth and Policy Regimes

One approach to the problem of enhancing productivity growth has been to relate it to policy regimes. We find this is a theoretical approach. The presumption is that a more competitive market structure is desirable, even though it is not made clear whether market structure determines the level or the rate of growth of productivity. A particular version of this approach links productivity growth to trade regimes suggesting that more open trade regimes encourage productivity growth. It is striking how poor is the empirical evidence on this. (Balakrishnan, et al. 1998)

X-inefficiency has been conceived of as firm-specific inefficiency. It can result in slack due to managerial lethargy and its reduction, it is held, can be achieved by engineering entry. Entry can of course mean either domestic supply or imports, the latter implying a more open trade regime. This has been used as an argument to promote trade liberalisation in developing countries. However, it has been pointed out that this route to the frontier requires that managerial supply curve in effort is backward bending in income. So it seems that managers in this account are not profit maximisers, a premise that may not be agreeable to some in the profession (Balakrishnan, et al. 1998).

1.4 Objectives

The present study aims to explore the link between trade policy changes and total factor productivity growth in India for 22 two-digit industries covering the period 1975-76 to 2011-12. We deal with four aspects. In this context of this study, answers to the following questions are attempted:

- 1) What are the successful and not so successful stories with respect to trade policies and growth within the manufacturing sector?
- 2) What could be the broad lessons from India's experience of liberalization with respect to the manufacturing sector?

The primary objectives of this study are as follows:

- 1) To estimate productivity and growth rate of productivity at industry level for Indian manufacturing sector.
- 2) To examine the path of efficiency and productivity in the context of economic reforms undertaken by the Indian manufacturing sector.
- 3) To identify the determinants of productivity growth of the Indian manufacturing sector.
- 4) To examine the link between productivity growth and exchange rate changes.
- 5) To investigate whether the role of exchange rate in determining productivity increased during the post reform period.

The secondary objectives of the study are:

- 1) To examine whether the nature of the trade policy regime make a difference to the productivity growth.
- 2) To observe whether there is a relationship between productivity growth of the aggregate and the constituents that make up the aggregate.
- 3) A quantification of the trade orientation at the disaggregate industry level is undertaken by exploring how trade orientation should be measured given that trade restrictions in India have been highly complex and characterized by both tariffs and non-tariff barriers.

1.5 Hypotheses

Following are the main hypotheses of the present study.

- 1) Total factor productivity growth in manufacturing sector has been more robust during the post-reform period (1991 onwards) as compared to pre-reform period.
- 2) There is a causal link between total factor productivity growth rate and exchange rate.
- 3) Trade liberalization has a positive impact on industrial productivity growth.

1.6 Methodology

The present study estimates productivity growth in Indian organized manufacturing industries with more up to date and comprehensive data for the manufacturing sector of the economy. It uses the data from 1975-76 to 2011-12 with a view to trace the changing impact of reforms on productivity and output growth. The data is broken up into two periods: The pre (1990s) reform period from 1975-76 to 1990-91 (Period I) and the reform / post-reform period from 1991-92 to 2011-12 (Period II). Based on the broad phases of varying levels of output growth and capacity utilization, the study breaks up the post reform period into following three sub-periods (SPs): Sub-period 1 from 1991/92 to 1999-2000; and Sub-period 2 from 2001-02 to 2011-12.

Productivity growth estimates of Indian manufacturing have always raised questions in terms of the methodology used. The studies on India's manufacturing productivity have been more about documenting the productivity growth for different industries in organized manufacturing at various levels of industries—2 and 3- digit levels of national industrial classifications. These studies, based as they are on growth accounting, rely on two very heroic assumptions—perfect competition and constant returns to scale. Further, most of the estimates relate to the value added form of the production function rather than the gross output form. In the light of these, there are several methodological issues which merit attention in interpreting TFP growth rates: (1) growth accounting versus econometric estimation, (2) value added versus gross output, and (3) measuring intermediate inputs.

The present study uses various techniques of analysis:

1. The measurement of productivity growth for Indian industry mostly uses the 'growth accounting' methodology. The present study also employs same method.
2. Tornqvist Productivity Index technique is used to compute total factor productivity and thereafter find total factor productivity growth.
3. Multi-variate regression model is tested between individual industry productivity growth and independent variables.
4. Ganger causality test is conducted to explore the link between real exchange rate movements to productivity growth. It is entirely possible that this structural link is consistent with a long-run growth model in which the causality runs in both directions.
5. Basic panel regression model use to incorporate various manufacturing industries across different time periods.

A detailed explanation of the research methodology is presented in Chapter 3.

1.7 Sources of data

The basic source of data used for the productivity estimates is the Annual Survey of Industries (ASI) brought out by the Central Statistical Organisation (CSO), government of India, which has been the basic data source of most studies on productivity in Indian industries.

Wholesale Price Index data is collected from the Office of the Economic Adviser, Government of India, Ministry of Commerce and Industry, Department of Industrial Policy and Promotion.

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The tariff and non-tariff data for various product categories (items in the tariff working-schedule under BTN or HS codes) have been derived from the Customs Tariff Working Schedule.