

Impact of Trade Liberalisation on India's Exports

*Thesis
Submitted to the University of Calicut
for the award of the degree of*

Doctor of Philosophy in Economics

by

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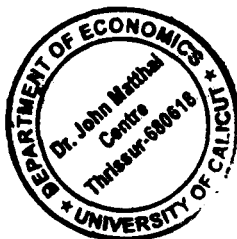
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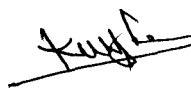
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Certificate

Certified that this written account on “**Impact of Trade Liberalisation on India’s Exports**” submitted for the award of the Degree of Doctor of Philosophy of the University of Calicut is a bonafide record of research work done by Ms. M. Sindhu under my guidance and supervision. No part of this work has been submitted earlier for the award of any other degree by any other university.

Place: Thrissur
Date: 18-12-06




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Declaration

I, M. Sindhu, do hereby declare that this written account titled **“Impact of Trade Liberalisation on India’s Exports”** is a bonafide record of research done by me under the guidance of Dr.A.C.Kuttykrishnan, Professor in Economics, University of Calicut. I also declare that this thesis has not been submitted by me earlier for the award of any degree, diploma, fellowship or any other similar title.

Place: Thrissur

Date: 18-12-06


M. Sindhu

*To my parents, teachers and brothers
For their prayers, inspirations and blessings*

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Chapter I
Introduction

Foreign trade occupies an important place in any economy and its role in the world economy has increased over the past 50 years. Trade has grown much faster than world output and some of the countries have achieved the fastest economic growth by rapidly increasing their role in world trade. So as to increase their share in world trade different, countries adopted various trade policies in different times. Developed countries mainly followed export promotion measures but developing countries adopted import substitution policies in 1950s, 1960s and 1970s. But the experiences showed that import substitution policies widely used by the developing countries were less successful than the export oriented policies used in East Asia's high growth economies. As a result, the policy makers in many developing economies began adopting policies for more open trade during the 1980s. By the late 1980s nearly all of the centrally planned regimes that had followed restricted trade relations with other countries had introduced reform, which gave foreign trade and investment a prominent place in their development programme. These reforms led to dramatic changes in developing economies involvement in international trade.

Trade liberalisation is one of the prominent components of globalisation. Perhaps the most important aim of globalisation is the rapid integration of goods and financial markets, that is, promotion of trade and investment are the prime driving forces behind globalisation. Globalization is defined by International Monetary Fund as the growing economic interdependence of countries world wide through increasing volume and variety of cross border transaction in goods and services and of international capital flow and also through more rapid and widespread diffusion of technology. It is clear from the above definition that economic globalisation involves long distance flow of goods, services, capital and information. Globalisation also involves the organisation of the processes that are linked to these flows. Along this line, the distinguished economist, Paul

Krugman¹ defines economic globalisation as the transfer of technology and capital from high- wage countries and the resulting growth of labour intensive exports in world exports. This definition stresses strictly on economic transactions and refers three critical components. These components are economic and financial flows, markets for the exchange of goods and services, and foreign direct investment via transnational enterprises. Friedman emphasised the role of free market, free trade and the free flow of capital in fostering economic integration while defining globalisation. Globalisation is therefore defined as a process whereby all national markets are integrated to form a global economic system where the production and distribution of products and services are made possible on a worldwide basis. Thus, the importance given to trade which has an important role in the economic growth of any country in reform agenda is very clear from the above definition.

Trade liberalisation is considered as one of the important components of globalisation process. This may be due to the fact that trade has a prominent role in the economic growth of any country. There exists a difference of opinion regarding the relationship of trade and economic growth and theoretical studies also show that the relationship between foreign trade and economic growth can be positive, negative or elective one. The classical and neo classical economists held the positive view. According to them foreign trade is an engine of growth. The classical theories of comparative advantage, Heckscher- Ohlin and Samuelson theories of factor price equalisation justify the virtue of free trade. The neo classical economic theory also argues that removal of trade barriers would improve economic welfare. On the other hand, structuralists believe that international trade has actually operated to the detriment of poor countries causing deterioration in terms of trade. In between the two, extreme positions lie the elective view, which incorporates some elements of these two schools.

¹ Paul Krugman, (1999) *The Return of Depression Economics*, Norton University Press.

Nurkse believes that growth in the underdeveloped countries should proceed through domestic industrialisation because there is little chance of reliance on export led growth. Nurkse further adds that the productivity in agricultural sector must also increase. Otherwise increased income from manufactures will be partly spent on foodstuff and thus create pressure on import or cause inflation. According to him, the strategic importance of export in economic development of an underdeveloped country is beyond any argument².

Unlike the earlier theories, most of the new growth theories recognized the importance of trade openness. The new growth theories that emerged in the late 1980s provided a rigorous analytical framework within which trade liberalisation can be linked with economic growth. In particular, Grossman and Helpman (1992)³ argue that technological change can be influenced by a country's openness to trade. According to him trade openness also provides access to imported inputs, which embody new technology and increases the size of the markets facing the producers which in turn raises returns to innovation and affects a country's specialization in research intensive production. Thus a country's openness leads to improvements in domestic technology, which helps the more efficient production process and culminates in productivity improvements. The new literature on endogenous growth links trade openness with innovation and growth.

Trade liberalization also enables cheaper and easier access to foreign technologies and global capital and makes possible greater international exchange of information. Lowering of trade restrictions makes possible the import of capital and intermediate goods which embody superior technology and this helps in reducing costs and also in turn increase productivity growth in the

² Gershen, Feder (1983) "On Exports and Economic Growth," *Journal of Development Economics*, Vol.12, pp59-73

³ Gene Grossman and Elhanan Helpman (1991) *Innovation and Growth in Global Economy*, MIT Press, Cambridge

sector which uses these products. Thus integration of the world economy will also influence the pace and direction of technical change positively.

Trade liberalization is also supported on the ground that it may help for correcting the domestic relative price ratio so that resources flow to the exportable sector whereas restricted trade regime leads to a resource misallocation by altering the domestic relative-price ratio in favor of the comparatively disadvantaged sector. Further, the lowering of controls on exports allows firms and industries to target the export markets and overcome under utilization of capacities due to deficient demand at home. The net result of this is to allow the producers to reap the benefits of scale and thus makes it possible to reduce costs. This is supposed to affect productivity growth positively.

The above arguments show that trade liberalization is supposed to have a positive impact on the economic growth and there by introduction of openness measures has gained an important place among different countries. Thus, there arose a need to organize and also to coordinate various activities related to trade liberalisation and for that various international organisations emerged. A brief account of the important international institutions that emerged to promote the trade openness as well as to coordinate the policies followed by different countries is given in the following section.

The most important international organization developed after the Second World War was General Agreement on Tariff and Trade (GATT). It was signed in 1947 by 23 countries. India was one of the founder members of the GATT. It was concerned with the promotion of international trade through tariff reduction, doing a way with non discriminatory practices and evolving rules to counter protectionism. The guiding principle of GATT is the Most Favoured Nation clause. GATT provided for the reduction in tariff and trade restriction in a phased manner over a period of time and this task is accomplished in different rounds of trade negotiations held from time to time. The first round was held in Havana

in 1947. Eight rounds of multilateral trade negotiations were held and the eighth and last round was in Uruguay in 1986 known as 'Uruguay Round'.

Agriculture and textile and clothing have been brought with in the GATT fold in the Uruguay Round. The system of multilateral rules was extended to include Intellectual Property Rights and Services. The Uruguay Round did little to liberalise trade in agriculture and service. The three major areas with regard to market access for goods include liberalization of trade in manufactured goods, agriculture and textile and clothing. Both developed as well as developing countries have declared bound tariff on a large number of manufactured goods along with lowering of tariff rates. One of the major accomplishments of the Uruguay Round agreement is the Agreement on Textile and Clothing (ATC) which stipulates that the Multi Fiber Agreement (MFA) is to be phased out in three stages over a period of 10 years commencing January1, 1995, which would integrate trade in textiles and clothing.

The signing of the final Act of the Uruguay Round by member nations of GATT in April 1994 paved the way for the setting up of the World Trade Organisation (WTO) and an agreement to this effect was signed by 104 members. The WTO agreement came into force from January1, 1995 and India became a founder member of the World Trade Organisation. The main functions as set out in Article III are that the WTO shall facilitate and also provide the framework for the implementation, administration and operation of the agreement and of the Multilateral trade agreement. The second function is that WTO shall provide the forum for negotiation among its members concerning their multilateral trade relations in matters dealt with in the agreement. Another function is to administer the Trade Policy Review Mechanism. The administrative mechanism of WTO is divided into Ministerial Conference and General Council. The first Ministerial Conference was held in Singapore in 1996. The second conference was held in Geneva in 1998. The next Round was in

Seattle in 1999. The fifth WTO Ministerial Conference was held in Cancun, Mexico from September 10 to 14, 2003 and it was a mid term review of Doha development agenda, the fourth conference. The debate at Cancun was focused on two main issues like liberalization of agriculture and developing new multilateral discipline on the Singapore issue. These issues were raised by the developed countries in the first Ministerial Conference on the issue of investment, competition policy, government procurement and trade facilitation would merely be studied and that there were no negotiating mandates needed. This issue was opposed by the developing countries under the leadership of India and the developing countries succeeded in this attempt.

One of the key principles of WTO is nondiscrimination, i.e., any barriers to trade should apply equally to all member countries. There are four important exceptions to this vital principle. First, developed countries can give tariff preference to Less Developed Countries. Second, countries entering into regional free trade agreements do not need to extend the preference negotiated on an MFN basis. Third, countries can invoke a temporary safeguard protection to one of its industries suffering serious injury due to a surge of import. Fourth, temporary quantitative restrictions are allowed to deal with serious balance of payment problems. The ultimate objective of WTO is to remove all sorts of trade barriers, starting with tariff, to make free trade among all nations possible so that all markets are fully integrated and globalised and governments are obliged to accept unprecedented constraints on their autonomy.

Depending upon the major areas open for negotiation in the Uruguay Round, the WTO agreement can be divided into the following categories. (i) Agreement on agriculture, which provides the framework for long term reform of agriculture trade and domestic policies with the objectives of introducing, increased market orientation in agriculture trade. (ii) Agreement on trade in textiles and clothing (Multifiber Agreement). This provides for the phasing out

of the import quotas on textiles and clothing in force under the Multi Fiber Arrangement by the end of the transition period on January 1, 2005. (iii) Agreement on Market Access, in this the member nations will cut tariff on industrial and farm goods by an average of about 37 per cent. (iv) Agreement on Trade Related Investment Measures (TRIMS) calls for introducing national treatment of foreign investment and removal of Quantitative Restrictions. (v) Agreement on Trade Related Intellectual Property Rights (TRIPS). Prior to the TRIPS agreement, the intellectual property rights concerning the trade were governed by the Paris Convention of 1863, which was revised up to 1967. (vi) Agreement on services, the trade in services like banking, insurance, travel, maritime transportation, mobility of labour, etc. has been brought with in the negotiation and it is brought under the General Agreement on Trade in Services (GATS) rule.

These are some of the institutional arrangements developed for promoting the trade liberalisation efforts. Even then the efforts to liberalisation measures, reasons for its introduction, design of the reform package, benefits and its impact will be different for different countries. When, why, and how the reform process was carried out across the countries is explained below.

In most of the East Asian economies, trade liberalization efforts were made in the early 1980s. Reforms in South Asia were relatively slow and retained an anti-export bias. Taiwan was the first developing country to shift to outward orientation in the late 1950s by unifying and devaluing the exchange rate and adopting measures which gave exporters more or less free trade status. Korea followed Taiwan with a five-year lag and by 1985 she had removed most Quantitative Restriction (QRs) and tariff levels. Sri-Lanka is an exception in South Asia who replaced all QRs by 1977 and by mid 1980s there were no bans, import quotas and domestic content requirements. In Malaysia, Thailand and Indonesia, a situation of strong external payments created an impetus for trade reforms. In Philippines, the motivation for the reform came from the balance of

payments disturbances. India started providing easier access to imports as early as the late 1970s. However, major trade liberalisation attempts only occurred in the early 1990s. Turkey responded in the 1980s to the debt crisis by undertaking a stabilization program wherein reform of trade and payments policies was a key component. The character and pace of trade reforms differed from country to country reflecting differences across the Asian countries in the level of development

The reasons for introduction of reforms varied among the different countries. It signaled a new phase of development for some countries (eg. China). For many countries, the reform measures were undertaken as part of macro economic stabilisation in response to economic crises faced by these countries (e.g. number of countries in Latin America and Africa). In launching these reforms, there was an active collaboration of the Bretton Wood institutions, i.e., International Monetary Fund and World Bank. The common element among all these countries has been the outstanding effort of their government in launching these reforms though they were not following the same mix of policies. The policy approach varied in different countries due to initial conditions for introduction of reform , potential political coalition, institutional capabilities, policy preferences and degree of international support. Due to these reasons the outcome and experience also varied among the countries.

In designing and sequencing reform it is important to consider whether trade liberalisation and stabilisation are compatible and whether the fiscal deficit and inflation should be reduced before trade policy reform is introduced. To the extent that tariff reduction leads to revenue losses, liberalisation can increase the deficit and lead to inflation (World Bank 1988)⁴.

⁴ World Bank (1988) *World Development Report*, New York, Oxford University Press.

Trade policy reform more than just reducing and stream lining border barriers, also requires developing institutions. Thus to take advantage of the opportunities created by open trade regime there is need for institutional capacity which is in short supply in developing economies. In addition, supporting policies are likely to be needed to alleviate adverse impact on particular group. Globalisation is likely to be sustainable only if it is accompanied by policies that equip people to take advantage of the benefits offered by increased integration with the rest of the world economy.⁵

The benefits that derive from the trade openness also attracted the attention of the economists and policy makers and there also exists difference of opinion among them. Mostly the benefits of openness were analysed from two alternative perspective, first from the traditional trade theoretic view point of the efficiency enhancing role of free trade in a static context and second from the perspective of growth accounting and inter temporal efficiency and welfare. International trade economists have typically argued that an open trade regime is very important for economic development. This view has been based partly on neoclassical trade theory, which generally finds that a country improves its welfare from trade liberalisation, and partly on casual empirical observation, that countries which remains highly protected for long periods of time appear to suffer significantly.

The proponents of a neutral trade regime predict gains in manufacturing productivity from outward looking trade policies. Outward trade orientation brings about familiarity with new technologies, induces capacity utilization as well as scale benefits via production for export markets and brings about international competition. These in turn are expected to result in productivity improvements in the industrial sector. A number of theoretical arguments linking

⁵ Dan, Rodrik (1996) Trade and Industrial Policy Reform in Developing Countries: A Review of Recent Theory and Evidence *In* Behrman, J and T.N Srinivasan (eds) *Hand Book of Development Economics and Trade*, North Holland

trade liberalisation with higher rate of industrial productivity growth can be put down. These are (i) those that affect productivity growth via scale benefits arising from correcting the domestic-relative price ratio in favor of the comparatively advantaged sectors. (ii) Those, which help to improve productivity via the reduction in managerial slackness due to competition and (iii) those that allow imports embodying superior technology to improve productivity.

The openness also helps to reduce the barriers of trade. In general, when markets are functioning effectively, this will result in a reduction in the domestic price of the liberalized good, by either making cheaper foreign goods available or reducing the rents that may have previously been captured by domestic producers. It can also increase the production and can allocate the resources efficiently. Even if openness only refers to the goods market, liberalization allows improved access to the ideas and technologies embodied in foreign goods. Such access can, in principle, enhance a country's technological capability and assist productivity improvement.

The main objections that have been raised against openness to international trade are; some sectors are dominated internationally by a relatively small number of large multinational enterprises. Many developing country governments fear that trade liberalization will enable large foreign companies to eliminate small domestic rivals through anti-competitive behaviour, even when those domestic companies are efficient. After domestic rivals have been removed, such companies could then be in a position to charge monopoly prices. Increased openness precludes the possibility of trade measures to protect strategic industries. Many East Asian economies used trade protection to stimulate investment and productivity improvements in industries with strong potential for technological capability. In the same way, as some commentators argue that capital market liberalization played a role in facilitating large and rapid capital outflows that precipitated the Asian crisis of 1997–98. It is said that

trade liberalization may increase terms-of-trade volatility and, as a consequence, the volatility of GDP. Furthermore, long-term changes in the structure of the economy resulting from trade liberalisation could increase the concentration of economic activity, making countries more vulnerable to changes in world prices. Several countries oppose participation in multi-country trade agreements (rather than openness itself) because of the loss of sovereignty involved.

Though trade liberalisation efforts are subjected to objection, most of the countries have recognized its importance as a means to promote the trade. Trade policy reforms launched by the developing countries, which form part of the privatization and liberalisation policies, aim to accelerate the economic development. This can be realised through improved international competitiveness, increased efficiency in the allocation of resources, stimulating domestic saving and investment and the strengthening of technological capabilities and exploiting dynamic comparative advantage. On the external sector, liberalisation consisted of measures such as reduction of export controls and state trading, the removal of import quotas, import licensing and other quantitative restrictions and reduction of the level and the variability of import tariff rate.

From the above discussion it is clear that the reasons for introduction of trade reform, objectives and policies followed by different countries were not similar. Various trade policy packages followed, its measurement and the main instruments used for measuring the impact of trade liberalisation by different countries are given below.

Trade policy relates to the overall structure of incentives to produce and consume and hence imports or exports tradeable goods and service. It typically serves the long run objective of growth and development. Trade policy is therefore usually closely linked to policies on both local and foreign investment, technology and particular sectoral objectives like industrial policy, agricultural

policy, regional policy, etc. In general, trade liberalisation has been equated with becoming more 'outward oriented'. Liberal outward looking trade policies can lead to a higher economic growth through efficient industrialization of developing countries, only if they are accompanied by appropriate fiscal, monetary and exchange rate policies. The classical economist discussed the gains from trade in their work and advocated the policy of free trade. In his principles of Political Economy (1848), J.S.Mill discusses the gains that result from 'Foreign Commerce', which Mill further classifies into direct and indirect gains. The indirect gains from trade termed as 'benefits of high order' arise when a country which produces for a larger market than its own, can introduce a more extended division of labour, can make greater use of machinery, make use of more inventions and improvements in the process of production.

Pritchett (1996)⁶ argues that the term trade liberalisation tends to be interpreted in three broad ways. Countries may be considered more outward oriented if their trade reforms imply a move towards neutrality, liberality or openness. A move towards neutrality involves equating incentives, on an average, between the exporting and import competing sectors. A more liberal regime is one where the level of intervention has been reduced. Finally an increase in openness is equated with an increase in the importance of trade in the economy (as a percentage of GDP). Harrison (1996)⁷ suggests that a good measure of trade policy ought to capture the difference between neutral, inward oriented and export promoting regime.

The interaction between trade and commercial policies and macro economic policies is considerable and complex. Macro economic policies were related to the short term as well as long term achievement of overall internal and external balances.

⁶ L. Pritchett (1996), "Measuring Outward Orientation in LDCs, Can it be Done?", *Journal of Development Economics*, Vol. 49, pp307-335.

⁷ A.E. Harrison (1996), "Openness and Growth: A Time Series Cross country Analysis for Developing Countries", *Journal of Development Economics*, Vol.48, pp. 419-447.

The two principle instruments of macro economic policy are aggregate demand (monetary and fiscal) policies and exchange rate policies. Trade and macroeconomic variables are strongly inter-related and interdependent.

Empirical measurements of the impact of trade policies have frequently been treated in terms of change in input or output mix rather than in terms of different policy regime. It is common to assume that there is a one to one relationship between output mix and policy, that is output mix actually revealed by policy. Obviously, there are many factors that influence upon output and output mix besides government policy. A simple measure of policy episode in different countries and time period is not easy to find out. The principal traditional summary measures of the orientation of trade policy and conceptually the simplest is that favoured by Bhagwati, Kruger and the World Bank-; the degree of anti export bias' as measured by relationship between the exchange rate for a country's export, allowing for all taxes and subsidies and that for its import. Trade interventions in developing countries are of two types, tariff and Non Tariff Barriers (NTB). Import tariffs are simply indirect taxes, which apply on a discriminatory basis, to imports. They may be ad valorem or specific. The range of instruments that qualify as non-tariff barrier is diverse, with some being fiscal, some quantitative, some involving monitoring and so on.

Direct price comparison and the coverage or frequency ratio of imports are used to measure non tariff barriers. Tariff barriers to trade are measured as either nominal or effective rate of protection. The tariff often used is either the published tariff rate or the collection rate, which is total import duty divided by the value of imports. The trade policy measurements based on black market premium is also used for measuring trade policy. Other important measures used for measuring trade policy are Trade Restrictiveness Index, Heritage Foundation Index, Index of Trade Liberalisation, Outward Orientation index, and Sachs-Warner openness index.

Thus it is clear from the discussion that the ultimate aim of trade liberalisation is the reduction of various restrictions on trade and thereby promotion of exports.. More specifically trade reform comprises of policies and institutional framework to reduce the barriers of trade. It is also clear from the above explanation that trade reform has pros and cons on trade as well as on economic growth. In this study thus an attempt is made to examine the impact of trade liberalisation on exports from India.

Trade policies in India has undergone many changes since Independence and liberalisation has been a key ingredient of recent economic policies in India. Earlier, India like many other developing countries based her industrialization and development strategies on inward looking policy of import substitution. There has been a phase of inward looking import substitution strategy relying on high tariff and non- tariff barriers from the 1950s until around 1980s. There has been a gradual shift in policy since then and it changed into a structural adjustment programme in the 1990s. The dismantling of the high tariff barriers as well as changes in trade and industrial policies occurred during the period since 1990. This might have far reaching changes in the trade and trade related sectors of the country.

Chapter II

Theoretical Framework and Review of Literature

- 2.1 Theoretical Development
- 2.2 Empirical Studies
- 2.3 Importance of the Study
- 2.4 Objectives of the Study
- 2.5 Hypotheses

Role of trade in economic development is becoming more and more important. So there are also a number of academic works examining various issues of trade. In this chapter, important theoretical and empirical works on trade performance and determinants are reviewed.

2.1 Theoretical Development

Analysis of trade behavior raises two types of issues. The first issue refers to the analysis of the determinants of trade behaviour at the various levels of trade activity, i.e., the issue of why do nations trade? What commodities do they trade, with whom they trade? etc. The second type of question is concerned with what should be the choice of commodity composition of imports and exports, choice of exporting and importing firms, choice of trade strategies or policies. Trade theory has developed in both directions, beginning from the classical analyses of Torrens, Ricardo (1821), J.S.Mill (1902), etc. Several labels have been assigned to the different schools of thoughts in trade theory, such as classical, neo-classical and modern, neo-factor-proportion, neo-technology, orthodox, modern, etc. The general features of the whole trade theory described in the label 'Pure Theory of International Trade' encompass all the school of thought¹.

The question of identifying the determinants of trade has occupied the minds of economic theorists ever since Torrens, Ricardo, Mills, etc. The Ricardian frameworks consider only one factor of production via labour and assume constant returns to scale. Ricardian theory recognizes differences in technologies and demand condition between the countries. The distortions introduced by trade policies are not recognised in it.

¹ Nicholas, Perdikos and Williams A Kerr (1998) *Trade Theories and Empirical Evidence*, Manchester University press.

After more than a century of Ricardo's theory, another landmark in trade theory is the Factor Proportion Theory associated with the works of Heckscher (1919), Ohlin (1933) and Samuelson (1948). The main contentions of this theory are that a country exports the product, which uses relatively more of a factor that is relatively more abundant in it and imports the other products. Suppose, two countries A and B, produce two goods products X and Y, country A is relatively more capital abundant i.e., $K_A/L_A > K_B/L_B$. Where K_A , K_B denotes the capital endowments of the two countries and L_A and L_B their corresponding labour endowment. Let product X be relatively more capital- intensive i.e., $K_X/L_X > K_Y/L_Y$, where K_X and L_X and K_Y , L_Y denote factor use per unit in the production of X and Y. The Heckscher- Ohlin- Samuelson proposition states that capital abundant country A would export the relatively more capital intensive product X and import the relatively less capital-intensive product Y. The proposition is based on a number of simplifying assumptions like identical production function, absence of scale economies, identical demand condition, absence of tariff/ trade policies etc.

In spite of the tautological nature of the Factor Proportion Theory, much of the work in theory was spread around it. Samuelson's factor-price equalisation theorem (1948), Jones (1958) extension of the H-O theorem to cases of more than two factors and product and Leontief Paradox (1953) are based on the factor proportion theory. However, some extension of the H-O theory has provided some deeper insight into the explanation of trade behavior like human skill, natural resource with capital and labour factor. But the extension has been basically within the framework of the factor -proportions theory. However, there have been some sporadic attempts to depart from the basic premises of the H-O theorem. The thought underlying these attempts could be classified into five main groups: (i) Neo-technology (ii) Social physics school, (iii) Revealed

Comparative Advantage Approach, (iv) Approach of Effective Protection and Domestic Resource Costs and (v) others.

In the Neo-technology school, there are three main approaches to the introduction of technology factor in the analysis of trade flows. In the first one, differences in scale economies as between the product and the two trading countries are recognised as the significant determinants of trade flows: this approach is discussed by Ohlin (1967) Dreze (1960) Hafbaur (1970) and Keesing (1968). In this, the size of the market and degree of scale economies in production determine the pattern of trade. In the second school of thought, identified as the 'stage of production hypotheses', it is suggested that the degree of sophistication determines the nation's trade flows. But this theory does not provide adequate explanations for the measurement of degree of sophistication. The third major formulation in the neo- classical school may be termed as the technology gap and product cycle theories to which major contributions are made by Tucker (1774), Kravis (1956), Posner (1961), Haufbaur (1970), Douglas (1966), Gruber- Mehta-Vernon (1967), Keesing (1967), Hirsch (1965), Vernon (1966) and Wells (1966). The main contention of this formulation is that countries pass through different phases with regard to technological levels, product diversification, product differentiation etc. Those countries, which have started early in the manufacture of new goods with differentiated characteristics, can have advantage in exporting them while those which lag behind, have to take up only standardised goods for export. The special advantage of the innovations and leaders determine the pattern of trade. The trade policy variable is omitted in this approach also. The bulk of the work in the neo technology theory exists only at a level of literary presentation. Barakakoti (1975)² has discussed the neo technology theory within the neo classical General Equilibrium framework by

² Barakakoti (1980) "Economic Methodology, Trade Theory and Policy" In, John Black and L.Alan Winter (eds) *Policy and Performance in International Trade*, Macmillan India Ltd., New Delhi

presenting a sample exposition of the mechanism in which the process and product innovation dynamically generate international trade.

Fundamental departure from the premises of the factor proportion and neo technology school is found in the formulation of the social physics school. Suggestion to apply the analogy of the concept and the theory of physics to social science were first made by Marshall himself in using the concept of equilibrium, stability, statistics and dynamics. More explicit contribution in this context is made by Carey (1958) who discussed the principle of social sciences with the analogy of those of physics. Reilly (1929) and Stelwart (1947) have made significant contributions in analysing the economic phenomena, such as retail trade, interaction between social groups etc. by using the theories of physics. The first attempt in using the concept of gravitational force, gravitational energy, gravitational potential etc. in the field of interregional movement of goods and services was made by Isard and Bramhal (1957). Their model is known as Gravity model. Population, distance between two regions etc are used in the formulation of the model. An extension of this formulation was made by Pentti Poyhonen, Kyosti Pulliainen and Stig Eric Bergsteon (1961;1963) by including variables like national income, transportation cost, etc. Jan Tinbergen extended the basic Gravity model by introducing the trade policies such as preference for trade agreements, etc. Hans Linnemon (1966) extended Tinbergen's model by introducing the concept like potential supply, potential demand and trade impediments. Social physics school has made significant contribution to trade theory but this school has confined its analysis to the aggregate level (GDP, Population) and all other determinants of trade flows are not introduced explicitly.

The revealed comparative advantage theory pioneered by Balassa is the first attempt to recognise explicitly that trade flows are the final effect of a multiplicity of factors and that the pattern of comparative advantage of country

can not be identified well by examining only one or two determinants of trade flows but by analysing the observed trade flows in totality, based on the concept of revealed preference in value theory. It is suggested that observed trade flows of a country among a group of countries should be used to construct indices of revealed comparative advantage.

Development of trade theory has been enriched by the contribution of new concept such as Effective Rate of Protection (ERP) and Domestic Resource Cost (DRC). These concepts have emerged largely in the context of analysing the effect of trade policies on the domestic production activities and trade flows. Effective rate of protection is aimed at measuring the net effect of the protection policies on the production activity by taking into account their incidence both on the input and output. As against this, the degree of protection gives the incidence of protection policies only on the output side. Nominal rate of protection is measured by the implicit tariff defined as percentage excess of the domestic price of a product over its international price. Effective rate of protection of a production activity is defined as the percentage excess of the activity in domestic prices in terms of value added over that of international prices.

Thus, ERP measures the degree to which the rewards to the primary factors of production are made in the protected situation as compared with that in the free trade situation. Given the mobility of the factors of production as between the different production activities, they would move towards those activities, which have larger ERPs away from those, which have lower ERPs. The sectors, which have relatively larger ERPs, attract relatively more resources. Based on this argument, the ERP theory suggests that the different sectors should be ranked according to their ERPs so that the pattern of resource allocation introduced by the trade policies etc. can be identified. It may be noted that ERPs of the different sectors would differ from each other for the following reasons: (i) the technologies as introduced by the Leontief input coefficient are different. (ii)

Implicit tariff for different inputs is not uniform but they vary among themselves. The latter differences are largely due to the different incidence of the trade policies on the domestic price of different commodities. Thus, ERP theory implicitly recognises the role of technology factors and trade policies as determinants of resource allocation. The pattern of comparative advantage and hence the trade flows are not directly derived from the structure of ERP. It is only the net incidence of the protection system on the production activities that are measured by ERPs. However there are some attempts to estimate the exportable surplus or the import demand by using ERP estimate.

As against the ERP theory, the DRC approach is aimed at identifying the pattern of comparative advantage. DRC approach can be explained in terms of the techniques of benefit-cost analysis. The opportunity cost of domestic resources engaged in earning or saving of foreign exchange is defined as DRC. The domestic resources consist of the primary factors of production such as labour, capital and also of the non-traded inputs or the primary factors used in their production. Opportunity cost valuation is obtained by using the shadow price of the factors. The net earning or saving of foreign exchange is defined by the value of the output of tradeable products in international price minus the international value of imports used directly or indirectly in their production³.

The theoretical development and the determinants of trade according to various theories have been explained above and it is also clear that trade policy gained more importance in the modern theories.

³ V.RPanchamukhi (1978) *Trade Policies in India: A Quantitative Analysis*, Concept Publishing Company, Delhi.

2.2 Empirical Studies

In this section important studies related to trade performance and determinants with special focus on trade policy and trade reform is attempted. It examines both theoretical and empirical studies at aggregate, industry and firm level exports.

2.2.1 Data Structure

Pradhan and Saluja (1998)⁴ discussed different sources of industrial statistics in India, their limitations and the method of filling the data gaps. The source of data for the organised sector and unorganised sector of the manufacturing industry was also discussed.

Shanta and Raja (1999)⁵ provided various data sources available for corporate statistics. The study gives a detailed account of various databases like Central Statistical Organisation, Annual survey of Industries, Reserve Bank of India etc. The study concluded with certain suggestions to improve the existing database of Indian statistics.

Nagaraj (1999)⁶ examined the quality of data in Index of Industrial Production, Annual Survey of Industries, and National Account Statistics. The reliability of these data source is examined by using correlation coefficient method to time series of annual growth rate. The result showed that India's industrial data system has weakened over the years and many of the widely used indicators and presumed technical relationship have little empirical validity, which supported the perception of the deteriorating data quality.

⁴B.K Pradhan and Saluja, M R (1998) "Industrial Statistics in India: Sources, Limitations and Data Gaps", *Economic and Political Weekly*, Vol. 33, No.21, May 23-29, pp.1263-1270.

⁵ N.Shanta and Raja Kumar D (1999) "Corporate Statistics: The Missing Numbers", *Journal of Indian School of Political Economy*, Vol. 11, No.4, pp.655-658.

⁶R. Nagaraj (1999) "How Good Are India's Industrial Statistics? An Explanatory Note", *Economic and Political Weekly*, Vol. 34, No.6, February 6, pp. 350-355.

Roy (2001)⁷ focused on the various dimensions of trade database and opined that India's trade database suffers from lack of consistency due to reasons ranging from sample bias to coverage of data. The article suggested that apart from adjustment in coverage and survey designs, harmonisation of data across production, trade and prices would make the database compatible with the emerging economic system. The article covers the areas like comparison of RBI and DGCI&S, advantages and limitations of DGCI&S data, production and trade data synchronisation, index of trade, etc.

Veeramani (2001)⁸ attempted to provide guidelines for compiling data from different sources to produce a harmonized database. It raised certain relevant research issues on international trade in relation to domestic industrial structure, attempted a critical assessment of various available data sources for empirical analysis and highlights the advantage of choosing certain specific sources like Director General of Commercial Intelligence and Statistics (DGCI&S) which provides data on India's foreign trade, Annual Survey of Industries, which provide data on industrial characteristics and PROWESS which provides data on firm characteristics.

2.2.2 Trade Policy and Trade Theory

Rostan (1985)⁹ published quantitative analysis of a sample of 52 developing countries to answer the question whether the outward orientation promoted growth. His result showed that for the period 1967-70 when world market conditions were generally favourable, there was a strong positive correlation between export orientation and growth performance. However, for the period 1973-79, when world market conditions become more favourable the

⁷ S.Sinha Roy (2001) "India's Trade Database: contours, Inconsistencies and Ways Ahead", *Economic and Political weekly*, Vol. 36, No.1, January 6-12, pp 51-58.

⁸ C.Veeramani (2001) "Analysing Trade Flows and Industrial Structure of India: the Question of Data Harmonisation", Working Paper No.321, Centre for Development Studies, Thiruvananthapuram

⁹ Kavoussi Rostan (1985) "International Trade and Economic Development: The Recent Experience of Developing Countries", *The Journal of Development Areas*, vol.19 pp 1859-64.

correlation was weak. These results seem to imply that when external demand is weak, gains from openness are likely to be offset by its negative effects. On the other hand when the world demand is strong the benefits of openness clearly outweigh its dangers.

Krueger (1990)¹⁰ opined that despite the very significant trend towards increased liberalisation of trading regime by developing countries, little has been gained in terms of negotiated liberalisation on the part of developed countries. During the 1960s and 1970s, failure to negotiate reciprocal negotiation was probably not important due to both the small amount of trade carried out by the developing countries and the industrial countries were in any event undertaking major liberalisation of their trade and payment regime.

Meier (1990)¹¹ considered political economy aspect of trade policy in the less developed countries. The study concluded that neither the old political economy nor the new political economy nor syntheses of old and the new is yet fully satisfactory. The models of the new political economy need to be made more relevant for the developing countries and more application to empirical case studies is required as the subject is in rudimentary stage.

Michaely *et al.* (1991)¹² used before and after trade liberalisation approach with reference to 17 countries. They found that there occurred a fall in manufacturing output in the first period and then a recovery in the second period. The authors also found a strong correlation between trade liberalisation and rapid export growth. In most cases manufacturing export growth fell during the first years of liberalisation.

¹⁰ Anne O.Krueger (1990) "Trend in the Trade Policy of Developing Countries", In Charles S. Pearson and James Riedel, (eds) *The Direction of Trade Policy*, pp.87-107, Basil Blackwell, Oxford.

¹¹ Gerald, M.Meier (1990) "Trade Policy Development and the New Political Economy" In Ronald W. Jones and Anne O. Krueger, *The Political Economy of International Trade* (eds) Basil Black Well, Oxford.

¹² Michaely, M. Papageorgias D and Choksi A.M (1991) *Liberalising foreign trade: Lessons of Experience in the Developing World*, Basil Blackwell, Oxford

Streeten (1991)¹³ explained the structural adjustment issues like adjustment for what, of what, who benefits, who lost and how the adjustment is. He opined that the nature of adjustment policies that comprise measures additional to stabilisation such as the reduction of tariff, the elimination of control on wages and prices, the creation of institutions to facilitate export credit etc. aimed at increasing the capacity to export.

Elhanan and Rasin (1991)¹⁴ expanded and tested the new trade theories that have developed during the last decades incorporating the elements of industrial organization and political economy in order to study the trade structure and formation of trade policy. The study also addressed issues like trading blocks, strategic trade policy, political economy of protection, growth oriented trade policies, etc.

Thomas and Nash (1991)¹⁵ synthesised the conclusions of various earlier studies on trade policy reforms with a study by the World Bank analysing reform in developing countries particularly those supported by adjustment lending programmes. The article reviewed conditions these countries had before trade policy reforms were implemented and examined how such reform actually took place. The survey also considers the most important issues in designing and implementing trade policy reforms and concluded that although past reforms had positive impact, future programme should emphasise three elements; reducing the level of protection, maintaining macro economic stability and accounting for the conflict and complementarities with other policies. Attri (1992) critically

¹³ Paul, Streeten (1991) "Structural Adjustment: A Survey of Issues and Options" In Hans Singer, Neelamper Hatti and Rameswar Tandon (eds) *Adjustment and Liberalisation in the Third World* pp 53-119, Indus Publication Company, New Delhi.

¹⁴ Elhanan, Helpman and Assaf, Rassin (1991) *International Trade and Trade Policy*, The MIT Press, England.

¹⁵ Vinod, Thomas and John Nash (1991) "Reforms of Trade Policy, Recent Evidence From Theory and Practice", *The World Bank Research Observer*, Vol.6, No.2, pp 219-240.

examined the prominent existing literature on trade liberalisation in order to arrive at a set of attributes essential for successful trade liberalisation¹⁶.

Rodrick (1992)¹⁷ opined not to give more importance to trade reforms as a cure for all economic problem, just as developing countries embraced protectionist policies in the 1950s and 1960s as a holistic solution to the problem of development. The hypotheses of his study were that trade policy played a rather asymmetric role in development and concluded that the role of trade policy was not so favourable.

Bleaney (1993)¹⁸ examined whether developing countries lost the potential gain from liberalisation through adverse movement in terms of trade and concluded that a global policy shift in the developing world towards greater outward orientation may depress the price of agricultural commodities and hence worsen the terms of trade of developing countries. The direct income effect of this was likely to be small, but the indirect effects working through a tightening of balance of payment constraint could be of considerable significance and may entirely offset the expected gain from trade liberalisation.

Bhagwati and Srinivasan (1999)¹⁹ systematically examined the theoretical and empirical studies relating to the issue of growth, trade openness and related issues. The study concludes that cross- country regression methodology used for the analysis suffers from drawbacks like weak theoretical foundation, poor quality of database and inappropriate econometric methodologies. They concluded that the most compelling evidence on the issue can come only from

¹⁶ V.N Attri (1992) "Trade Liberalisation in Developing Countries: A Literature Survey", *Indian Economic Journal*, and Vol.39, No.3 pp41-37.

¹⁷ Dani Rodrik (1992) "Limits of Trade Policy Reform in Developing Countries", *Journal of Economic Perspectives*, Vol.6, No.1, pp. 87-105.

¹⁸ Michael, Bleaney (1993) "Liberalisation and Terms of Trade of Developing Countries: A Cause for Concern?" *The World Economy*, Vol.16, No.4, pp453-466.

¹⁹ T.N.Srinivasan and Jagdish Bhagawati (2001) *Outward-orientation and Development: Are Revisionist Right?* Discussion Paper No.806, Economic Growth Centres, Yale University.

careful case studies of policy regime of individual entries such as those of OECD, NBER and World Bank

Harrison and Hanson (1999)²⁰ focused on three unresolved issues with regard to the impact of trade reforms. First, many studies linking trade reform to long run growth is surprisingly fragile. Second, puzzle identified was the small impact of trade reform on employment in developing countries. Finally, they analysed evidence on the relationship between trade reform and rising wage inequality, focusing on the 1985 Mexican trade reform. It was found that wage inequality in Mexico rose after the reform, which was puzzling in a Heckscher-Ohlin context if Mexico has a comparative advantage in producing low skill intensive goods.

Panagariya (1999)²¹ discussed the recent trade reforms and future trade policy agenda in the four largest countries in South Asia, Bangladesh, India, Pakistan and Sri Lanka. In terms of Non Tariff Barriers (NTB), Bangladesh, Pakistan and Sri Lanka have achieved the levels comparable to their East Asian counterparts. India still lags behind underlining the need to urgently address the liberalisation of its consumer goods sector. With the exception of Sri Lanka, tariff in South Asia is high and thus there is considerable room for reduction, compression and rationalisation. A key issue that needs to be addressed adequately at least in the case of India is the simultaneous reform of domestic-tax regime especially exercises tax.

Anderson and Neary (2003)²² introduced an index of trade policy restriction defined as uniform tariff that maintains the same trade volume as a given tariff or quota structure. Their index, Mercantilist Trade Restrictiveness

²⁰ A Harrison and G. Hanson (1999) "Who Gains From Trade Reform? Some Remaining Puzzles", *Journal of Development Economics*, Vol.59, No. 1, pp. 125-154.

²¹ P.Panagariya. (1999) "Trade Liberalisation in South Asia: Recent Liberalisation and Future Agenda", *The World Economy*, Vol.22, No.3 pp 353-78

²² James E Andersen and Peter Neary (2003) "The Mercantilist Index of Trade Policy", *International Economic Review*, Vol.44, No.2, pp 627-649.

Index (MTRI) overcomes the problems of the trade weighted average tariff. It avoids substitution bias and correctly accounts for the general equilibrium transformation and takes import volume instead of welfare as benchmark. Empirical application to international cross section and time series components of trade policy confirmed their theoretical result. They found that trade weighted average tariff generally underestimates the true weights of tariff as measured by the trade volume- equivalent index, this in turn always underestimates the welfare equivalent index. The paper also presented an empirical application that showed how the Mercantile Trade Restrictiveness Index could be implemented in a Computable General Equilibrium framework.

Bandaru and Yu (2003)²³ examined the desirability of free trade in South Asia. They examined whether SAPTA or SAFTA creates gains for its members or not, is it better for South Asian countries to promote non-discriminatory trade liberalisation than promote SAFTA. The study analysed various issues like welfare efficiency, production and export using trade data and global Computable General Equilibrium model (CGE), and concluded that while the impact of preferential trade liberalisation is very small, the impact of unilateral trade liberalisation is significant for South Asia. Under preferential liberalisation small countries will lose or gain marginally, while the biggest country in the region, India, will be the sole winner. This runs contrary to the findings of some of the previous studies that smaller countries in the region would gain from preferential trade liberalisation in comparison with India's gain.

Bhagwati (2004)²⁴ showed that globalisation is in fact the most powerful social goods in the world today. He is of the opinion that globalisation policies have not aggravated the social issues of child labour, women's rights, democracy and environmental problems.

²³ Jayatilleke S. Bandaru and Wusheng Yu (2003) "How Desirable is the South Asian Free Trade Area? A Quantitative Economic Assessment", *The World Economy*, Vol.26, No.9, pp1293-1323

²⁴ Jagdish Bhagwati (2004) *In Defence of Globalization*, Oxford University Press, New Delhi

Bhagwati and Srinivasan (1976)²⁵ examined India's foreign trade regime in its interaction with domestic policies to assess its efficiency and growth. The study concluded that India's foreign trade regime in connection with the domestic licensing policies in the industrial sector led to economic inefficiencies and impaired the economic performance.

Ahluwalia (1992)²⁶, Rao (1992)²⁷ and Sen (1992)²⁸ in their paper analysed the trade policy measures that existed in India till 1991. Ahluwalia examined the major building blocks of India's trade policy, critical gap in the overall policy regime as it evolved up to seventies, its reorientation in eighties and a broad assessment of the performance record. The paper also discussed the new economic policy measures with special reference to the significant role that is expected about trade policy in the new design. Rao analysed the economic reforms undertaken in India in 1991. He opined that trade reform and other economic reforms are good for any country. However their usefulness depends on a credible and stable macro economic framework and the institutions and other mechanism to implement and sustain the reform. Sen examined various trade policy measures that existed in India prior to the liberalisation and also major policy changes introduced in 1991.

Bhagwati (1994²⁹), Joshi and Little (1996)³⁰, Ahluwalia and Little (1998)³¹, Parikh (1999)³² were appreciative of the outcome of reform and support

²⁵ Jagdish Bhagwati and T.N Srinivasan (1976) *Foreign Trade Regime and Economic Development*, Macmillan Company of India, New Delhi.

²⁶ Isher Judge Ahluwalia (1992) "Trade Policy and Industrialization in India" In by Bibek Debroy, (ed) *Global and Indian Trade Policy Changes*, Pp 57-62 Annapurna Publications, New Delhi.

²⁷ V.L.Rao (1992) "Trade Reform: Global development and Indian Response Industrialisation in India" In Bibek Debroy, (ed) *Global and Indian Trade Policy Changes*, pp113-123 Annapurna Publications, New Delhi

²⁸ Pronab Sen (1992) "From Digism to convertibility, Analysis of India's Recent Trade Policy Changes" In Bibek Debroy, (ed) *India in Global and Indian Trade Policy Changes*, pp-163-182 Annapurna Publications, New Delhi.

²⁹ Jagdish Bhagwati (1994) *Indian in Transition: Freeing the Economy*, Oxford University Press, New Delhi

³⁰ V.Joshi. and I.M.D Little (1996) *India's Economic Reforms: 1991-2001*, Oxford University Press, New Delhi.

the faster implementation of the remaining issues on the reform agenda. But Ghuman (2003)³³ and Nagraj (1997)³⁴ criticised the reform and seek rethinking on the coverage, sequencing and implementation of the reform.

2.2.3 Measures of Trade Openness

The simplest measure of trade orientation is based on actual trade flows, such as import/ GDP, export/ GDP and exports and imports as share of GDP. Balassa (1985)³⁵, Miler and Upadyay (2000)³⁶ and Jin (2000)³⁷ used these measurements. Most of these measures showed a positive association with GDP growth. Barro (1991)³⁸ and Balla and Lau (1992)³⁹ used price based measures of trade policy. They used comparison between goods sold in the domestic and international markets as a measure of trade policy.

A subjective assessment of trade policy was undertaken by Sach and Warner (1998)⁴⁰, World Development Report Index (1987)⁴¹, Trade liberalisation index (Thomas1991)⁴² Heritage foundation index (Edward, 1998)⁴³. Sach and

³¹ I.J Ahluwalia and IMD Little (1998)(eds) *India's Economic Reform and Development: Essays for Minoan Singh*, Oxford University Press, New Delhi

³² Kirit Parikh (1999) *India Development Report, 1999-2000*, Oxford University press, New Delhi

³³ Ranjit Singh Ghuman (2003) "Globalisation and Developing Economies with Special Reference to India" In P.P Arya and B.B.Tandon (eds) *Economic reform in India Form First to Second Generation and Beyond*, pp31-51, Deep an Deep Publications, New Delhi.

³⁴ R.Nagaraj (1997) "What has Happened Since 1991: An Assessment of India's Economic Reforms", *Economic and political Weekly*, Vol.8, pp28-35

³⁵ Bella Balassa (1985) "Export Policy Choice and Economic Growth in Developing Countries After the 1973 Oil Shock", *Journal of Development Economics*, Vol.18, No.2, pp23-35

³⁶ S.M.Miler and M.P. Upadyay (2000), "The Effect of Openness, Trade Orientation and Human Capital on Total Factor Productivity", *Journal of Development Economics*, Vol.63, pp399-423.

³⁷ J.C.Jin (2000) "Openness and Growth: An Interpretation of Empirical Evidence From East Asian Countries", *Journal of International Trade and Economic Development* Vol.9, No.1, pp577-97.

³⁸ S.Barro (1991) "Economic Growth in a Cross Section of Countries", *Quarterly Journal of Economics*, Vol.106, pp.401-444.

³⁹ S.Balla and L.J Lau (1992) *Openness Technological Progress and Economic Growth in Developing Countries*, Working Paper No.12, World Bank, Washington D.C

⁴⁰ J.Sach and A.Warner (1995) "Economic Reform and the Process of Global Orientation", *Working Papers on Economic Activity*, vol.1 pp.1-118

⁴¹ World Development Report (1987), The world Bank, Washington D.C

⁴² V.Thomas, (1991) *Best Practices in Trade Policy Reform*, Oxford University Press, New Delhi.

⁴³ S.Edwards (1998), "Openness, Productivity and Growth: What Do We Really Know?" *Economic Journal*, Vol.98, pp 383-398.

Warner openness index is an index based on tariffs, quota coverage, black market premium, social organisation and existence of export marketing boards. While it suffers from criticism applicable to black market premium. Trade liberalisation index by Lopez, Thomas and Nash used an index with 1 for the case of highly repressed external sector and 20 when foreign trade is fully liberalised. World Development Report Outward Orientation Index is also subjective and is based on country attributes. This index classified countries into four categories according to the level of tariff and other distortions.

Some of the studies used the observed values of the variables associated with trade restrictions like tariff averages, Quantitative Restriction (QR) averages, collected tariff rates etc. Tariff is measured as import weighted average tariff rates (Whalee, 1993)⁴⁴. Edward (1993)⁴⁵ used collected tariff ratio i.e. ratio of total revenue on trade taxes on international trade to total trade. He also used QRs, i.e. average coverage of Non Tariff Barrier (NTB) as a measure of openness. Some studies argued that the Black Market Premia for foreign exchange as a good proxy for the overall degree of external sector distortion.

Edward (1992)⁴⁶ used Leamer's openness index, which measures openness as the deviation of actual trade pattern from those predicted by the country's endowment using Heckscher- Ohlin factor intensity model.

Dollars (1992)⁴⁷ constructed two indices (i) index of real exchange rate distortion, measured as actual price level divided by the predicted price level (ii) index of real exchange rate variability measured by the coefficient of variation in

⁴⁴ J.Wha-lee (1993) "International Trade Distortion and long Run Economic Growth", *IMF staff papers*, Vol.42, No.2 pp.299-328.

⁴⁵ S.Edward (1993) "openness, Trade Liberalisation and Growth in Developing Countries, *Journal of Economic Literature*, Vol.31, pp 1358-1393.

⁴⁶ S.Edward (1992) "Trade Orientation, Distortion and Growth in Developing Countries", *Journal of Development Economics*, Vol. 39, pp31-57

⁴⁷ D.Dollar (1992) "Outward Oriented Developing Economies Really Do Grow More Rapidly, Evidence from LDCs 1976-1985", *Economic Development and Cultural Change*, Vol.40 pp.523-542.

the index of price level. Balla and Lau (1992) used relative prices, the ratio of domestic and international price as a measure of openness.

Most of the studies used trade distortions in terms of export output ratio, import output ratio and import penetration ratios. Import penetration ratio is the ratio of import to domestic availability. Domestic availability is output plus import minus export. Some other studies used the direct measure of trade policy, (legal tariff ratio, nominal rate of protection and coverage ratio (percentage of import covered by license) eg. Kim (2000)⁴⁸. Share of export in total demand (export promotion) was used by Bonelli (1992)⁴⁹ and Norouz (2001)⁵⁰ used import substitution (share of import in total demand).

2.2.4 Exchange Rate and External Trade

Exchange rate policy has received considerable importance as a major policy instrument to combat with the balance of payment disequilibrium. As part of the ongoing liberalisation process exchange rate policy in India also underwent a significant change. One of the first measures in the process of liberalisation was that rupee was devalued to the extent of nearly 18 per cent. Devaluation as a policy instrument is basically intended to tide over the balance of payment difficulties. However, the controversy that surrounds the efficacy of devaluation/depreciation as a policy instrument in solving the problems in external front is still unresolved.

Ahum and Sakthivel (1999), Ghosh (1992), Sarkar (1992,1994) and Srinivasan (1998) found that the movement in exchange rate does not have

⁴⁸ E.Kim (2000) "Trade Liberalisation and Productivity Growth in Korean Manufacturing Industries: Price Protection Market Power and Scale Efficiency", *Journal of Development Economics*, Vol. 62, pp.55-83

⁴⁹ R. Bonelli (1992), "Growth and Productivity in Brazilian Industries: Impacts of Trade Orientation" *Journal of Development Economics*, Vol. 39, pp85-109.

⁵⁰ H.Norouz (2001) *Protection in Indian Manufacturing; An Empirical Study*, Macmillan India, New Delhi.

significant influence on exports and imports of India. Ghosh (1990)⁵¹ argues that real exchange rate has only exerted a marginal influence on the growth of export in SDR terms for the period 1973-74 to 1985-86. The study concludes that the emphasis on exchange rate as a vital policy instrument in improving current account deficit may not turn out to be successful. Sarkar (1992)⁵² also found no significant impact of devaluation /depreciation on exports and imports for the period 1971-1990, using simple regression models. Sarkar (1994)⁵³ used stationarity and cointegration techniques to examine the movement and relationship between exchange rate and export and import. The result showed that the movements in exchange rate do not have any meaningful association between export and balance of trade. Srinivasan's (1998)⁵⁴ analysis of India's exports over 1963-94 also found that real exchange rate appreciation negatively affected export performance. The result also suggested that the increase in GDP and overall world export have offset the negative effect of real exchange rate appreciation. Nag and Upadhyay (1994)⁵⁵ using monthly data for the period 1979 to 1993 examined the relationship between exchange rate and trade series. The study concluded that the exchange rate played an important role on trade performance of India. The stationarity test and cointegration test were used for the analysis. Sarkar (1997)⁵⁶ using monthly data for the period 1991-94 reached the conclusion that the movement in real exchange rate influenced the Dollar

⁵¹Ghosh, 1990: "Exchange Rates and Trade Balance Some Aspects of Recent Indian Experience", *Economic and Political Weekly*, Vol.9, No.24, pp 441-445

⁵² P.Sarkar (1992) "An Econometric Study of Trade Flows: A Case Study of ESCAP Countries", *Indian Economic Journal*, Vol.32, No.3, pp 15-23.

⁵³P.Sarkar (1994) "India's Balance of Payment and Exchange Rate Behaviour since 1971: A New Approach", *Economic and Political Weekly*, Vol.29, pp43-48.

⁵⁴ T.N Srinivasan (1998) "India's Export Performance a Comparative Analysis" In I.J Ahluwalia and I.M.D Little (eds.) *India's Economic Reform and Development: Essays for Manmohan Singh*, New Oxford University press, Delhi.

⁵⁵ Nag and Upadhyay (1994) "Exchange Rate and Trade Imbalances" *Economic and Political Weekly*, Vol.29, No.14, pp819-820.

⁵⁶ Prabijit, Sarkar (1997) "Foreign Trade and Real Exchange Rate Behavior, 1980-96", *Economic and Political Weekly*, May 17-24, pp 1133-1139.

value of export and import. Dholakia and Saradhi (2000)⁵⁷ examined the effect of exchange rate pass through and exchange rate volatility, important determinants of the effectiveness of exchange rate depreciation, in achieving the desired trade balance. The analysis was done with quarterly data from 1980 to 1996. The study used Augmented Dickey Fuller test and Philip Pernon test for the analysis and the result showed that export quantities responded positively and significantly to the exchange rate depreciation but the exchange rate and volatility do not have significant relation with the volume of import.

Marjit *et al.* (2000)⁵⁸ examined the currency devaluation and export performance of India for the period 1951 to 1994, using import statistics by simple regression methods. The analysis showed that the impact of exchange rate devaluation was strongly realised on reported sale than of actual export to U.S. Srinivasan (2001)⁵⁹ estimate the relationship between exports and the real exchange rate using a larger data set from 1960 to 1998. The study also showed the REER negatively though not significantly related to the export performance.

2.2.5 Tariff Rates Related Studies

The review of India's trade policy by the World Trade Organisation (WTO) in 1998 noted that about 32 per cent of tariff lines are subject to Quantitative Restriction based licencing, which for most of them act as import bans. The review also commented on escalations of tariff on the basis of extent of processing, i.e. lowest tariff on unprocessed goods (simple average tariff of 25 per cent in 1997-98 covering 12 per cent of tariff lines) a higher rate on semi processed goods (average 35 per cent in 1997-98) and a highest rate on processed goods (37 per cent covering 50 per cent of tariff lines), which ensures higher

⁵⁷ Ravindra H Dholakia and Raveendra Saradhi V (2000) "Exchange Rate Pass Through and Volatility, Impact on Indian Foreign Trade", *Economic and Political weekly*, pp4109-4116.

⁵⁸ Sugata Marjit, Basudeb Das Gupta, Sandip Mithra (2000) "Currency Devaluation and Exports, Separating the Actual from Statistical", *Economic and Political Weekly*, Vol.42, pp1553-1560.

⁵⁹ T.N Srinivasan (2001) *India's Reform of External Sector Policies and Future Multilateral Trade Negotiations*, Working Paper No.830, Economic Growth centre, Yale University.

levels of protection in the processed manufacturing sector than those reflected in the nominal rate.

Chopra *et al.* (1995) and Prusell (1996) made an international comparison of tariff rates. Chopra *et al.*⁶⁰ showed that India had the second highest level of the maximum tariff (65 per cent), next to Egypt and highest level of average tariff (55 per cent). The average tariff level ranged between 10 and 15 per cent for 6 out of 13 countries (Korea, Argentina, Chile, Malaysia, Thailand and Brazil) under study. Pursell (1996)⁶¹ has undertaken a comparison across 26 developing countries for the year 1993 for 13 broad product categories. He presented for each product category, the average tariff rate (unweighted) for 26 developing countries in respect to the post Uruguay Round (UR) applied rate and bound rate. Four points emerged from the study (i) India's actually applied rate ranks highest or second highest for all the thirteen product categories among 26 developing countries, (ii) India's average tariff rate in absolute terms is more than twice as high as the average of actually applied rates by the 26 developing countries for all the product categories, (iii) the post Uruguay Round bound rate negotiated by India is invariably higher and for some products much higher than the average of the post UR bound rate of the 26 developing countries. (iv) for all the product categories put together, the average applied tariff rate of 51.6 per cent for India is not only the highest but also nearly three times as high as the average level of 19.2 per cent for sample countries.

World Bank (2000)⁶² provided the sectoral share of import affected by non-tariff barriers (NTBs). The average weighted share of imports for all the sectors covered in the study and covered by NTBs estimated come down

⁶⁰ A.C. Chopra, Collyn, R. Hemming and K. Parker (1995) *India's Economic Reform and Growth*, IMF Occasional paper No.134, Washington D.C.

⁶¹ G.Prusel (1996) *Indian Trade Policies Since the 1991/92 Reform*, World Bank, Washington D.C.

⁶²World bank (2000), "Policies to Reduce Poverty and Accelerate Sustainable Development", World Bank, Report No.194, Washington D.C

significantly in all the sectors classified according to activity (primary, secondary) according to industries and according to use based activities. In 1999-2000, it was still high as 56 *per cent* in consumer non durables, 27 per cent for consumer durables, 16 per cent for basic goods and 14 per cent for capital goods. World Bank Report also provided an international comparison of tariff for the year 1998, for large countries with population over 20 million. It showed that India had the second highest average tariff rate next only to Argentina and higher than Asian and Latin American countries.

Aggarwal (2004)⁶³ suggested that tariff cuts are not expected to benefit India's export to the US in a major way by using ISIC 4 digit level of disaggregation. The study concluded that increase in India's export was mainly due to the competitive factor and the market effect of tariff reduction was small for most of the items, which displayed significant price elasticity in India's case. Due to insignificant market penetration effect of tariff reduction a number of products of India's exports are not price responsive despite the response of US market to the tariff changes.

2.2.6 Trade Liberalisation and Export Performance

Ahuja (1993)⁶⁴ examined the performance of India's export after the introduction of liberalisation programme. The study covers the periods from 1990-91 to 1993-94 for major export items. The study examines the trade policy announced during the period and its effect on export and concluded that the success of liberalisation was contingent upon the way in which the units are motivated to respond to the structural changes under way in the economy. The author also opined that even though exports are given a vanguard role in the

⁶³ Aradhana Aggarwal (2004) *Impact of Tariff Reduction on Exports: A Quantitative Assessment of Indian Export to U.S*, Working Paper No.120, Indian Council for Research on International Economic Relations, New Delhi.

⁶⁴ Shobja Ahuja (1993) "Lberalisation of Trade in services, the Revealed Comparative Advantage Approach", *Foreign Trade Review*, Vol. 38, No.1, pp43-58

scheme of development, priorities are still confronted with ill-defined policy parameters on the export sectors.

Mehta (1993)⁶⁵ attempted to analyse the impact of trade policy reform. The trade performance in the post 1991 scenario was analysed in terms of selected commodities for export and import for the period from April to December 1991.

Singh (1994)⁶⁶ focused attention on the positive link between import liberalisation and export promotion. The author surveyed the existing literature on import intensity in Indian industries and tried to assess the impact of import intensity on export. The study concludes that import liberalisation has a positive impact on export of chemicals and chemical products, cotton textiles and engineering industries.

Hajra and Senate (1997)⁶⁷ examined fifty years of India's foreign trade performance since 1940. The study gave a detailed account of trade performance, policy change and balance of payment scenario of India for different decades since 1940. The paper concludes that the trade policy has positive impact on India's foreign trade and competitiveness of India's export in particular.

Muneesh (1997)⁶⁸ presented an analytical over view of Balance Of Payments (BOP) developments and the concomitant evolution of external sector policies since Independence.

Kantawala and Padaria (1999)⁶⁹ examined the critical points of trade liberalisation policy with special reference to Indian experience. The study

⁶⁵ K. S Mehta (1993) *Liberalisation and India's Export Competitiveness*, Macmillan India Ltd., New Delhi.

⁶⁶ D.Singh (1994) "Impact of Import Liberalisation on Exports", *RBI Occasional paper*, Vol.1 No.1.

⁶⁷ Sujana Hajra and David L.Senate (1997) "Fifty years of India's Foreign Trade: Issues and Perspectives", *Reserve Bank of India Occasional Papers*, Vol.18, No. 2 &3.

⁶⁸ Muneesh Kapur (1997) "India's External Sector Since Independence: From Inwardness to Openness", *Reserve Bank of India Occasional papers*, vol.18, Nos. 2 &3.

⁶⁹ Kantawala and Padaria (1997) *Trade Liberalisation in India Some Issues*, Macmillan India Ltd., New Delhi.

analyses three main issues of trade liberalisation, such as the link between policy orientation and trade regime from 1951-52 to 1993-94, the relationship between trade openness and growth of the economy and vulnerability of the economy to external shocks. The export, import, GDP and Terms of trade data were used for the analysis. The study observed a close link between policy orientation and trade regime in India. The increase in the degree of openness has not resulted into increase in the growth rate of GDP, however, it has positive impact on per capita real GDP. It is also observed that with the increase in the degree of trade openness, the vulnerability of the economy to external shock particularly in terms of income effect increases.

Hargopal (2002)⁷⁰ examined the performance of external sector for the period of 1980-81 to 1997-98, which is divided into two as pre and post liberalisation period. For the analysis basic economic variables like export, import, trade deficit current account deficit etc. were used. The study concludes that post liberalisation policies have a major positive impact on external variable.

Kumar (2001)⁷¹ examined the factors that should mould India's export over the coming two decades. The factors that will affect the demand for and supply of export of goods and service and the demand for imports were analysed. Ahuja (2001) analysed the export incentives or export promotion scheme of the Government of India (GOI) and the status of each of these incentives. It was noted that India needs to be strategic in devising its export incentives, in such a way as to give with the some incentives selectively to industries where the country has comparative advantage.⁷² Bhattacharya (2003) examined the export performance of India from 1980-2000 and concluded that India can achieve a

⁷⁰ Sai Hargopal (2002) "Performance of External sector – A Review", *Indian Economic Journal*, vol.49, No.3 pp55-63

⁷¹ Nagesh, Kumar (2001) *India's Trade in 2020, A Mapping of Relevant Factors*, Working Paper No.10, Research and Information System for Aligned and Non Aligned Countries, New Delhi.

⁷² Rajeev Ahuja (2001) *Export incentive in India Within the WTO Frame Work*, Working paper No.60, Indian Council for Research on International Economic Relations, New Delhi.

rate of growth, which is almost 2-3 times higher than the global export growth rate, but the problem is the absence of sustained performance.

2.2.7 Trade Liberalisation and Manufacturing Sector of India

Empirical studies suggest that trade reforms promoted total factor productivity (TFP) during the decade of the eighties (Goldar 1986⁷³; Ahluwalia 1991⁷⁴; Mitra and Krishna 1998; Chand and Sen 2002⁷⁵). Das (2001)⁷⁶ reported a positive impact of the lowering of NTBs in the intermediate goods sector. Although Goldar and Kumari (2003)⁷⁷ reported a deceleration of TFP growth in Indian manufacturing in the 1990s, their analysis indicated that the lowering of effective protection to industries promoted productivity growth during the period 1991-98

A number of recent studies, however, contradict this view. Several studies (Krishna and Mitra 1998⁷⁸; Balakrishna *et al.* 2000⁷⁹; Singh *et al.* 2000⁸⁰; Norouz 2001⁸¹; Srivastava 2001⁸²; Das 2003a⁸³) found TFP growth in the manufacturing

⁷³ B.Golder (1986) *Productivity Growth in Indian Industry*, Allied Publishers Private Limited, New Delhi.

⁷⁴ I.J Ahluwalia (1991) *Productivity and Growth in Indian Manufacturing*, Oxford University Press, New Delhi.

⁷⁵ S.Chand and K. Sen 2002 "Trade Liberalisation and Productivity Growth: Evidence from Indian Manufacturing", *Review of Development Economics* Vol.6, No.1, pp 120-132

⁷⁶ D.K.Das (2001) *Trade Liberalisation and Industrial Productivity: An Assessment of Developing Country Experiences*. April, Working Paper 77, Indian Council for Research on International Economic Relations, New Delhi.

⁷⁷ B.Golder and A. Kumari (2003) "Import Liberalisation and Productivity Growth in Indian Manufacturing Industries in the 1990s," *The Developing Economies*, Vol. 41, Number 4pp. 436-60.

⁷⁸ P.Krishna and D. Mitra (1998) "Trade Liberalisation, Market Discipline and Productivity Growth, New Evidence From India", *Journal of Development Economics*, Vol. 86, pp 447-65

⁷⁹ P.Balakrishnan, K.Pushpangadan and M. Suresh Babu (2000), "Trade Liberalisation and Productivity growth in Manufacturing: Evidence from Firm Level Panel Data' *Economic and Political Weekly*, October 7, pp3679-3682.

⁸⁰ S.Singh, T. Coelli, and E. Fleming., (2000) *The Effects of Private Sector Competition upon Productivity Growth in Indian Dairy Processing Plants*, Working Paper No. 1/2000, Centre for Efficiency and Policy Analysis University of New England.

⁸¹ H.Norouz (2001) *Protection in Indian Manufacturing, Empirical Study*, Macmillan India, New Delhi.

⁸² V.Srivastava (2001) *The Impact of India's Economic Reforms on Industrial Productivity, Efficiency and Competitiveness: a Panel Study of Indian Companies 1980-97*. National council of Applied Economic Research, New Delhi.

sector had worsened during the nineties compared with the eighties. Norouz's found insignificant impact of trade liberalisation on TFP for a cross section of industries. Most of the above studies estimate an average production function to evaluate productive efficiency of Indian industries.

Das (2003b)⁸⁴ documented the effective rate of protection, import coverage ratio and import penetration rates of Indian manufacturing for around 72 three-digit industries divided into three-use based sectors for the four phases of trade reform. Observing the individual industries he found that the effective protection levels were the highest in the second phase as well as in fourth phase of trade liberalisation. Pandey (2004)⁸⁵ showed that the protection to Indian registered manufacturing industry declined during 1980s and 1990s

2.2.8 Determinants of Aggregate Exports

Goldstein and Khan (1976)⁸⁶ investigated the price responsiveness of both export demand and export supply using quarterly data on the aggregate export of eight industrial countries for the period 1955-1970. Two simple models of export demand and supply were introduced and these models were estimated simultaneously. The study used both equilibrium and disequilibrium models. The result showed that price elasticity of demand for export was substantially different when export supply relationship are explicitly taken into account.

⁸³ Deb Kusum Das (2003) *Manufacturing Productivity Under Varying Trade Regime: India in the 1980s and 1990s*, Working Paper No. 54, Indian Council for Research on International Economic Relations, New Delhi

⁸⁴ Deb Kusum Das (2003) *Quantifying Trade Barriers: Has Protection Declined Substantially in Indian Manufacturing?* Working Paper No. 105, Indian Council for Research on International Economic Relations, New Delhi.

⁸⁵ Mihir Pandey (2004) *Impact of Trade Liberalisation in Manufacturing Industry in India in The 1980's and 1990's*, Working Paper No. 140, Indian Council for Research on International Economic Relations, New Delhi.

⁸⁶ Morris Goldstein and Mohsin S Khan (1976) "The Supply and Demand for Exports: A Simultaneous Approach", *Review of Economics and Statistics*, Vol. 60 No.2, pp43-66

Arize (1990)⁸⁷ investigated empirically the demand and supply of export in seven Asian developing countries namely India, Indonesia, Korea, Malaysia, Pakistan, Philippines and Thailand using quarterly data for the period 1973-85. The supply and demand models were specified and the variables included were exchange rate, export unit value, domestic price of input, and index of domestic capacity and error term. The study concluded that the long run supply elasticities of Asian export was positive.

Hoekman and Djankov (1997)⁸⁸ analysed the magnitude of the changes in trade across the Central and Eastern European countries during 1990-1995 period, focussing in particular on trade with European Union. It found that import of intermediate inputs and machinery are the important determinants of the changes in export structure. Outward processing arrangement and Foreign Direct Investment have a less impact. Wilson (2001)⁸⁹ examined the determinants of manufactured export in Kenya for the period 1971-2001. He used cointegration and Error Correction Approach using Johansen's procedure to estimate the model based on time series data. The study concludes that manufactured export respond positively to changes in the real exchange rate, productive capacity and regional trade. Capacity utilisation and regional trade have most the significant influence, where as real exchange rate is found insignificant. Trade restrictions are found to be detrimental to the expansion of the manufacturing sector.

Athukorala (1998)⁹⁰ used export supply function with variables like real exchange rate, liberalisation and production capacity from 1977-1995 for Sri

⁸⁷ Augustine Arize (1990) "An Econometric Investigation of Export Behaviour in Seven Asian Developing Countries", *Applied Economics*, Vol.22, PP 891-904.

⁸⁸ Bernad Hoekman and Simeon Djankov (1997) "Determinants of Export Structure of Countries in Central and Eastern Europe", *The World Bank Economic Review*, Vol. 11, No.3, pp471-487.

⁸⁹ M.K.Wilson (2001) "Determinants of Manufactured Export in Kenya: A Cointegration Analysis" www.ru.ac.za

⁹⁰ Premachandra Athukorala (1998) "Export Response to Liberalisation: The Srilankan Experience", *Hitosubhashi Journal of Economics*. Vol.39 pp49-65.

Lanka. Using Error Correction method he found that real exchange rate and liberalisation had positive impact. Krykils *et al.* (1998)⁹¹ used simultaneous equation model of demand and supply factors of export with the focus on price, FDI and exchange rate to discern the factors that determines the trade between Japan and European Union from 1970 to 1994. The study used 3SLS method and found exchange rate devaluation affected the bilateral trade balance. Ahmed (2000)⁹² used Cointegration and error correction model to determine the supply of export in Bangladesh. The study found significant impact of trade liberalisation, using the dummy to capture the trade liberalisation impact.

Camerero and Tamaril (2004)⁹³ estimated the demand for export and import of manufactured goods for a panel-containing majority of the EU countries as well as the United States and Japan. The model included as explanatory variables other than the traditional determinants foreign direct investment also. They applied unit root and cointegration test allowing for heterogeneity. There was no evidence of cointegration when using just the traditional formulation. The results turn out to be favourable in accordance with the augmented model. Moreover the result points mainly to a complementary relationship between export and FDI.

Studies by Bhagwati and Srinivasan (1975)⁹⁴, Lucas (1987)⁹⁵ Wadhwa (1988)⁹⁶ Virmani (1991)⁹⁷ and Krishnamurthy and Pandit (1995)⁹⁸ noted the

⁹¹ Dimitrios Kirkyils, Pantelis Pantedis and Papazoglou (1998) "Japan European Union bilateral Trade an Empirical Investigation", *Hitosubhashi journal of Economics*, Vol.39, pp37-48.

⁹² N.U.Ahmed (2000) "Export Responses to Trade Liberalisation in Bangladesh: A cointegration Analysis", *Applied Economics*, Vol.32, No.8, pp1077-84.

⁹³ Marieim Camerero and Cecilio Tamaril (2004) "Estimating Exports and Imports Demand for Manufactured Goods: the Role of FDI", *The Review of World Economics*, Vol. 140, No.3, pp347-375.

⁹⁴ J.Bhagwati and T. N. Srinivasan, (1975) *Foreign Trade Regimes and Economic Development :India*, Columbia University Press, New York.

⁹⁵ Robert E.B Lucas (1987) "Demand for India's Manufactured Export", *Journal of Development Economics*, Vol. 24, No.1, pp63-76.

⁹⁶ C.DWadhwa (1988) "Some Aspects of India's Export Policy and Performance", In R. Lucas and G. Papanek (eds), *The Indian Economy*, Oxford University Press, New Delhi.

significant price responsiveness of exports. However, Nayyar (1988)⁹⁹, Ghosh (1990)¹⁰⁰ and Sarkar (1994)¹⁰¹ argued that Indian exports are not necessarily price responsive as turning points in India's export performance were not often led by the movements in exchange rate. Panchamukhi (1978)¹⁰² showed that domestic policies have significant effect on trade behaviour of developing countries.

The study by Bhagwati and Srinivasan (1975) highlights that an inward looking policy, with capacity constraints, lack of competition, and high domestic demand, do not signal enough incentives to export. Nayyar (1988) argued that it is incorrect to say that the policy regime mainly influences overall export performance. The external constraints provide an upper limit to growth of exports from India. Roy (2001¹⁰³;2002)¹⁰⁴ provides evidence on the primacy of world demand in determining India's exports growth. Virmani (1991),¹⁰⁵ Joshi and Little (1994)¹⁰⁶ and Krishnamurthy and Pandit (1995),¹⁰⁷ estimated either the

⁹⁷ A.Virmani (1991) "Demand and Supply Factors in India's Trade", *Economic and Political Weekly*, Vol.16, No.24, pp309-314.

⁹⁸ K.Krishnamurthy and V. Pandit, (1995) *India's Trade Flows: Alternative Policy Scenarios: 1995-2000*, Working Paper No. 32, Centre for Development Economics, Delhi School of Economics, Delhi.

⁹⁹ D.Nayyar (1988) "India's Export Performance: Underlying Factors and Constraints", In R.E.B. Lucas and G.F. Papanek (eds.), *The Indian Economy: Recent Development and Future Prospects*, Oxford University Press, Delhi.

¹⁰⁰ D.Ghosh, (1990) "Exchange Rates and Trade Balance Some Aspects of Recent Indian experience", *Economic and Political Weekly*, Vol.19, No.24, pp 441-445.

¹⁰¹ P.Sarkar (1994) "India's Balance of Payment and Exchange Rate Behaviour Since 1971: A New Approach", *Economic and Political Weekly*, Vol. 29, pp 43-48.

¹⁰² V.RPanchamukhi (1978) *Trade Policies in India: A Quantitative Analysis*, Concept Publishing Company, Delhi.

¹⁰³ S.Sinha Roy (2001) *Post-reforms Exports Growth in India: An Exploratory Analysis*, Discussion Paper No.13, Research and Information System for the Non-aligned and Other Developing Countries, New Delhi.

¹⁰⁴ S.Sinha Roy (2002) "Persistence in India's Manufactured Export Performance", *Discussion Paper No. 29*, Research and Information System for the Non-aligned and Other Developing Countries, New Delhi:

¹⁰⁵ A.Virmani (1991) "Demand and Supply Factors in India's Trade", *Economic and Political Weekly*, Vol.16, No.24, pp.309-314 February

¹⁰⁶ V.Joshi and I.M.D. Little (1994) "India: Macroeconomics and Political Economy, 1964-1991", Oxford University Press, Delhi.

demand or the supply side. In most instances, either demand function is only estimated by assuming infinite elasticity of supply of exports or supply side estimates become redundant due to inappropriate choice of factors. Sinha (2002b)¹⁰⁸ showed the importance of demand factors such as world demand and real effective exchange rate as the determinants of India's export. Sharma (2000)¹⁰⁹ examined the role of FDI in export performance of India using annual data for 1970-98. The study investigated the determinants of export demand and supply model in a simultaneous equation framework. The result showed that FDI has no significant impact on export performance.

2.2.9 Determinants of Export Behaviour of Firms

Glejser *et al.* (1980)¹¹⁰ attempted to evaluate the export performance of Belgian firms. The variables selected were firm size, industrial concentration and foreign subsidiaries. The result showed that the firm size had positive influence. Hirsch and Bjaoui (1985)¹¹¹ analysed the relationship between export, firm size, and R&D for Israel firms. They regressed the export to sales ratio against firm size, R&D (lag of four years) and a proxy variable for other firm characteristics. The result showed that R&D was positively and statistically significant.

Wilmore (1992)¹¹² attempted to test the hypothesis that foreign ownership had a positive effect on export across Brazilian firms. His model contained

¹⁰⁷ K.Krishnamurthy and V. Pandit, (1995) 'India's Trade Flows: Alternative Policy Scenarios: 1995-2000', *Working Paper No. 32*, Centre for Development Economics, Delhi School of Economics, Delhi.

¹⁰⁸ S.Sinha Roy (2002b) *The Determinants of India's Exports: A Simultaneous Error-Correction Approach*, Discussion paper, 37/2002 Research and Information System for the Non-aligned and other Developing Countries (RIS), New Delhi

¹⁰⁹ Kishore, Sharma (2000) "Export Growth in India: Has FDI played a Role?" Discussion paper, No.816, Economic Growth Centre, Yale University.

¹¹⁰ A. Glejser Jaquemin and J.Petit (1980) "Export in an Imperfect Competition Framework: an Analysis of 1446 Exporters", *Quarterly journal of Economics*, Vol. 94, No.3, pp507-524.

¹¹¹ S.Hirsch and L. Bijaoui (1985) "R&D Intensity and Export performance: A Micro View", *Wiltwirtschaftliches Archive* L21 (2), and pp 238-251.

¹¹² L.Wilmore (1982), "Transnationals and Foreign Trade: Evidence from Brazil", *The Journal of Development Studies*, Vol.28, No.2, pp. 314-33

explanatory variables such as firm size, capital intensity, skill intensity, advertising and R&D in addition to foreign ownership. Foreign ownership, firm size and advertising were significant and had positive impact. Attinken *et al.* (1997)¹¹³ examined the role of geographical and sectoral spillovers on the exports by plants in Mexico. They found that the presence of multinational exporters in the same industry and scale economies increases the probability of exporting by Mexican firms. Robert and Tybout (1997a)¹¹⁴ estimated a dynamic probit model with plant random effect and found that firm size apart from firm's prior exporting experience, its age and its affiliation to multi plant firms favourably affect the export entry decisions of Columbian firms.

Robert and Tybout (1997b)¹¹⁵ developed dynamic model of the export decision by a profit maximising firm and test for the presence and magnitude of sunk cost, using a sample of Colombian plants. They found that sunk costs are large and are significant determinants of export growth. Unobserved heterogeneity across plants also plays a significant role in the probability that a firm can export. Clerides *et al.* (1998)¹¹⁶ examine export participation and the effect of exporting on learning in Columbia, Mexico and Morocco. They examined the role of geographical and sectoral spillovers on the export decision for the Columbian plants and found some evidence for spillovers. Wignaraja (1998)¹¹⁷ examined the factors that influence firm level export performance in three industries in Sri Lanka (27 firms). The variables selected were capital,

¹¹³ Berian Aitken, Gordon Hanson and Ann Harrison (1997) "Spillovers, Foreign Investment and Exports Behaviour", *Journal of International Economics*, vol.43, No.1, pp 103-132.

¹¹⁴ Mark J Roberts. and James R. Tybout (1997a), *What Makes Exports Boom?* Directions in Development Series, The World Bank, Washington D.C.

¹¹⁵ Robert Mark and James Tybout (1997b) "An Empirical Model of Sunk Cost and the Decision to Exports" *American Economic Review*, No.87, Vol.4, pp 545-564.

¹¹⁶ Clerides, Sofronics, K Soul Lach and James R Tybout (1998) "Is Learning by Exporting Important, Macro Dynamic Evidence from Columbia, Mexico and Morocco", *Quarterly Journal of Economics* Vol.113, No.3, pp. 903-947.

¹¹⁷ Ganeshan Wignaraja, (1998) *Trade Liberalisation in Sri Lanka – Exports, Technology, and Industrial Policy*, Macmillan Press Ltd., London,

skills, foreign ownership, and technology and firm size. The study found that physical capital, skills, foreign ownership, greater internal technological efforts and firm size are positively associated with firm level export performance. The study was based on the cross section data for 1988. Wakelin (1998)¹¹⁸ estimated a Tobit model as well as truncated regression model to investigate the role of innovation in determining export behaviour of a sample of 320 UK firms over the 5 year period of 1988-1992 and found that the firms probability to export positively depends upon the number of firm innovation and the level of innovation in the sector

Bleaney and Wakelin (1999)¹¹⁹ used a firm-level data set to nest firm-specific and trade-theoretic determinants of export activity for a sample of British manufacturing firms using Tobit and OLS methods. Amongst the trade-theoretic variables, technological innovation, as measured by R&D expenditure, emerges as the main determinant of exports from the U.K., with much weaker support for the factor endowment theory.

Bernard and Jensen (1997¹²⁰;1999¹²¹) documented significant differences between exporters and non exporters among U.S manufacturing plants. Exporters have more workers, proportionately more white collar workers, higher wages, higher productivity, greater capital intensity and higher technology intensity and are more likely to be a part of a multi plant firm. However, these substantial cross- section differences between exporters and non exporters can not tell us about the direction of causality i.e., whether good firm become exporters or

¹¹⁸ Katherine Walkelin (1998), "Innovation and Export Behaviour at the Firm Level", *Research Policy*, Vol. 26, Issue 7, 8; April, pp. 829-841.

¹¹⁹ Michael Bleaney and Katharine Wakelin (1999) "Sectoral and Firm-Specific Determinants of Export Performance: Evidence from the United Kingdom", *Research Paper No.99/12*, Centre for Research on Globalisation and Labour markets, University of Nottingham.

¹²⁰ Andrew Bernard and Bradford Jensen (1997) "Exporters, skill upgrading and the Wage Gap" *Journal of International Economics* Vol.42 No. 1, pp3-31

¹²¹ Andrew Bernard and Bradford Jensen (1999) "Exceptional exporter performance: Cause, Effect or Both?" *Journal of International Economics* Vol.47 No. 1, pp1-25

exporters become good firms. Zeufack (2001)¹²² used a combined micro and macro level data set for investigating the determinants of export performance in Asia and Africa's manufacturing. Tobit estimations found no robust association between skill intensity and export performance in the textile and garment industries in Ghana, Kenya and India. Dijk (2001)¹²³ analysed export behaviour of Indonesian companies using a unique database covering all manufacturing firms active in 1995 (28 industries at the three-digit level). Using Tobit and Papke and Woolridge (PW) model he pointed that both technology and cost related factors determine export behaviour of export intensive firms and to a lesser degree on scale intensive firms. The models do not work well in explaining export of science based and specialised supplier firms.

Lefebvire and Lefebvire (2001)¹²⁴ examined the export performance of 3000 Canadian manufacturing firms. The study considered the factors like level of automation, the degree of modernisation of equipment and machinery and the presence of unique know-how and found that these factors had a positive influence on the export performance of Canadian firms. Sterlachini (2001)¹²⁵ examined a variety of characteristics besides size, which are able to influence firms export behaviour, namely the propensity to take on work subcontracted by other firms, affiliation with a business group and geographical location. The study used both Probit and Tobit models for a sample of 3659 Italian manufacturing firms. The result showed that the intensity of subcontracting

¹²² Albert Zeufack (2001) Export Performance in Africa and Asia's Manufacturing: Evidence from Firm-level Data, *Journal of African Economics*, Vol.10, and pp 258-281.

¹²³ Michiel Van Dijk (2001) *The Determinants of Export Performance in Developing Countries: The Case of Indonesian manufacturing*, Working Paper No.42, Eindhoven University of Technology, the Nether Land.

¹²⁴ E.Lefebvre and L.A Lefebvre (2001), Innovative Capability as Determinants of Exports Behaviour and Performance, A longitudinal study of Manufacturing in SMEs, In A Kleinknedit and P. Mohanan (eds) *Innovation and Firm Performance, Econometric Application of Survey Data*, Palgrave, London

¹²⁵ Alessandr Sterlacchini (2001) "The Determinants of Export Performance: A Firm Level Study of Italian Manufacturing", *Wiltwirtschaftliches Archive*, Vol. 137, No.3, and pp 450-472.

depresses the export performance of small and medium sized enterprises. The intensity of R &D and the introduction of new technology are more effective for medium sized and large firms.

Alvarez (2002)¹²⁶ analysed the determinants of export performance of Chilean manufacturing plants. Instead of focusing solely on the export decision he analysed factors that determine success in the exporting process. The results tended to confirm the empirical evidence that productivity, size and human capital increase the probability of remaining as an exporter. In addition, the results suggested that purchases of foreign technical licences and the participation of foreign capital contribute positively to export performance. Greenway and Yu (2004)¹²⁷ investigated the interaction between exporting and productivity at the firm level, using a panel of firms in the UK chemical industry, which was technology intensive and largest exporting sector. The study found that exporters are more productive than non exporters. This superior productivity performance among exporters appeared to be caused by both self selection and learning by exporting effects. In contrast to other studies learning effects are positive among new entrants, weaker for more experienced exporters and negative for established firms.

Arnold and Hussinger (2004)¹²⁸ examined the causal relationship between productivity and exporting in German manufacturing by applying a matching technique. The study concluded that high productivity firms self select themselves into export market and exporting themselves did not play a significant role for the productivity of German firms. Bernard and Jensen

¹²⁶ Roberto Alvarez E (2002) "Determinants of Firm Export Performance in a Less Developed Country" Anderson Graduate School of Management, UCLA www.ucla.org

¹²⁷ David Greenway and Zhihong Yu (2004) "Firm level interaction Between Exporting and Productive Industry Specific Evidence", *Review of World Economics*, Vol. 140, No.3, pp 376-392.

¹²⁸ Jens Matthias Arnold and Katrin Hussinger (2004) "Export Behavior and Firm Productivity in German Manufacturing A Firm-Level Analysis", ZEW Discussion Paper No. 04-12

(2004)¹²⁹ examined the factors that increase the probability of entry into exporting using a panel of U.S manufacturing plants. They tested for the role of plant characteristic spillovers from neighbouring exporters; entry cost and government export promotion expenditure. Entry and exit in the export market by U.S plants are substantial, past exporters are apt to re enter and plants are likely to be exported in consecutive years. However, they found that entry costs are significant and spillovers from the export activity of other plants are negligible. Buch *et al.* (2005)¹³⁰ provided evidence on the determinants of the activities of German multinational firms by using newly available firm-level data set from the Deutsche Bundesbank. The specific goal of this paper was to demonstrate the relative role of country-level and firm-level determinants of foreign direct investment and the result suggested that firm-level heterogeneity had an important influence on internationalization patterns as stressed by recent models of international trade. The study also found positive agglomeration effects for the activities of German firms that stem from the number of other German firms that are active on a given foreign market.

Lall and Kumar (1981)¹³¹ examined the factors that determine the Indian engineering firm's export. Firm size and R &D were taken as the independent variables. The R & D turned out to be significant but it had a negative sign, it may be due to the dummy variable which was taken as proxy for R&D. Lall (1986)¹³² tested export propensities of engineering and chemical firms against a number of technological variables like age of the firm, skills, royalty license, foreign equity and R&D. Of these variables the first three were insignificant in

¹²⁹ B. Andrew, Bernard and J.Bradford Jensen (2004) "Why Some Firms Exports", *The Review of Economics and Statistics*, Vol.86, No2, pp561-569.

¹³⁰ Claudia M. Buch, Jörn Kleinert, Alexander Lipponer and Farid Toubal (2005) "Determinants and Effects of Foreign Direct Investment: Evidence From German Firm-Level Data", *Economic Policy*, Vol. 20 Issue 41 Pp 52-54

¹³¹ S. Lall and R. Kumar (1981) "Firm-Level Export Performance in an Inward Looking Economy: The Indian Engineering Industry", *World Development*, Vol.9 No.5, pp. 453-463.

¹³² S.Lall (1986), "Technological Development and Export Performance in LDCs: Leading Engineering and Chemical Firms in India", *Weltwirtschaftliches Archive*, Vol.122, No.1, pp. 80-91.

both industries. Foreign equity was not significant in engineering and R&D was significant in both industries. Kumar and Sidharthan (1993)¹³³ explained export performance of Indian firms in 13 industries. He found that skill (share of high income employees in the wage bill) and technology (R&D expenditure to sales ratio) were both significant with a positive sign in four industries and capital intensity (gross fixed to sales ratio) was significant with a negative sign in six industries.. Subrahmanian and Joseph (1994)¹³⁴ analysed the export intensity of foreign controlled and domestic firms in Indian industry, using data collected from CMIE for the period 1990 to 1992. A sample approach of comparison of export intensity of firms showed that local firms better performed on export front than the foreign controlled firms. Results of their more sophisticated econometric analysis too did not show any relatively greater export intensity of foreign controlled firms. Patibandla (1995)¹³⁵ argued that in the presence of capital market imperfections and suboptimal contractual arrangements, small firms faces transaction or selling cost in the domestic markets. One of the strategic responses by small firms towards overcoming the mobility barriers imposed by high transaction cost in the domestic market is to break into the competitive world market. Small firms that could realize a critical level of production efficiency and possible information externalities through inter-firm linkages might be able to succeed as exporters. The empirical observation derived from the analysis of firm level data provided reasonable support to the main argument.

¹³³ Nagesh Kumar and N.S.Siddharthan (1993), *Technology, Firm Size and Export Behaviour in Developing Countries: The Case of Indian Enterprises*, Working Paper No. 9, Maastricht: UNU/INTECH

¹³⁴ K.K.Subrahmanian and K.J Joseph (1994) "Foreign control and export intensity of Firms in Indian Industry", *working paper no.258*. Centre for Development studies, Thiruvananthapuram.

¹³⁵ Murali Patibandla (1995) "Firm size and Export Behaviour: An Indian Case Study", *Journal of Development Studies*, Vol.31, No.6, pp868-882

Subramanian *et al.* (1996)¹³⁶ analysed the export performance of FDI firms using cross section data for the period 1991-92 to 1993-94. They could not observe a better export performance of FDI firms in terms of both actual export performance and export probability. Agarwal (2001)¹³⁷ found that foreign firms have not performed better than the local firms in export in the post reform period 1996-2000. However the result is not robust across various technology grouping and the foreign ownership dummy turned out to be significant at ten per cent level only in the case of medium and high technology industries. Bhavani and Tendulkar (2001)¹³⁸ examined marginal impact of scale and share of sales expenses on the probability of exporting of Textile and Garment industry in India. They divided the industry into three categories on the basis of ownership of property (single ownership, proprietary and limited companies). They found that every single determinant (scale, share of wages, share of sales expenses and technical efficiency) had an increasing marginal impact on export performance in Tobit model.

Kathuria (2002)¹³⁹ found that the productivity of foreign owned firms improved in the post-reform period and Indian owned firms which invested in R&D gained from productivity growth. Kumar and Pradhan (2003)¹⁴⁰ attributed to identify factors that played important role in the export competitiveness of Indian manufacturing firms with particular emphasis on knowledge based

¹³⁶ K.K.Subrahmanian, D.V.S Sastry, Patnaik and S. Hajra (1996) *Foreign Collaboration Under liberalisation Policy: Pattern of FDI and Technology Transfers in Indian Industry Since 1991*, Development Research Group Study, No.14, Department of Economic Analysis and policy, Mumbai.

¹³⁷ R. Agarwal (2001), *Technical Efficiency and Productivity Growth in the Central Public Sector Enterprises in India During 1990s*, Discussion paper No. 28/2001, Institute of Economic Growth, NewDelhi.

¹³⁸ T.A.Bhavani and S.D.Tendulkar (2001) "Determinants of Firm-level Export Performance: a Case Study of Indian Textile Garments and Apparel Industry" *Journal of International Trade and Economic Development*, Vol.10, No.1, pp 65-92.

¹³⁹ S.Kathuria. (2002) "Liberalisation, FDI and Productivity Spillovers – Analysis of Indian Manufacturing Firms", *Oxford Economic Papers*, Vol.54, pp 688-718.

¹⁴⁰ Nagesh Kumar and Jaya Prakash Pradhan (2003) *Export Competitiveness in Knowledge Based Industries: A Firm level Analysis of Indian Manufacturing*, Discussion Paper, No. 43, Research and Information System for aligned and Non aligned countries, New Delhi.

industries. The study found that younger firms have export competitiveness in the high technology and low technology sub sample of Indian manufacturing where as in the medium technology, older firms are more competitive. Firm size had a non linear impact. Access to foreign raw materials is also observed as a critical factor for export success. Foreign affiliates in Indian manufacturing are found to achieve higher export success than domestic firms. The liberalisation measures are also found to be positive.

Mahambare (2004)¹⁴¹ found that foreign owned firms continued to be the most efficient but technical efficiency declined in the late 1990s in the case of manufacturing sector in India and the reform had positive impact in this sector.

The above literature survey shows that still there exist very few studies, which provides a comprehensive analysis of the impact of trade liberalisation on export performance of India. Most of the studies concentrate only on one aspect, either commodity composition or direction of trade at the aggregate level. The studies which deals with the performance at the industry and firm level during liberalisation is also very few. The literature survey also shows that there exists few studies, which focuses on the determinants of exports especially the role of trade policy at the industry and firm level export performance. Hence in this study an attempt is made to examine the impact of trade reform on exports of India.

¹⁴¹ Vidya Mahambare (2004) Trade Liberalisation and India's Manufacturing Sector, www.cardiff.ac.uk"

2.3 Importance of the Study

The present study examines the impact of trade liberalisation on India's exports. Comprehensive reform measures were introduced in various sectors of the economy but one of the most important reform measures is the opening up of trade or trade liberalisation. The present study thus selected trade liberalisation. In order to examine the impact of trade reform, manufacturing sector exports is selected, which contribute about more than 70 per cent of the country's exports. There were studies, which examined the impact of the trade reform measures on the exports and imports sectors but most of the studies concentrated at the aggregate level. But the clear picture of the impact can be factored out only if the study is made at a more disaggregate level at specific sectors. Though disaggregate level study was also under taken it is either for few years or for one or two firms or industry. The studies which deals with the post reform determinants of exports at the industry and firm level is also a very few. The significance of the present study is that it examines the impact of the reform as well as the determining factors of exports during the reform period both at the aggregate and disaggregates levels. In the present study thus the analysis is done at the aggregate level, industry level (for 15 industries as per ASI) and at the firm level (firms at 7 seven industries) so as to examine the impact of trade reform.

2.4 Objectives of the Study

The study tries to analyse the impact of trade policy on the export performance and determining factors of manufacturing sector export at the aggregate, industry and firm level. The main objectives of the study are to:

- (i) examine the trends in India's exports, its composition and direction
- (ii) analyse the impact of trade liberalisation on aggregate exports

- (iii) assess the impact of trade liberalisation on exports of manufacturing industries in India
- (iv) analyse the factors that determine the exports of firms under trade liberalisation.

2.5 Hypotheses

Trade liberalisation measures are introduced to improve the export performance of the country by reducing the barriers to trade. With the opening up of the trade sector it is expected that the country can engage in more trade relations with other countries without much restrictions. The ultimate objective of trade reform measure is to improve the competitiveness and thereby better export performance. Thus the trade liberalisation measures will improve the export performance by improving the competitiveness, which will improve production by employing better techniques of production, improved quality standards, better marketing strategy, etc. But the trade policy reform will affect the different sectors of the economy in a different manner, as these strategies may be different. The impact will be different when we examine from the whole sector or the aggregate economy and from the inter sectoral or disaggregate level. There may be some sector specific factors determining the impact of reform when we take into consideration industry level and firm level export performance. The export strategies adopted by various industries will be different and the firms within each industry will be different and thereby the impact also may be different. So to assess the impact of reform the analysis is to be done at more disaggregate levels. In order to assess the impact of trade reform on the exports of India both at the aggregate and disaggregate level the null hypotheses tested is that trade liberalisation has no significant impact on export performance of India. To test the above hypotheses study has specifically used the following null hypotheses (H_0).

- a) Trade liberalisation has no impact on aggregate exports
- b) Industry level exports and trade liberalisation are unrelated
- c) Trade liberalisation has no impact at the firm level exports.

In accordance with this the alternative hypotheses formulated is that trade liberalisation has significant impact on India's exports. Three alternative hypotheses (H_1) for the above null hypotheses can be formulated as (a) Trade liberalisation has significant impact on aggregate exports, (b) Industry level exports and trade liberalisation are related and (c) Trade liberalisation has significant impact at the firm level exports.

Chapter III

Methodology

- 3.1 Data Source
- 3.2 Methodology
- 3.3 Chapter Scheme
- 3.4 Limitations

Introduction

The economic liberalisation measures introduced in India have significant bearing on the growth of the economy and its structure, especially on the industrial structure. Most important prerequisite for any serious analysis of the underlying dynamics is the existence of a consistent and accessible database. Further the nature and content of data requirement in a liberalised regime is different from that in a regulated regime. This is because of greater integration of the economy with the rest of the world and the consequent strengthening of linkages between different aspects related to domestic and external sectors of the economy. Data source and methods used for the present study are given in this chapter.

3.1 Data Source

The present study mainly used secondary data for the analysis. The period of study is mainly from 1980-2002. Different data sources available at national and international levels on trade and related variables used for the present analysis are examined in this section. The availability, coverage and limitations of these data source are also explained. The data source is divided as the international and national level.

3.1.1 International Trade Data Source

United Nation's Trade Data (UN TRADE DATA)

An important source, which gives data on international trade, is the UN trade database. The UN data on trade flows are available from two different volumes of its publication titled 'International Trade Statistics Year Book' volume 1 subtitled as 'Trade by country' and volume 2 'Trade by Commodity'. The quantity and value in US dollars of imports and exports of commodities by countries are given in volume 2. The data for majority of countries from 1962, are

also available in electronic format. The major limitation of the UN data are i) it did not report exports or imports for those commodities whose share in the total is less than 0.3 per cent and ii) time lag is involved in making the data available¹.

Commodity Trade Statistics (COM TRADE)

This is published by the UN trade statistics division, which collects data from individual countries. The data is available from 1960 onwards and at various level classification like Harmonised system (HS), SITC revision 1992, 1996 and 1998.

IMF Direction Of Trade (DOT) Statistics

IMF Direction of Foreign Trade Statistics Year Book prepared by the General Economy Division of the Bureau of Statistics is the most relevant and widely used international trade database for the bilateral trading data. The yearbook gives 7 years of data for 186 countries along with world and area summaries. The classification distinguishes three main categories of countries like industrial countries, developing countries and a group of countries summarized as other countries. The electronic database of the same publication is also available².

UNCTAD Trade Statistics

Another international publication on trade is a) UNCTAD Trade and Development statistics renamed as UNCTAD Hand Book. The UNCTAD handbook of statistics provides a comprehensive collection of statistics relevant to the analysis of world trade, investment and development. The Hand Books, which is largely based on existing national and international data sources provides the unique compilation of data through the use of rank ordering, growth rate, shares and other special calculations so as to facilitate the interpretations.

¹ International Trade Statistics Year Book, United Nations, Department of Economic and Social Development, statistical office, New York.

² Direction of Trade Statistics Year Book, International Monetary Fund, Washington D.C.

Data are divided into seven parts. Part one of the publication includes value; growth and share of world trade in current price, trade balance, intra trade by region and trade in services. Part two covers volume, unit value and terms of trade indices; part three covers network of world trade summary by selected region of origin and destination and exports and imports structure by selected commodity groups. Exports and imports structure by commodity groups and by country is included in the fourth part. Part fifth consist of Balance of Payment, Foreign Direct investment, financial flows etc. Basic indicators of development are included in the next part and some special statistics in the seventh part³.

World Trade Organization Trade Statistics

The World Trade Organisation also publishes data on trade, GNP, production, Tariff level and foreign direct investment. The data is available in electronic database format.

Trade and Production Data Base

This database contains trade, production and tariff data for 67 developing and developed countries at the industry level over the period from 1976. The sector disaggregation in the database follows the International Standard Industrial Classification (ISIC) and is provided at 3 digit levels (28 industries) for 67 countries and at the 4 digit level (81 industries) for 24 of these countries⁴. The source of trade database is United Nations Statistics Departments, which collects data from individual countries and then reports the data in the Commodity Trade Statistics (COMTRADE) database and it includes imports, exports and mirrored exports (i.e., exports calculated using import data reported

³ UNCTAD, Hand Book of Statistics, United Nation, United Nations Conference on Trade and Development, Geneva, New York.

⁴ The sources of production data are the CD-ROM version of UNIDO's Industrial Statistics database at the 3 and 4-digit level of ISIC classification. It include data on value added, total output, average wages, capital formation, number of employees and the number of firms. The sources of MFN average tariffs are the UNCTAD's Trains database and WTO's Trade Policy Reviews and Integrated Data Base (IDB)

by partner countries). Trade data is aggregated by region and income levels according to World Bank definition. A separate data set is provided on bilateral trade flows (by partners) at the industry level. The ISIC database is created by transforming the SITC Rev.2 classification. The concordance table developed by OECD, which provides two slightly different concordance tables: one for exports and another for imports.⁵ The major problems of the Trade and Production database are the presence of the label 'not classified' as a partner. This is the case when the country does not know or does not disclose the origin or the destination of trade flows. In the Trade and Production database, data on not classified countries are not allocated to any particular region but are reported as separate observations as 'not classified' value result as negative due to concordance aggregation between the SITC and the ISIC classification. In this case negative value is split across all regions according to weights calculated on the basis of existing documented trade. This problem affects only minimal parts of the data and is equivalent in assuming that exports or imports not classified by country of destination or origin are distributed to each region using as weights the documented trade flows.⁶

3.1.2 Indian Trade Data Sources

Major source of official data on Indian trade flows are the publications of (i) Reserve Bank of India (ii) Director General of Commercial Intelligence and Statistics (DGCI&S) apart from the above sources. The Director General of Foreign Trade (DGFT) is responsible for licensing statistics, the Reserve Bank of India (RBI) for the balance of payment statistics and the DGCI&S for the balance of trade statistics in India.

⁵ The table do not follow a one to one correspondence, but matching is done through a method of estimated weights. The trade and production database is balanced and report values for imports and exports

⁶ Alessandro Nicinita and Marcelo Olarreaga (2001) Trade and Production, 1976-99, Washington.

Reserve Bank of India

The RBI statistics is based on the merchandise transaction taking place in the economy, which is valued at the actual price paid through the banking channel, where export figures are on the basis of declarations and imports are on the basis of realisation rather than on landed merchandise. As the major purpose of the RBI data is to provide information on the balance of payment situation in the country, it is not available at different levels of disaggregation.

Director General of Commercial Intelligence and Statistics (DGCI&S)

The DGCI&S provides the most comprehensive and up to-date data on India's foreign trade. The data include information on value, quantum and value of exports and imports both country and commodity wise. This statistics is based on customs clearance of merchandise transaction at major parts of the country. Export statistics are based on declaration made by importers in bills of entry, both being subsequently checked by custom authorities, furnish these data to DGCI&S⁷

The two major publications of the DGCI&S are (i) Monthly statistics of Foreign trade of India (MSFTI) (commodity-Country) - Volume one of MSFTI includes Exports and Re-Exports and Volume two Imports. (ii) Statistics of Foreign trade of India (SFTI) by Countries (Country- Commodity) Volume one of SFTI includes Exports and Re-Exports and Volume two Imports (Quarterly). March issue of these publications gives annual data. Volume I, that is , the export data of MSFTI has been split into two parts from April 1998 onwards, with part one containing (Harmonised system) chapters 1-49 and the remaining chapters in

⁷ The shipping bills and bills of entry for each item of export and import contains all relevant details of the transactions, such as I) code number of the commodity, II) description of the codes, III) Licence particulars of the goods in case of imports IV) value of export/import V) Quantity (Gross and net) VI) amount of duty VII) name of exporter/ importer and VIII) Country of consignment / origin and destination

part two. There are two parts for SFTI export Volume also, part one containing countries starting with English alphabet A to M and part two N to Z.

Unlike the RBI, DGCI&S provides data at a highly disaggregate level. The DGCI&S has adopted a new commodity classification system known as the Harmonised system (HS) from April 1987.

Table 3.1
Classification of Trade Data

Years	UN Classification	Indian Classification	Structure
January 1957 to March 1965	Standard International Trade Classification (SITC)	Indian Trade Classification (ITC)	10 broad sections
April 1965 to March 1977	Standard International Trade Classification-Revised (SITC-R)	Revised Indian Trade Classification (RITC)	SITC-R 5 digits RITC 7 digits, subdivided into 184 groups
April 1977 to March 1987	SITC-Revision 2	Indian Trade Classification - Revision 2 (ITC-R2)	ITC-R2 7 digits, total number of Commodities are 7088
April 1987 to December 1995 (February 1986 Onwards for tariff)	Harmonised System (HS)	ITC (HS)	2-digit chapters (97) 4-digit HS headings (1253) 6-digit HS subheadings (5063) 8-digit commodity classification
January 1996 Onwards	Revised HS	Revised ITC (HS)	As above, with changes in some Sub-headings. 10,839 commodities at the 8-digit level

Source: Mihir Pandey, 2004⁸

⁸ Mihir Pandey (2004) *Impact of Trade liberalisation in Manufacturing Industry in India in 1980s and 1990s*, Working Paper No.140, Indian Council for Research on International Economic Relations New Delhi.

The classification consists of 99 chapters (including chapter 77 reserved for future use) represented by 2-digit codes, 1253 HS heading represented by 4-digit codes and 5062 HS subheading represented by 6-digit codes. The 8-digit codes of HS nearly 17035 in number have been derived by further sub division of 5062 HS sub heading to capture data on commodities of national importance. Manual handling of such a vast body of data is laborious. Now the data pertaining to the above two publications available in an electronic database. 'India Trade' supplied by Centre for Monitoring Indian Economy (CMIE) since 1995.⁹ Trade data is available according to the Indian Trade Classification [ITC (HS)] based on the harmonised Commodity description and Coding System. Earlier the data was based on the United Nations Standard International Trade Classification (SITC). The changes in the classification of trade data is shown in Table 3.1.

The DGCI&S data is preferred among the available other sources due to the following reason. First it is the most comprehensive and up to date official statistics on India's trade flows. Second it is available at a reasonable time lag, particularly with the introduction of electronic database. Third it is possible to match the trade classification followed by DGCI&S with the NIC and a concordance table is provided by Debroy and Santhanam (1993)¹⁰.

Data on Industrial Characteristics

There are two sources of data for industrial production. One is the Index of industrial production (IIP) and the other is National Accounts Statistics that is based on ASI data. While the IIP is available at monthly intervals, the NAS is

⁹ The DGCI&S data appears to be the preferred one among the available sources, because of the following consideration 1) it is the most comprehensive and up-to-date official statistics on India's trade flows 2) this data are available to the users with a reasonable time lag particularly so with the introduction of the electronic database 3) it is possible to match the trade classification system followed by the DGCI&S with the NIC and a concordance table is provided by Debroy and Santhanam.

¹⁰ C, Veeramni (2001) *Analysing Trade Flows and Industrial Structure of India: the Question of Data Harmonisation* , , Working Paper No.321, Centre for Development Studies, Thiruvananthapuram.

published annually, but with a longer time lag. The IIP is available for 18 two-digit industry groups, as well as five use-based, three input-based and two sector-based categories. The source of the data used for the index is voluntary reporting of monthly output by firms with equipment investment of over Rs. 20 lakh in 1980. Small-scale firms are included in those industry groups where they dominate. The IIP is revised every ten years. The index is, however, plagued by incomplete coverage, and does not cover the unregistered manufacturing sector at all.

Annual Survey of Industries (ASI)

For the purpose of collection of data on manufacturing, industrial activity in the country is divided into factory (registered or organised) and non-factory (unregistered or unorganised) sectors¹¹. The most comprehensive official data source on production statistics of the factory sector is the ASI brought out annually by Central Statistical Organisation¹². The ASI has been conducted since 1959 at the authority of collection of Statistics ACT 1953. The primary unit of enumeration is the factory and the reference period is the accounting year of the factory ending on any day during financial year. From 1987-88 onwards a new sampling design has been adopted, according to which, factories employing 100 or more workers whether using power or not constitute the Census sector. The remaining factories constitute the non-census (sample) sector. Also from 1987-

¹¹ The ASI replaced both the Census of Manufacturing Industries (CMI) and the Sample Survey of Manufacturing Industries (SSMI), which were the main official industrial statistics till 1958. The CMI gave information by type of ownership⁴ at the aggregate level, that is, for the entire manufacturing sector for the years 1951 to 1958. Variables for which information was available included productive capital, persons employed, salaries, wages and benefits to employees, gross output, materials consumed, and value added. Since 1954, this information was given at the industry level. This was, however, available only up to the year 1958. One major drawback of this data source was that it did not distinguish between government and non-government companies. It also did not distinguish between workers and salaried-class.

¹² The factory sector covers units registered under the factory Act 1948. The non-factory sector consisted of household and non-household industrial units, which are not registered under the said Act.

88 a stratified uni-stage sampling design has been adopted for the sample sector and the coverage of the census sector has been reduced.

From 1989- 90 onwards, NIC 1987 is followed for classification of industries. All the factories in ASI are accordingly classified in the appropriate industry group on the basis of value of the principal product manufactured by them. Therefore units get classified as one and only one industry group even though it might be manufacturing products belonging to different industries. The NIC 1987 is based on the international system devised by UN in its International Standard Industrial Classification (ISIC) 1968 Revision¹³. The classification consisted of 24 items at 2- digit level, 196 items at 3- digit level and 288 items at 4- digit level.

Major publications of the Central Statistical Organisation (CSO) relating to manufacturing statistics are, (i) Annual Survey of Industries, summary result for the factory sector. This is published every year and presents summary results of 32 selected characteristics. Data at 2 and 3 digit level of disaggregation are given for all the states and for all India. The important characteristics for which estimates are available are number of factories, capital (fixed, working, invested), number of workers, employees, total persons, man days, wages, emoluments, outstanding loans, fuels and materials consumed, gross output, depreciation, net value added, net income, profit, rent paid and interest paid. (ii) Annual Survey of Industries, detailed results for factory sector. In this publication of ASI from 1993-94 onwards detailed tabulation is being undertaken on annual basis. These volumes provide detailed all India, state wise, as well as industry wise data at 4-digit level of industrial classification.

¹³ The CSO is following a new commodity classification system NIC 1998, which is based on the ISIC 1990 (which is also harmonized with International Harmonised Commodity description a coding system, HS 1996. Efforts have been made construct every 4 / 5 digit category of revised NIC in such a manner so that one or more subheadings of HS can be assigned as a whole, to only one such category of NIC, to the extent possible.

One of the major limitations of the Annual Survey of Industries is that it does not provide data on advertising expenditure, the extent of foreign collaboration, marketing expenditure intensity, etc which is essential to understand the marketing structure such as industrial concentration, scale efficiency etc. Further data pertaining to individual factories within industry is not available. To overcome the above deficiencies of the ASI data, PROWESS database, which provide the firm level data including market structure, can be used.

PROWESS

The CMIE provides firm level statistics through its various publications and mostly through the electronic database 'PROWESS'. In terms of number of variables, for which information is available, this is the most comprehensive of available database. The industrial classification followed is much disaggregated. The data are available from 1988-89 onwards.

The RBI, BSE and Department of Company Affairs (DCA) also provide data at firm level¹⁴. The RBI provides data on finances of small, medium and large public limited companies, which is published in the RBI bulletin. Data was provided on a quinquennial basis until 1980-81 since then it is provided for three years. The basic data file of survey containing the company statistics is not being published, but it is possible to access on special request. But the limitation of the data is that it is essentially a sample data, thus the number of firms covered is comparatively less. Another major source of firm level data extensively used for research work is the 'Stock Exchange Official Directory published by BSE. Every issue contains data for the last 10 financial years. The DCA is another agency providing firm level data through its various publications. The DCA provides data of about 25000 public limited companies which are now available

¹⁴ Shanta.N and Raja Kumar D (1999) "Corporate Statistics: The Missing Numbers", *Journal of Indian School of Political Economy*, Vol. 11 No.4, pp.655-658.

in an electronic database 'First source' supplied by the CMIE. The major limitation of the BSE and DCA data is that the number of variables for which data provided is very few. The ICICI and IDBI also provide data at firm level¹⁵. The present study used PROWESS database.

In addition to these sources Economic Survey, Monthly Abstract of Statistics, etc. also provides data on trade, industrial characteristics and other related variables on Indian economy¹⁶.

3.2 Methodology

The present study examines the impact of trade reform on the export performance of India. The study to discern the influence of trade liberalisation is carried out at the aggregate level of export, industry level and at the firm level. Export performance is examined by using various growth rate and percentages. Average, and compound growth rates are used to examine the growth rate of exports. Determinants of exports at the aggregate levels are examined by using the Multiple regression, cointegration and Error correction methods. In order to examine the export performance of 15 industries as per the Annual Survey of Industries classification in India growth rate, export intensity, and import penetration ratio are mainly used. Multiple regression models are used to examine the impact of liberalisation at the industry level. The determinants and impact of trade liberalisation at the firm level is examined for seven industries by using the Tobit model. The models and the variables used for the analysis are given below.

Impact of trade liberalisation on India's exports at aggregate level is examined using Error Correction Model. Vector Error Correction Models is used

¹⁵ The data available with ICICI and IDBI covers only those companies assisted by these organizations.

¹⁶ Data on trade and other variables on Indian economy are also available in electronic form in India stat.com.

for the analysis. The Vector Error Correction models use error term from cointegration vectors. Johansen and Juselius Cointegration method is used in the present study. The cointegration method requires the variables to be stationary. The stationarity of the variable is examined using Augmented Dickey Fuller Test.

3.2.1. Augmented Dickey Fuller Test

The variables used for the analysis is tested for stationarity. From a theoretical point of view, a time series is a particular realisation of a stochastic process. If the underlying stochastic process that generates the series is assumed to have finite parameters and to be invariant with respect to time, then the process is said to be stationary. This simply means that the mean, variance and auto covariances of the series are all constants. In this case, i.e., if the process is stationary, the time series can be described by a simple algebraic model. If, on the other hand, the characteristics of the stochastic process change over time i.e., non-stationary, it is not possible to model the process in terms of an equation. Stationarity can be tested using Dickey Fuller test (DF), Augmented Dickey Fuller test (ADF) or by Philip Peron test¹⁷. The present study used Augmented Dickey Fuller Test for testing the stationarity. The model used for the analysis is

$$\Delta X_t = \alpha_0 + \beta X_{t-1} + \delta t + \sum_{i=1}^m \theta_i \Delta X_{t-i} + \varepsilon_t$$

Where Δ is the difference operator, t is the time trend, ε is the stationary random error, m is the maximum lag length. Null hypotheses is that $\beta = 0$, exists unit root. It will be rejected if β is negative and statistically significant.

¹⁷ Philips and Perron have developed a more comprehensive theory of unit root. The test are similar to ADF tests but they allow an automatic correction to Dickey Fuller procedure to allow for autocorrelated residuals. The test often gives the same conclusion and suffers from the most limitations of ADF tests.

3.2.2. Johansen and Juselius Cointegration Test

Cointegration test is used for testing the existence of a long run equilibrium relationship between variables. The concept of cointegration was introduced by Granger (1981) and Engle and Granger (1987), and is used as a statistical property to describe the long-run behaviour of economic time series. A variable is integrated if it requires differencing to make it stationary. If the (non-stationary) series is differenced d times to make it stationary, then the series is said to be $I(d)$. If two series y_t and x_t both are $I(1)$, then in general, any linear combination of them will also be $I(1)$. A set of integrated time series is cointegrated, if some linear combinations of the series are stationary. Thus, given two variables y_t and x_t , if they are indeed $I(1)$ processes, verified through some unit root tests, a simple method of testing whether they are cointegrated is to estimate the 'cointegrating regression' and then test whether the residual u_t is $I(0)$ or not. Such residual based procedures were the earliest cointegration test. In addition to the residual based testing, advanced methods like Engle and Granger and Johansen and Juselius methods are also used for estimation.

The present study used the Johansen and Juselius (JJ) (1990) cointegration estimator for cointegration analysis. This technique overcomes some of the shortcomings of the Engle- Granger (1987) cointegration method. The Johansen (1988) method, which was later, revised by Johansen and Juselius (1990) allows for testing more than one cointegrating vector in the data by calculating the Maximum likelihood estimate of these vectors. The existence of more than one cointegrating vector implies higher stability of the model. Johansen and Juselius test result gives two test statistics, Trace test and Maximum Eigenvalue test. Trace test is a joint test where the null is that the number of cointegrating vectors is less than or equal to r against an unspecified or general alternative that there are more than r . Max Test conducts separate test on each eigenvalue and its null hypotheses is that the number of cointegrating vector is r against an

alternative of $r+1$. The Max test is recommended as the better test among the two. In this model all the variables are treated as endogenous. The equation for estimation can be written in a Vector Auto Regressive (VAR) framework as follows.

$$Y_t = \Pi Y_{t-1} + e_t$$

When the series are I (1) the system can be formulated in an equilibrium Error Correction form as

$$\Delta y_t = \sum \delta_i \Delta y_{t-1} + \gamma y_{t-1} + e_t \quad i = 1, 2, \dots, p-1$$

Where γ is the long run coefficient matrix. With the assumption that Y_t is $I(1)$, γ , can not be full rank and rank of $(\gamma) = \gamma < n$, there exists linear combinations of y_t . The impact multiplier can be written as

$$\gamma = \alpha \beta'$$

Where α and β are $(n \times r)$ matrices of rank r and $\beta' y_t$ comprises γ cointegrating stationary relations. Then the equation can be written as

$$\Delta y_t = \sum \delta_i \Delta y_{t-1} + \alpha (\beta' y_{t-1}) + e_t \quad i = 1, 2, \dots, p-1$$

Johansen (1988) and Johansen and Juselius have derived the likelihood ratio test to determine the cointegrating rank (r) of γ . The null hypotheses that at most r (ie, $0 \leq r \leq n$) cointegrating vector is tested using the trace test with the statistics tested using the trace test with the statistics

$$\lambda_{\text{trace}}(r) = -T \sum_{i=r+1}^g \ln(1 - \lambda_i)$$

The likelihood ratio test statistics for the null hypotheses of r cointegrating vectors against the alternative $r+1$ cointegrating vector is the maximum Eigen value.

$$\lambda_{\text{max}}(r, r+1) = -T \ln(1 - \lambda_{r+1})$$

Johansen and Juselius (1990) indicated that the Trace test may lack the power relative to Maximal Eigenvalue. Based on the power of a test maximum eigenvalue is preferred.

3.2.3. Vector Error Correction Models

In order to examine the long run impact of the trade policy, Error Correction model is used. The Error Correction model combines long run information with a short run adjustment mechanism. That is the Error Correction model contains the information, whether the past values of the variables affect the current values of the variables under consideration. The error correction term often denoted is nothing other than the residual from the level regression. The error correction model in the present study is used to examine the long run relationship between variables. The principle behind the model is that there often exists a long run equilibrium relationship between economic variables. In the short run there may be disequilibrium, with the error correction mechanism, a portion of the disequilibrium in one period is corrected in the next period. The Error Correction model is thus a means to reconcile short run and long run behaviour. Notable contributions in the area have been made by Saragan (1964) Davidson, Hendry, Serba and Yen (1978), Carrie (1981), Dawson (1981) and Engel and Granger (1987). An important theorem known as the Granger representation theorem, states that if two variables Y and X are cointegrated then the relationship can be expressed as Error Correction Mechanism. Different methods to estimate Error Correction Model also exist. Almost all model uses error terms from cointegrating vector for estimating Error Correction Model. The present study used Vector Error Correction Model (VECM) for the analysis.

Vector Error Correction Model (VECM) is essentially a Vector Autoregression Model (VAR). The VECM includes the error correction term from the cointegration equation. It allows all the variables in the system to

interact with itself and with each other, without having to impose a theoretical structure on the estimate. It also provides a method of analysing the impact of a given variable on itself and on all other variables. The impact of each variable can be assessed using variance decomposition and impulse response function. In the present study impulse function and variance decomposition are not considered. The vector Error Correction model used for the present analysis is

$$\Delta Y_t = \theta_0 + \sum_{i=1}^{k-1} \theta_i \Delta Y_{t-i} + \alpha \beta' Y_{t-k} + \varepsilon_t$$

Where Δ is the difference operator, Y_t is vector of time series variables, θ_0 is the intercept and matrix β consists of r cointegrating vector ε is the error term

3.2.4. Model Adequacy Tests

In order to test whether the fitted model is correctly specified or adequate the following Model Adequacy tests are also used in the present analysis.

RESET-The RESET (Regression Specification Test) developed by Ramsey (1969), tests functional form misspecification. The null hypotheses of no functional form misspecification would be rejected if test statistics were too high.

General Heteroscedasticity Test (F-test)-The assumption of no heteroscedastic errors should also be checked using White's (1990) General heteroscedasticity (F-test). A small P value (associated with large F value) rejects the null of no heteroscedasticity in errors.

ARCH-Auto Regressive Conditional Heteroscedasticity (ARCH) is used for checking the serial correlation in errors.

The instability of the parameters in the model is examined through a joint (F) statistics, large value of which reveal parameter non- constancy and indicate a fragile model with some structural breaks.

3.2.5. Multiple Regression Models

The study used multiple regression models mainly for examining the determinants of exports in the pre and post reform period and for assessing the impact of the trade reform on the Indian manufacturing industries. The multiple regression models used for the present analysis is specified as follows

$$Y_t = \alpha + \beta X_{its} + \varepsilon_t$$

Where Y is the dependent variable selected for the analysis and X_{its} are the explanatory variables selected and ε_t is the error term

3.2.6. Granger Causality Test

The direction of causality is tested by Granger Causality test. This test explains the direction of causation between the variables selected for the analysis. The intention behind Granger test is that suppose X Granger causes Y but Y does not Granger cause X, then past values of X should be able to help to predict future values of Y, but past values of Y should not be helpful in forecasting X. when we identify one variable as the dependent variable (Y) and another as explanatory variables, we make an implicit assumption that changes in the explanatory variable induces changes in the dependent variable. This is the notion of causality in which information about X is expected to affect the conditional distribution of the future values of Y . If X causes Y and Y causes X, then there is feed back effect, that is jointly determined and other wise it is determined unidirectionally.

The test statistics is explained as,

$$F = \frac{(ESSR - ESS)/q}{ESS/n - p - q}$$

where ESSR is the Explained Sum of Residuals, ESS is Explained Sum of Squares, q degrees of freedom for numerator, n-p-q- degrees of freedom for denominator.

3.2.7 Tobit model

The factors that determine the export intensity of the firm is examined using the Tobit model. The Tobit model is used for the analysis as the export behavior of the firm involves two important decisions that are whether to export or not. In this case the dependent variable may take value as zero or the actual export value. In such a situation where values of dependent variable is not observed for some of the observation Tobit is the suitable model. The general form of Tobit model is that

$$Y = \begin{cases} \alpha + \beta X_t + u_t & \text{If } Y_t > 0 \text{ or } u_t > -\alpha - \beta X_t \\ 0 & \text{If } Y_t \leq 0 \text{ or } u_t \leq -\alpha - \beta X_t \end{cases}$$

The Basic assumption behind the model is that there exists an index function , $I_t = \alpha + \beta X_t + u_t$. If $I_t < 0$ the value of the dependent variable is Zero and if $I_t > 0$, the value of dependent variable is I_t . Suppose that the u has he normal distribution with mean Zero and variance σ^2 then ‘Z’ standard normal random variable is defined as, $\leq$

$$Z = u / \sigma$$

denoting $f(Z)$ the probability density of the standard normal variable Z , and $F(Z)$ its cumulative density, ie, $P[Z \leq x]$. Then the joint robability density for those observation for which Y_t is positive is given by

$$P_1 = \prod_{i=1}^{i=m} 1/\sigma f[Y_i - \alpha - \beta X_i / \sigma]$$

where Π denotes the products and m the number of observation with positive y values. The probability function for observation with Zero y value is defined as

$$P_2 = \prod_{j=i}^{j=m} p[u_j \leq -\alpha - \beta X_i]$$

The joint probability for the entire sample is given as $L = P_1 P_2$. AS it is non linear in α and β Ordinary Least Square procedure is not appropriate. The direct interpretation of the individual variable is not possible in Tobit model so the relationship with the variable is explained in the present analysis.

The model used for the present analysis is given below

$$\begin{aligned} Ex_{it} &= X_{it}\beta + U_{it}, \text{ if } X_{it} + U_{it} > 0 \\ &= 0 \quad \text{if } X_{it} + U_{it} = 0 \end{aligned}$$

where X_{it} is the factors that explains the export intensity of i^{th} firm in t^{th} period. $Exit_{it}$ is the export intensity of firms.

This model takes into account the probability as well as the intensity of exports. The Tobit model is used to examine the determinants of firm level exports and also to examine the impact of trade reform.

These are the methods used in the present analysis to satisfy various objectives. The description of the variables are given in respective chapters.

3.3 Chapter Scheme

The study is divided into nine chapters. The introductory chapter is followed by chapter on theoretical framework and review of literature. The data source and methodology is explained in the third chapter. Chapter four gives trade policy measures introduced in India. Trends in export performance of India is examined in chapter five. Analysis of the impact of trade liberalisation on aggregate exports is included in chapter six. Chapter seven examines the impact of trade liberalisation at industry level and chapter eight analysed the impact of trade liberalisation on the export behaviour of firms. Summary and conclusions are given in chapter nine.

3.4 Limitations

The analysis is based on the secondary data. So there may be the problems related with the time series data analysis. We have adjusted the problems of Multicollinearity, Autocorrelation and Heteroscedasticity to the possible extent so as to retain the significance of the model. Another limitation of the study is that due to non availability of data for some of the analyses, the period of analysis is not from 1980. As India adopted Harmonised Code system from 1987 the item wise analysis at aggregate level is examined since 1987. The firm level data are available since 1989 only so the analysis is done from that year. Trade policy variables like openness index and liberalisation dummy are used in the study by taking its limitations into consideration. The analysis is on exports, so that impact on imports is excluded. Among the exports, manufactured exports of goods are selected for the analysis so that trade in service is not taken into consideration for the present analysis.

Chapter IV

Trade Policies in India

- 4.1 Pre Reform Trade Policies
- 4.2 Trade Liberalisation Policies

Indian economy registered significant changes since the introduction of globalisation. The economy has to reorient to the changing multilateral trade discipline within the GATT and WTO framework apart from the impact of various unilateral economic reforms under taken since 1991. The unilateral trade policy measures have encompassed exchange rate policy, foreign investment, external borrowing, import licensing, custom tariffs and export duties. The multilateral aspect of India's trade policy refers to the country's commitments to WTO with regard to trade in goods and services, trade related investment measures and intellectual property rights. The multilateral trade liberalisation under the auspices of the Uruguay Round agreement and the WTO negotiations aimed at reducing tariff and non- tariff barriers on international trade, outward oriented strategy for export promotion and improving competitiveness of Indian industry etc. In this chapter an overall review of the trade policies followed in the country is attempted.

4.1 Pre Reform Trade Policies

India's foreign trade policy during the last five decades may be classified into import substitution policy, export drive policy and export acceleration policy. The import substitution policy was followed in the first two decades, the export drive policy in the third and fourth decades and export acceleration policy in the 1990s. Export acceleration policy referred to India's transition towards a globalised economy by stimulating exports and facilitating imports of essential inputs as well as capital goods. At the early stage, Indian exports were non-competitive and performed poorly in the international market. Export promotion effort was initiated in the late 1960s and 1970s in the form of export incentives and export services to generate export performance on a sustained and long-term basis. The main export incentives introduced were cash compensatory support

(CCS)¹, Import Replenishment, Duty Draw Back Scheme (DDS)², Market Development Assistance (MDA), etc. The main institutional effort for export promotion policies introduced in the 1970s was in the form of creation of export promotion Council, Commodity Boards and specialised service institutions. In 1973, industrial licensing policies were liberalised to allow firms to increase their authorised capacity for exports. In 1975-76 import policy was liberalised in order to make availability of imported inputs to registered exporters and actual users. The liberalisation of import regime was further strengthened in trade policies announced in 1978-79.

The pre reform export policy can be divided into three phases. The phase 1 (up to oil shock of 1973), which was characterized by export pessimism. This phase can be divided into two sub periods 1952-66 and 1966-73. The first sub period covers the first three five year plans and was characterized by passive export policy. The second sub period starts with the devaluation of rupee by 36.5 per cent in 1965. Export subsidies were introduced for some non traditional goods in 1966 and by 1967 they covered the bulk of engineering goods, chemicals, cotton textiles, paper products etc. The second phase, which began in 1973, undertook a lot of export promotion measures and these measures increased export growth. There was a more positive approach to export promotion strategy during the third phase. The industrial and development policies treated exports as an integral part. The export policy emphasized the technological up gradation, increase in the size of plant and strengthening the international competitiveness of domestic industries. In the mid 1980s the government of India had adopted a long-term three year import - export policy.

¹ This was introduced in 1966 to provide compensation for unrebated indirect taxes paid by exporters on inputs, higher freight rates and market development costs but it was abolished in July 1991

² The objective of this policy is to reimburse exporters for tariff paid on the imported materials and intermediates and central excise duties paid on domestically produced inputs, which enter into export production.

The import policy of Government of India can also be classified as import restriction and import substitution. The Government had to import capital equipment, machinery, intermediate goods, technical know how etc. in large quantities following the Mahalanobis strategy of development which encouraged large scale industrialization of the country during the second five year plan (1956-57). But export earnings were stagnant during this period. Therefore the Government restricted the import and this was followed up to 1977-78. But there was a brief period of import liberalisation after the devaluation of 1966.

The import substitution in India has two broad objectives, (a) to save scarce foreign exchange for the import of more important goods (b) to achieve self reliance in the production of as many goods as possible. The import substitution policy has various phases. While in the earlier phase import substitution took the form of domestic production of consumer goods, in the second phase emphasis shifted to the replacement of the import of capital goods and in the third phase dependence on the imported technology was reduced and indigenous technology was developed. The policy of import substitution enabled the country to save valuable foreign exchange and in changing the structure of imports.

The year 1977-78 initiated a new era of import liberalisation in the country. This process was carried forward in 1980s. The annual import policy of 1980-81 to 1984-85 followed the liberal approach of providing necessary imported inputs for the industrial sector. However the real thrust for liberalisation came from 1985 onwards when the system of formulating long term policies was adopted. The three long term export-import policies announced covered the period 1985-88, 1988-90 and 1990-92. The long-term three year import - export policy (1985-88) aimed at providing easy access to import, essential for maximising production and exports. The main policy changes were abolition of automatic licencing, inclusion of 201 items of industrial machinery in the list of capital goods allowed for import

under Open General License (OGL), decanalisation of 53 import items, raising the minimum limit for the import of capital goods against REP licenses from Rs.1 lakh to Rs. 2 lakh for registered exporters irrespective of their level of export performance. The second three-year policy (1988-91) carried forward the process of trade liberalisation to make the Indian export more competitive in the international market.

4.2 Trade Liberalisation Policies

The structural adjustment programme in 1980s and early 1990s have focused on using fiscal and monetary policies to restore the Balance of Payment equilibrium and stimulate economic growth in developing countries. Until June 1991, India followed a very restrictive economic policy characterised by exclusion of the private sector in a number of important industries and sectors, entry and growth restrictions on private, particularly large enterprises and stringent restriction on foreign capital and technology import. The salient features of the trade policy reform introduced in 1991 are exchange rate adjustment and reduction in the role of subsidies in export promotion by abolishing the cash compensatory support (CCS). The liberalisation of import has been done by substantially eliminating licensing, quantitative restrictions and other regulatory controls. Prior to economic reform, India operated a system of Quantitative Restrictions (QRs) through an import licensing regime.

The trade reform has introduced important changes in the licensing, tariff rationalisation and Quantitative Restrictions. The trade policy enunciated since 1991 strengthened the Advance Licenses, designed to provide exporters with duty free access to the input they need to produce competitively for the world market. Further liberalisation measures like extension of this facility to deemed export, extension of licenses to other item etc. were also introduced since 1991. During the post reform period various Export- Import policies were introduced.,

Annual policy changes were also made during the period since 1992. The important reform measures introduced in these two EXIM policies are summarized below.

Special import licences (SIL)

A number of items from the negative/ restricted list were permitted free for import and many others were shifted to the list of item which can be imported under special import licences. By 1997, as many as 69 items in the special import list have been shifted to the free list and another 95 items have been taken off from the restricted list and placed in SIL list. In 2000- 2001 policy the special import licences were abolished. All items under SIL will now be importable on surrender of SIL equivalent to 5 times CIF value of imported goods.

Export promotion of capital Goods Scheme

Under the scheme the capital goods were allowed to import at a concessional rate. This system was further strengthened in the subsequent Exim Policy, by permitting import of various goods. The scope of the EPCG scheme at zero duty has been extended further to Bio-technology, small scale engineering industry, Chemicals, textiles etc. By 2000-01 EPCG scheme was extended to all sectors and to all capital goods without any threshold limit.

Other Export promotion measures like Deemed export, Duty Entitlement Pass Book scheme, Duty Free Replenishment certificate etc. were simplified and rationalised during the reform period. During the post reform period significant changes are introduced in the tariff rate, exchange rate, foreign investment, etc. The significant measures introduced in these area which have will its impact on India's exports are examined in the following sections.

4.2.1 Tariff Reforms in India

The most important characteristics of trade policy reforms introduced since 1991 was removal of Quantitative Restriction and tariff rationalisation. India's

tariff structure was highly complex and difficult to administer because of a large number of end use exemptions. The average tariff was far above the world average. The Government, following the recommendation of the Tax reform committee, reduced the peak level of tariff to 150 per cent in 1991-92 and further to 110 per cent in 1992-93. In 1990-91, the unweighted average nominal tariff was 125 per cent with a peak level of 355 per cent. In 1993-94, the corresponding figures were 71 per cent and 85 per cent. In 1994 the peak rate was reduced to 65 per cent, bringing the average down to 50-55 per cent. In 1995 the peak rate was further reduced to 50 per cent, together with reduction in almost all other rates as given in Table 4.1 and Table 4.2.

Table 4.1
Tariff Rates of India

Year	Maximum Tariff	Average Weighted Tariff Rate
1990-91	330.0	87.0
1993-94	85.0	47.0
1995-96	50.0	25.0
1996-97	52.0	25.0
1998-99	50.8	20.0

Source: Economic Survey

A policy of phased reduction in maximum tariff rate has been combined with a reduction in the average level as well as in dispersion of rates of tariffs. The import weighted average tariff for the whole economy came down to 24.6 per cent in 1996-97 from 87 per cent in 1990-91. However in its commitment under the Uruguay Round, India chose to bind tariffs at a much higher rate than those being applied. In the case of intermediate goods the tariff increased from 21.9 per cent in 1996-97 to 31.9 per cent in 1999-2000, which is clear from Table 4.3. Similar movement is also apparent in the case of unweighted averages of tariff rates.

Table 4.2 gives the tariff structure of India. The tariff rate is highest in consumer goods industries. The tariff rate is highest for the intermediate and

capital goods also. The tariff rate for the economy as a whole has come down from 128 in 1990-91 to 39.6 per cent in 1999-2000. The import weighted average tariff given in Table 4.3 also shows that the rate has been reduced in the subsequent years since 1991. The rate has been reduced in almost all sectors since 1991. It is highest in consumer goods and capital goods.

Table 4.2
Tariff Structure of India -1990-2000

Sector	1990-91	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00
Whole economy	128	94	71	55	40.8	38.6	34.4	40.2	39.6
Agricultural product	106	59	39	31	25.1	25.6	24.6	29.6	29.2
Mining	N.A	N.A	71	48	30	24.8	24.4	29.4	26.6
Consumer goods	142	92	76	59	45.4	45.4	39.8	45.9	42.9
Intermediate goods	133	104	77	59	43.7	38.8	34.7	40.7	41.2
Capital goods	109	86	58	42	33.1	33.8	29.7	35.3	35.3_

Source: World Trade Organisation (WTO) Report

Table 4.3
Import Weighted Average Tariff Rates of India

Sector	1990-91	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
Whole Economy	87	64	47	33	27.2	24.6	25.4	29.7	30.2
Agricultural Product	70	30	25	17	14.9	14.7	14	16.1	17.7
Mining	N.A	N.A	33	31	27.6	22	21.9	19.5	17.7
Consumer goods	164	144	33	48	43.1	39	33.8	39.3	32.1
Intermediate Goods	117	55	40	31	25	21.9	26.1	31.5	31.9
Capital Goods	97	76	50	38	28.7	28.8	24.7	30.1	32.2

Source: World Bank Report

The trends in the average tariff rate for India, developing countries, industrial countries and low income countries are given in Table 4.4. Table shows that India's tariff rates are high compared to other country groups. The average tariff rate in India over the years came down from 100 per cent in 1980 to 33 per cent in 2002, but still it is higher than other countries. The average tariff rate of low income countries are higher compared to the middle and high income

countries. Figure 4.1 also shows that the average tariff rate of India declined since 1990.

Table 4.4
Trends in Average Unweighted Tariff Rates for India, Developing and Industrial Countries, 1981-2002 (%)

Year	India	Developing Countries	Low Income	Middle Income	High Income Non-OECD countries	High Income OECD Countries
1981	74.30	28.70	35.53	24.68		-
1982	-	32.60	37.30	29.47	9.75	-
1983	-	36.87	44.22	31.98	9.63	-
1984	-	31.64	34.92	29.90	9.58	-
1985	-	29.58	35.84	27.67	7.46	-
1986	100.00	28.39	34.69	24.13	7.99	-
1987	98.80	25.73	29.00	23.60	10.68	-
1988	-	25.95	32.64	21.50	5.13	7.10
1989	-	25.53	30.53	22.85	4.60	8.18
1990	81.80	25.88	32.92	21.38	5.83	7.93
1991	79.20	26.62	43.18	20.25	2.63	8.50
1992	53.00	22.17	34.69	16.56	0.13	7.93
1993	47.80	21.33	28.09	16.33	2.18	6.82
1994	47.80	20.22	26.66	15.45	2.16	7.24
1995	41.00	16.66	19.95	14.41	5.72	6.28
1996	38.70	16.21	18.51	14.66	7.32	5.48
1997	35.00	17.14	19.34	15.31	7.93	4.87
1998	30.00	16.23	18.38	14.51	7.63	4.38
1999	32.50	15.38	17.17	13.95	7.88	4.08
2000	31.00	14.31	15.58	13.27	7.95	3.78
2001	30.90	13.68	14.63	12.92	7.64	3.31
2002	33.00	13.64	14.72	12.76	7.44	3.18

Source: World Trade Organisation (WTO) Report

Figure 4.1

Average Tariff Rate of India (%).

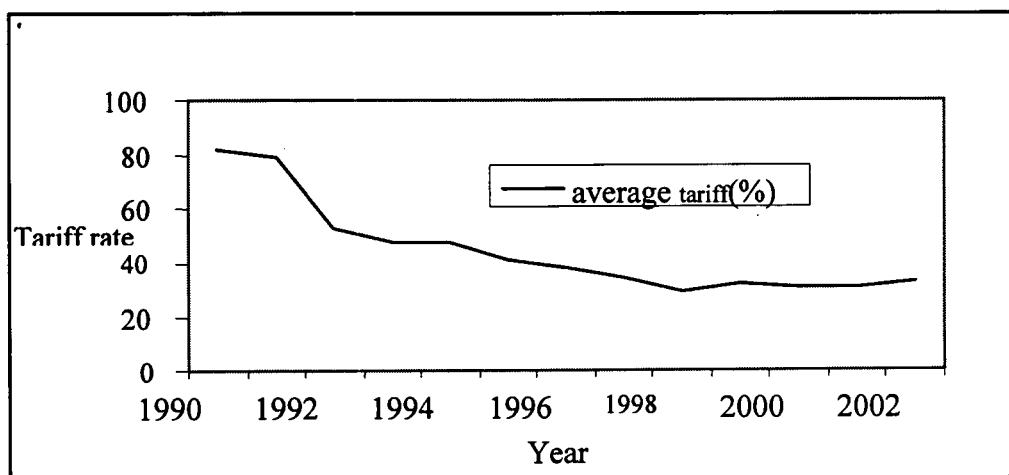


Table 4.5 gives an international comparison of mean tariff rate of important countries. It shows that mean tariff rate was highest in Bangladesh in 1990s but it declined to 22.4 in 1999. In India also the mean tariff rate is highest compared to other countries, though it declined to 34.3 in 1999 from 84.1 in 1990, still it is higher compared to other countries.

Table 4.5
International Comparison of Tariff and Non-tariff Barriers of Manufactured Products

Country	Year	Mean tariff	World import Weighted Mean tariff	Year	Tariff line Covered by NTBs
India	1990	84.1	93.6	1990-93	58.9
	1999	34.3	28		
Bangladesh	1989	132.2	125.5		NA
	1999	22.4	18.5		
China	1992	44.9	46.5	1994	11.3
	1998	17.4	18.5		
Indonesia	1989	27.1	27.4	1993	2
	1999	11.8	14.3		
South Korea	1988	18.6	17.8	1988	N.A
	1999	7.8	7		
Malaysia	1988	17.6	14.4	1993	2.4
	1997	12	9.4		
Nepal	1998	18.3	21	1998	0.5
	1999	13.5	17.8		
Pakistan	1990-93	53	NA	1990-93	17.3
Philippines	1988	28	28.8		N.A
	1999	9.3	8.5		N.A
Sri Lanka	1990	27.5	22.2	1993	4
	1997	19.1	19.8		
Taiwan	1989	10.9	12.2		N.A
	1996	6.7	6.5		N.A
Thailand	1989	41.7	42.4	1990-93	4.2
	1993	47.3	43.7		

Source: World Trade Organisation (WTO) Report

Removal of Quantitative Restrictions (QRs)

QRs refers to measures other than tariff or duties taken to restrict imports or exports. Article XI of the GATT provides for the general elimination of QRs

on imports stipulating that imports may be controlled only through tariff. India has been maintaining QRs for Balance of Payment reason under the specific provision of GATT. In the import policy announced on 1st April 1996, 6161 tariff lines (at 10 digit level of HS ITC) out of total number of 10202 was made free. Import restrictions on 488 tariff lines were removed in 1996-97, 391 (at 8 digit level) in 1997-98, and 894 in 1998-99 and 714 in 1999-2000. The process of removal of QRs on BOP ground has been completed with the removal of restriction of remaining 715 items in 2001 as per Table 4.6.

Table 4.6
Chronology of Removal of India's Quantitative Restrictions

Tariff Lines	No. Of items
Total number of tariff lines as on April 1 1996	10202
Tariff line free as on April, 1996	6161
Tariff line freed for import during 1996-97	488
Tariff line freed for import during 1997-98	391
Tariff line freed preferentially for import from SAARC countries with effect from April, 1998	1429
1998-99	894
1999-2000	714
2000-01	715

Source: Exim- Policy 2001-02

Different types of non tariff imposed in India are given in Table 4.7. Non tariff barriers are classified as the prohibited, restricted, canalized, special import licensing, and the free list. The main aim of the reform measure is to reduce restriction. This is clear from table given below. Table 4.7 shows that about 94.70 per cent of the products are under the free list by 2001. The share of items under the restricted list was reduced to 4.72 per cent in 2001 from 29.6 in 1996. The number of canalized and items under special import licensing are almost

zero. By year 2001 almost 95 per cent of the item were put under the free list in India and that of the restricted item was only about 5 per cent.

Table 4.7
Different Types of Non Tariff Barriers Imposed on India's Imports, 1996-97 to 2001-02

Year	Tariff lines	Prohibited	Restricted	Canalized	SIL	Free	Total
As on 1.4.1996	No.of lines	59	2984	127	765	6161	10202
	% share	0.6	29.6	1.2	7.6	61	100
As on 1.4.1997	No.of lines	59	2322	129	1043	6649	10202
	% share	0.6	22.8	1.3	10.2	65.1	100
As on 1.4.1998	No.of lines	59	2314	129	919	6781	10202
	% share	0.6	22.7	1.3	9	66.4	100
As on 1.4.1999	No.of lines	59	1183	37	886	8055	10220
	% share	0.6	11.5	0.4	8.7	78.8	100
As on 1.4.2000	No.of lines	59	968	34	226	8854	10141
	% share	0.6	9.6	0.3	2.2	87.3	100
As on 1.4.2001	No.of lines	59	479	0	0	9611	10149
	% share	0.6	4.7	0	0	94.7	100

Note: No. of Tariff lines, 10 Digit level

Source: Director General of Foreign Trade

4.2.2 Foreign Direct Investment

Until the reform of 1991, India's attitude towards inflow of foreign capital, particularly Foreign Direct Investment (FDI), was of suspicions if not outright hostility. Prior to 1991, restrictions on FDI included limiting entry only to specified priority areas, upper limit of 40 per cent on equity participation and requirements of government approval on technology transfer, export obligation as well as phased increase in domestic content of production. The 1991 reforms did not significantly liberalise FDI. However a discretionary mechanism of approval through the Foreign Investment Promotion Board (FIPB) and an automatic approval mechanism (mainly for investment in infrastructure) through Reserve Bank of India were created. Yet much of the FDI comes through the

discretionary mechanism. The Government. Decided to welcome foreign investment, as it would bring advantage of technology transfer, marketing expertise and promotion of export. Automatic approval of foreign investment was allowed up to 51 per cent and foreign technology agreement permitted for 35 priority industries, which account for about 50 per cent value added in the manufacturing sector in 1995-96. Foreign Investment Promotion Council (FIPC) and Foreign Investment Promotion Board were constituted and revamped in 1996-97. Only in 2001, the government decided to allow 100 per cent foreign investment in several industrial sectors. Foreign investors no longer are required to sell 26 per cent equity to an Indian partner or the public. Also limit on FDI in specific sections were raised, from 20 per cent to 49 per cent in banking and 49 per cent to 74 per cent on internet service providers, paging and band width. The defence sector, hitherto excluded even to domestic investors, was opened to private investors (domestic and foreign).

The FDI inflow was very small amount in 1980 but it increased in the latter half of the 1980s. as given in Table 4.8. At the time of introduction of reform measures in 1991 the FDI was very low. Thereafter it showed an increasing trend. In absolute terms it increased from 75 million in 1991 to 3449 million dollars in 2002. The inflow of foreign direct investment in India is very low and it constitutes only a very small share in GDP as given in Table 4.9. The share to GDP shows an increasing trend since 1980. It increased from 0.04 per cent to 0.70 per cent in 2002. Percentage of FDI to Gross Domestic Capital Formation also increased from 0.24 in 1980 to 3.02 per cent in 2002.

Table 4.8
Inflow of Foreign Direct Investment in India (Million Dollars)

Year	India	% to Gross fixed capital formation in India	% to GDP in India
1980	79	0.24	0.04
1981	92	0.25	0.05
1985	106	0.24	0.05
1990	237	0.32	0.07
1991	75	0.12	0.03
1992	252	0.39	0.10
1993	532	0.88	0.19
1994	974	1.37	0.30
1995	2151	2.41	0.61
1996	2525	2.87	0.68
1997	3619	3.98	0.89
1998	2633	2.90	0.64
1999	2168	2.21	0.50
2000	2319	2.27	0.50
2001	3403	3.21	0.72
2002	3449	3.02	0.70

Source: World Investment Report

The compound growth rate given in Table 4.9 shows that FDI inflow has increased to developing countries and Asia during the post reform period. But it showed a decrease in growth rate compared to developed countries in the 1990s. The inflow to the world as a whole also showed a decrease in its performance. Though the FDI inflow has increased during the post reform period it shows a decline in growth rate in 1990s compared to 1980s.

Table 4.9
Compound Growth Rate of Foreign Direct Investment Inflow

Period	World	Developed countries	Developing countries	Asia and the Pacific	India
1980-1990	21.862	27.861	7.241	8.017	39.475
1991-2002	16.428	17.937	12.670	11.456	29.761

Source: Computed from World Investment Report

The outflow of FDI is given in Table 4.10. The share of India is very low compared to the developed and developing countries. India has contributed only 4

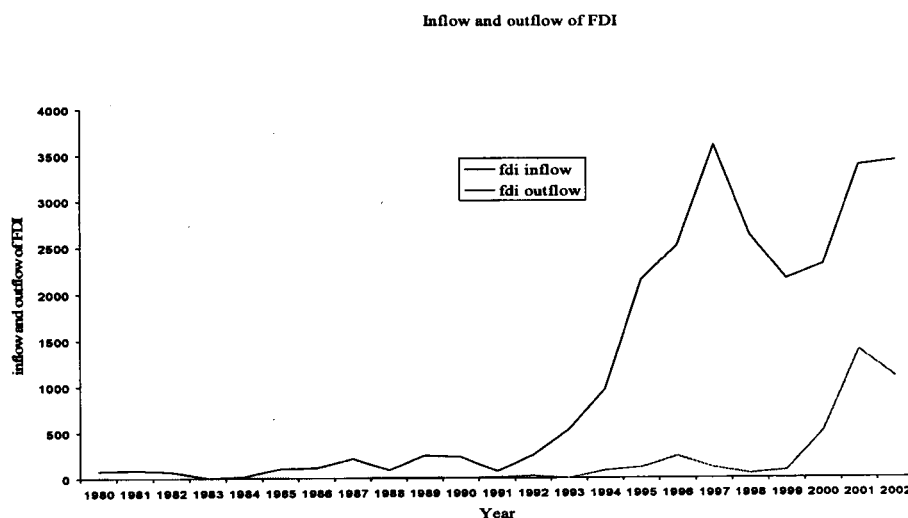
million dollars in 1980 but it increased in the subsequent years. The share to India's GDP was near to zero in 1980 and it increased to 0.22 per cent in 2002. The share to gross domestic capital formation was only 0.01 per cent in 1980. It increased to 0.97 per cent in 2002. Figure 4.2 gives the trend in inflow and outflow of FDI from India, which shows an increasing trend of inflow and outflow.

Table 4.10
Outflow of Foreign Direct Investment (Million Dollars)

Year	World	Developed countries	Developing countries	Asia	India	% to Gross capital formation in India	% to GDP in India
1980	53683.12	50343.37	3318.75	1044.08	4.00	0.01	0.00
1981	52839.08	50819.74	2016.34	318.60	2.00	0.01	0.00
1985	62178.24	57906.96	4270.27	2846.84	3.00	0.01	0.00
1988	177553.14	165559.82	11971.32	10722.86	11.00	0.02	0.00
1990	242056.85	225755.81	16247.44	10935.45	6.00	0.01	0.00
1991	198616.43	186686.59	11892.51	8000.73	-11.00	-0.02	0.00
1995	358235.35	304773.93	52719.33	42266.32	119.00	0.13	0.03
1999	1092279.36	1014331.30	75488.13	41668.41	80.00	0.08	0.02
2000	1186838.34	1083884.94	98929.39	83805.28	509.00	0.50	0.11
2001	721501.35	658094.35	59861.12	50308.95	1397.00	1.32	0.29
2002	596487.42	547603.05	44008.81	37884.31	1107.00	0.97	0.22

Source: World Investment Report

Figure 4.2
Inflow and Outflow of FDI From India



The FDI inflow is highest in China over the period since 1990. It increased from 3.49 billion Dollars in 1990 to 38.75 US billion dollars in 1999 and to 52.74 billion dollars in 2002. India occupied the fourth place among developing countries in FDI inflow. The share of India in all developing countries increased from 0.67 per cent in 1990 to 1.18 per cent in 1999 as per Table 4.11. Most of the Asian countries given in table show an improvement in inflow of FDI.

Table 4.11
Foreign Direct Investment to Developing Countries (Billion Us dollar)

Countries	1990	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
All developing Countries	24.3	47.5	66	88.8	105	130.8	170.3	173.2	181.9	231.88	252.46	219.72
India	0.16	0.28	0.55	0.97	2.14	2.43	3.58	2.64	2.17	2.32	3.40	3.45
China	3.49	11.16	27.52	33.79	35.85	40.18	44.24	43.75	38.75	40.71	46.88	52.74
Indonesia	1.09	1.78	2.04	2.11	4.35	6.19	4.68	-0.36	-2.75	-1.87	-4.55	-2.97
Thailand	2.44	2.11	1.8	1.37	2.07	2.34	3.75	6.94	6.21	3.35	3.81	1.07
Malaysia	2.33	5.18	5.01	4.34	4.13	5.07	5.1	5	1.53	5.53	3.20	2.74
South Korea	0.79	0.73	0.59	0.81	1.78	2.33	2.85	8.41	9.33	8.57	3.68	2.94

Source: World Investment Report

The Inward FDI Performance Index ranks countries by the FDI they receive relative to their economic size. It is the ratio of a country's share in global FDI inflows to its share in global GDP. Value greater than one indicates that the country receives more FDI compared to its relative economic size, a value below one receives less (a negative value means that foreign investors disinvest in that period). The index thus captures other things being equal the influence GDP has in attracting FDI. The other factors can be diverse, ranging from the business climate, economic and political stability, the presence of natural resources, infrastructure, skills and technologies, to opportunities for participating in privatisation or the effectiveness of FDI promotion³. From Table 4.12 it is clear that India receives less FDI compared to its economic size as the

³ FDI inward performance index is defined as $(FDI_i/FDI_w)/(GDP_i/GDP_w)$, where i and w is India and world respectively

performance index is less than one. The performance index is highest from 1995-97 period compared to other periods. The performance index was only 0.08 in 1980 ie the inflow of FDI was very negligible in India. It increased in the subsequent years and reached 0.54 in 1997 then it showed a decline in its performance thereafter. As the performance index is less than one the country receives less FDI compared to the economic size.

Table 4.12
FDI Inward Performance Index of India

Year	Index	Year	Index
1980	0.08	1992	0.15
1981	0.08	1993	0.21
1982	0.07	1994	0.31
1983	0.01	1995	0.53
1984	0.02	1996	0.52
1985	0.09	1997	0.54
1986	0.08	1998	0.28
1987	0.09	1999	0.14
1988	0.03	2000	0.11
1989	0.08	2001	0.27
1990	0.08	2002	0.33
1991	0.04		

Source: World Trade Organisation Report

Foreign investment inflows category wise is shown in Table 4.13. The investment through Foreign Investment Promotion Board constitutes the major parts of foreign institutional investment. The share through Non Resident Indians shows a decline since 1997-98.

Table 4.13
Category Wise Foreign Investment Inflows of India (US\$ million)

Particulars	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
RBI (automatic approval)		42	89	171	169	135	202	179	171	454
SIA/FIPB	66	222	280	701	1249	1922	2754	1821	1416	2221
NRI	63	51	217	442	715	639	241	62	84	67
Acquisition of shares	-	-	-	-	11	125	360	400	490	362
Total	129	315	586	1314	2144	2821	3557	2462	2155	2339

Source: Economic Survey

Foreign Portfolio investment to developing countries is shown in Table 4.14. The foreign portfolio investment in India was negligible till 1993. Since 1993 the share increased and it is 13.43 during 1994 an all time increase since 1990. By the end of 1990s, the share of India steeply declined.

Table 4.14
Portfolio Investment to Developing Countries (Billion U.S dollars)

Countries	1990	1992	1993	1994	1995	1996	1997	1998	1999
All Developing Countries	3.7	14.1	51	35.2	36.1	49.2	30.12	15.6	34.5
India	0.01	0.24	1.84	4.73	1.52	4.39	2.12	0.34	1.3
China	0	1.19	3.82	3.92	2.87	3.46	8.45	1.27	3.73
Indonesia	0.312	0.12	2.45	3.67	4.87	3.09	0.29	0.25	1.217
Thailand	0.45	0.004	3.12	-0.54	2.15	1.55	-0.31	2.34	2.52
Malaysia	0.29	0.385	3.7	1.3	2.29	4.35	-0.48	0.59	0.52
South Korea	0.58	3.045	6.02	2.52	3.55	3.7	1.25	4.09	12.43
Share of India in all Developing countries (%)	2.84	1.71	3.6	13.43	4.2	8.94	7.01	2.19	3.77

Source: World Investment Report

Export Processing Zone

with a view to giving impetus to export drive, the government set up Export Processing Zone (EPZ) which provides almost free trade environment for export production so as to make Indian export product competitive in the world market. The scheme of 100 per cent Export Oriented Unit (EOU) was introduced in 1980 to provide duty free access to import of raw materials, intermediate goods and technology on Open General Licence. Earlier India had one export processing Zone in Kandla port on the West coast of India. Unlike EPZs in the rest of Asia, Indian EPZs didn't attract any FDI. In 1999-2000 EPZs were replaced by Free Trade Zone (FTZ), which are to be treated as external to India's custom's territory. Other regulations will also be waived for firms operating in FTZs. In the exim policy 2000-01 a new scheme was introduced for establishment of Special Economic Zone (SEZ) in different parts of the country,

with a view to providing an internationally competitive and hassle free environment for export production. The unit operating in these zones are to be deemed outside the country's customs territory and will have full flexibility of operation⁴.

4.2.3 Public Sector Policy

Areas reserved for the public sector were narrowed down and greater participation by the private sector was permitted in core and basic industries. In place of 17 areas earlier reserved for investment by the public sector, 8 areas are reserved in 1991 and the number reduced to 6 in 1995-96. The subsequent industrial policy introduced since 1991, focused mainly on privatisation. Disinvestment commission was set up for identifying Public sector Enterprises for equity disinvestments as well as for working out the modalities of disinvestment in 1996-97. In 2000-01 policy, the Government decided to bring down its equity in all non strategic Public Sector Undertakings (PSU) to 26 per cent or lower, restructure and revive potentially viable PSUs and close down the PSUs which can not be revived. The Government targeted to get Rs.12000 crores through disinvestment in the year 2001. In addition to these major policy changes a lot of other policy measures like reduction in Custom Duty and Excise duty, infrastructural development policy, policy relating to small scale sector etc. were also introduced in the industrial policy introduced since 1991.

4.2.4 Exchange Rate Reforms

In the post-1991 reform period exchange rate policy changes were very significant. An important aspect of external sector is foreign exchange management. The exchange rate is the price at which one currency can be exchanged for another currency. Exchange rate policy is guided by the need to reduce excess volatility, prevent speculative activities, maintain adequate level of

⁴ Economic Survey (2001) Government of India, Delhi.

reserves and develop an orderly foreign exchange market. Rupee was linked to British Pound Sterling till 1946 since 1927. After that fixed exchange rate was prevailed in which the par value of rupee at Rs. 3.30 per US Dollar was fixed, this is also known as Bretton Woods System. However the system collapsed in 1971. Since 1973 Pound Sterling was floated by the British Government and rupee also floated. However in 1975 Government of India delinked the rupee from pound sterling and directed RBI to peg rupee with respect to the exchange rate movement of the basket of currencies like Pound, US Dollar, Yen and Deutsche Mark. In 1973 the Government enacted Foreign Exchange Regulation Act for restricting and regulating foreign exchange transaction. That is in India the exchange rate was done by the government. But now the exchange rate is mainly determined by the market forces.

The trade and balances in the current account is even now influenced by the movement in the exchange rate. Market forces largely determine the movements in the exchange rate, although Reserve Bank of India intervenes periodically. In 1991-92 the rupee was devalued by 22.8 per cent relative to basket of currencies, each currency being weighted by India's export to that country. This nominal devaluation resulted in a devaluation of Real Effective Exchange Rate (REER) by 16.3 per cent. During 1992-93, dual exchange rate system was introduced. Under this system India accepted the existence of two exchange rates in the country, official rate of exchange (controlled) and market rate of exchange (market determined) and partial convertibility of rupee was also introduced. So as to remove some of the defects of partial convertibility, the government adopted full convertibility of rupee on trade account. As a next step Government introduced convertibility in current account and now full convertibility on current account was introduced. The trade reform measures introduced in India since 1980 can be summarized as follows in Table 4.15.

Table 4.15

Export and Import Policy Changes-1980-2000

1980-85	1986-90	1991-95	1996-2000	2000-02
• OGL items not on the banned list can be allowed on essentiality and indigenous clearance • REP licenses to registered exporters made transferable • REP licenses issued to manufacturer-exporters whether they export directly or through others • Advance license with benefit of custom duty exemption was extended to new products and new markets • Setting up of Trading Houses for exports • Trading houses were allowed access to restricted and canalized items • Value of imports to promote technological up gradations doubled to US \$500,000 • Imports of raw materials by SSI under OGL allowed • Facility for import of certain canalized items allowed.	• Greater role by removing QR for tariff in regulating imports • Abolition of advance licenses • Items under OGL expanded • More items decanalized • Expansion in capital goods lists under OGL including machinery • Imports of capital goods against REP licenses granted to SSI/ non-SSI • Import of capital goods for NRI to set up industries • Import of machinery and raw material for export promotion in thrust areas • Concessions for export oriented units & Free Trade Zones • export-import pass book for manufacturer exporter	• Import control via licensing eliminated except for a negative list of mostly consumer goods • REP system was enlarged and restructured • Capital goods, raw materials and components may be imported by any person whether AU or not • All second hand capital goods having a minimum residual life of 5 years may be imported by the AU without a license • Some imports of consumer goods allowed • Imports of consumer goods under SIL • Number of items subject to export control reduced • Several incentives available to exporters • Tariffs were lowered and rationalized • Peak duty rates lowered in stages from 150 to 50% • Duty rate on capital goods lowered from 85 to 25%	• Peak tariff rates reduced • Lists of freely importable consumer goods expanded • Transferability of import licenses liberalized • More items put on OGL • Import of gold and silver liberalized • Basic customs duties on IT sectors rationalized • Special additional customs duty imposed • Further rationalization of peak tariff rates to around 30 per cent	• Quantitative Restrictions removed • 300 sensitive items kept under 'war room' watch • Important agro and petroleum products to be import through state agencies. • Major focus on agro exports • FDI permitted in Special Economic Zone • Globalization finally sweeps through Indian market. India has lifted quantitative restrictions from 715 items with effect from April 1, 2001. The new export-import policy (FY 2001-02) however, is not without any checks and balances. • India targets to attain at least 1 per cent of the expected global exports of US\$ 7.5 trillion by 2004 or US\$ 75 billion from the expected current level of US\$ 43 billion (2001). This works out to average 18 per cent annual growth in India's exports from the next three years to 2004. • Duty Exemption Scheme and Export Promotion Council Goods Scheme will be applicable to the agro sector. • In the Special Economic Zone Foreign Direct Investment is permitted under automatic route for all manufacturing sectors except a small negative list.

Source: Export Import Policy Various Issues

4.3 Conclusion

This chapter documented the trade policy measures introduced in India. Trade policies introduced in India during the reform period emphasised mainly on export promotion measures. Various export promotion measures during the reform period includes tariff rationalization, favourable attitude towards foreign direct investment, setting up of Free Trade Zone, Special Economic Zone etc. India has completed the process of removal of quantitative restrictions by 2001. Even now the average tariff rate of India is highest compared to other countries. From the above explanation it is found that trade policies in India have undergone significant changes in the post reform period.

Chapter V
Trends in Export Performance of India

- 5.1 Trends in Export Performance of India
- 5.2 Trends in Commodity Composition of India's Exports
- 5.3 Structure of Major Imports to India
- 5.4 Direction of Exports of India

The trade liberalisation measures were introduced in India in 1991 as part of the globalisation and liberalisation strategy, so as to improve the performance and also to integrate the external sector of the country with the rest of the world. At the time of independence the share of India in world trade was about 2 per cent but it declined in the subsequent years and in 2001-02 it reached to 0.8 per cent. In absolute term India's export increased from US \$ 1269 million in 1950-51 to US\$ 52719 million in 2002-03. Though in absolute term it shows a steep increase, India's share in world export is very low. As per the WTO reports 2003, India occupies the 30th position among the leading exporters. The import also shows an increase in absolute term, it increased from US\$1273 million in 1950-51 to US\$61412 million in 2002-03. India occupies 24th position in imports among leading importers as per the WTO report 2003. The report also indicated the following positive changes of world trade, that is the share of South-South in world trade increased after the introduction of trade liberalisation. There are changes in the composition and structure of trade, increase in the regional agreement and less volatility of commodity price. Now the important objectives of export-import policy of India are to increase the share of exports in world exports to one per cent. India adopted trade liberalisation policies since 1991 in external sector so as to improve trade performance and increase its share in world exports

With the introduction of trade liberalisation significant changes might have occurred in the external sector of the country. This chapter examines the impact of trade liberalisation on India's performance in foreign trade. This is analysed in terms of share in world trade, trends in trade etc. for the period 1980-81 to 2001-02. Commodity composition and direction of exports are analysed for the period 1987-88 to 2001-02 because India adopted a new commodity classification system known



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as the Harmonised System (HS) from April 1987. Thus time series analysis of specific product, which covers years prior to 1987, is rendered difficult.¹

5.1 Trends in Export Performance of India

The trend in export performance is examined in terms of comparison of export performance of India with other leading countries and trends in commodity composition and direction of the country. The comparison of India's exports with other countries is given in Table 5.1 to Table 5.5.

The share of major exporting countries, which contributes more than one per cent in world trade, is given in Table 5.1. These 13 countries account for more than 60 per cent of world exports. The United States contributes the major share in world exports, more than 10 per cent, followed by Germany and Japan. The growth rate of exports of Asian countries is given in Table 5.2.

Table 5.1
Share of Major Exporting Countries in Total World Exports

Countries	1980	1990	1995	2000	2002
Canada	3.3	3.7	3.7	4.3	3.9
United States	11.1	11.4	11.3	12.1	10.7
Mexico	0.9	1.2	1.5	2.6	2.5
France	5.7	6.3	5.8	5.1	5.1
Germany	9.5	12.2	10.1	8.6	9.5
Italy	3.8	4.9	4.5	3.7	3.9
Netherlands	3.6	3.8	3.9	3.6	3.8
United Kingdom	5.4	5.4	4.6	4.4	4.3
Africa	6.0	3.1	2.2	2.3	2.2
Saudi Arabia	5.4	1.3	1.0	1.2	1.1
China	0.9	1.8	2.9	3.9	5.0
Hong Kong, China	1.0	2.4	3.4	3.1	3.1
Japan	6.4	8.3	8.6	7.4	6.4

Source: Computed from World Trade Organisation (WTO) Report

The share of Asian countries in world exports is given in Table 5.2. It is clear from table that the share of Asia in world exports almost doubled, that is

¹ C.Veeramani (2001) Analysing Trade Flows and Industrial Structure of India: the Question of Data Harmonisation, Working Paper No.321, Centre for Development Studies, Thiruvananthapuram

from 16 per cent in 1980 to 28 per cent in 2002. Japan accounts for a major share of exports among the Asian countries. The share of majority of Asian countries in world exports is still below one per cent (share of about 8 countries out of 18 has less than one per cent share). The share of India increased from 0.4 per cent in 1980 to 0.8 per cent in 2002. The share of exports of almost all Asian countries increased in the 1990s.

Table 5.2
Exports Share of Asian Countries in World Exports (%)

Countries	1980	1990	1995	2000	2002
Asia	15.9	23.0	28.0	28.4	27.9
Afghanistan	0.0	0.0	0.0	0.0	0.0
Australia	1.1	1.2	1.0	1.0	1.0
Bangladesh	0.0	0.0	0.1	0.1	0.1
China	0.9	1.8	2.9	3.9	5.0
Hong Kong	1.0	2.4	3.4	3.1	3.1
India	0.4	0.5	0.6	0.7	0.8
Indonesia	1.1	0.7	0.9	1.0	0.9
Japan	6.4	8.3	8.6	7.4	6.4
Korea	0.9	1.9	2.4	2.7	2.5
Malaysia	0.6	0.9	1.4	1.5	1.4
New Zealand	0.3	0.3	0.3	0.2	0.2
Pakistan	0.1	0.2	0.2	0.1	0.2
Philippines	0.3	0.2	0.3	0.6	0.6
Singapore	1.0	1.5	2.3	2.1	1.9
Sri Lanka	0.1	0.1	0.1	0.1	0.1
Thailand	0.3	0.7	1.1	1.1	1.1
Viet Nam	0.0	0.1	0.1	0.2	0.3

Source: Computed from World Trade Organisation (WTO) Report

The growth rate of exports of Asian countries is given in Table 5.3. The exports growth rate of Asia as a whole shows a decline during the 1990s. Table also shows that among the Asian countries the highest exports growth rate is shown by Philippines during 1991-02 periods. The growth rate of Philippines shows a sharp increase during 1990s compared to the growth rate of 1980s. In 1980s the growth rate was highest in Korea but it shows a decline in the 1990s. Growth rate of export of majority of countries shows an increase during the post reform period. China maintained almost the same growth rate during 1980s and

1990s,ie, about 13 per cent. The growth rate of India increased during the reform period compared to the perform period. But the growth rate for the period 1980-02 shows that it is very low compared to other Asian countries.

Table 5.3

Compound Growth Rate of Exports of Asian Countries (%)

Countries	1980-02	1980-90	1991-02
World	6.83	5.94	5.96
Asia	8.97	9.91	6.36
Afghanistan	-8.35	-10.46	-2.11
Australia	12.21	6.59	4.36
Bangladesh	14.65	7.76	12.77
China	13.12	12.78	13.85
Hong Kong	9.27	7.6	8.96
India	6.18	7.26	9.21
Indonesia	6.21	1.33	6.09
Japan	11.37	8.91	5.29
Korea	11.95	15.05	8.17
Malaysia	5.43	8.63	9.07
New Zealand	7.36	6.16	3.13
Pakistan	11.42	8.10	3.36
Philippines	11.19	3.92	15.92
Singapore	9.06	9.94	6.91
Sri Lanka	14.08	5.32	8.24
Thailand	20.65	14.00	7.83

Source: Computed from World Trade Organisation Report

As clear from Table 5.4 imports growth rate of a majority of Asian countries also shows an increasing trend after 1990. The import growth rates of Asian countries in the pre and post liberalisation period are 7.97 and 5.95 per cent respectively. Vietnam, China and India show highest import growth rate during 1991-02 periods. The growth rate of import of India increased from 4.25 per cent in 1980-90 to 10.00 per cent in 1991-02 periods. Among the Asian countries the import growth rate is lowest in Indonesia during 1991-02 periods than 1980-90 periods.

Table 5.4
Compound Growth Rate of Imports of Asian Countries (%)

Year	1980-02	1980-90	1991-02
World	6.87	6.01	6.08
Asia	8.80	7.97	5.95
Afghanistan	-4.37	-0.08	3.43
Australia	6.20	6.41	5.07
Bangladesh	6.82	3.55	8.94
China	13.15	13.46	12.71
Hong Kong, China	12.87	15.26	5.40
India	7.06	4.25	10.00
Indonesia	5.90	2.68	0.62
Japan	5.66	5.07	3.82
Korea, Republic of	10.34	11.87	5.74
Malaysia	11.93	7.70	6.42
New Zealand	5.50	5.39	4.62
Pakistan	4.18	2.98	1.67
Philippines	10.07	2.89	9.53
Singapore	9.59	8.03	4.83
Sri Lanka	7.53	2.70	6.50
Thailand	11.83	12.68	3.49
Viet Nam	13.87	8.74	21.03

Source: Computed from World Trade Organisation Report

The share of Asian countries in total world imports is given in Table 5.5. The share increased from 16.94 per cent to 24.46 in 2002. Japan and China have highest share of import in 2002. The share of India in imports is also less than one per cent. Import share of majority of Asian countries is also less than one per cent (about 10 countries have less than one per cent share).

The growth rate of exports and its share in GDP is given in below. The annual average growth rate of exports of India increased in the post liberalisation period (19.00 per cent) compared to the pre reform period growth rate of (16.00 per cent). The growth rate of Indian exports shows a decline during the second half of 1990s. The growth rate decreased to 20 per cent during 1996-02 from 25 per cent in 1991-95. The annual average growth rate increased during the liberalisation period compared to the pre reform period as given in Table 5.6.

Table 5.5
Share of Asian Countries in Total World Imports (%)

Countries	1980	1990	1995	2000	2002
Asia	16.94	21.45	26.58	24.84	24.46
Afghanistan	0.04	0.03	0.01	0.01	0.01
Australia	1.08	1.18	1.16	1.07	1.08
Bangladesh	0.13	0.10	0.12	0.12	0.12
China	0.96	1.50	2.50	3.36	4.40
Hong Kong, China	1.11	2.39	3.71	3.19	3.10
India	0.72	0.66	0.66	0.77	0.84
Indonesia	0.52	0.62	0.77	0.50	0.47
Japan	6.81	6.63	6.36	5.66	5.02
Republic of Korea	1.07	1.97	2.56	2.39	2.27
Malaysia	0.52	0.82	1.47	1.22	1.19
New Zealand	0.26	0.27	0.26	0.21	0.22
Pakistan	0.26	0.21	0.22	0.16	0.17
Philippines	0.40	0.37	0.54	0.55	0.55
Singapore	1.16	1.71	2.36	2.01	1.73
Sri Lanka	0.10	0.08	0.10	0.11	0.09
Thailand	0.44	0.93	1.34	0.92	0.96
Viet Nam	0.06	0.08	0.15	0.23	0.28

Source: Computed from World Trade Organisation (WTO) Report

Table 5.6
Annual Average Growth Rate of India's Exports (%)

1980-85	10.00
1986-90	26.00
1991-95	25.00
1996-02	20.00
1970-80	18.00
1980-90	16.00
1991-00	19.00

Source: Economic Survey of India

The share of Total exports and manufactured exports in GDP is shown in Table 5.7. The total exports contributed only 0.52 per cent in 1970 and it increased to 1.09 per cent in 1981. The share increased to 16 per cent in 2000-01 periods. The manufactured exports contribute about 12 per cent in 2001 and it was 3.37 per cent in 1990. Share of both total exports and manufactured exports in GDP shows an increasing trend during liberalisation.

Table 5.7
Total Exports and Manufactured Exports as Percentage of GDP

Year	Manufactured	Total export	Year	Manufactured Export	Total Export
1970	0.27	0.52	1986	1.46	2.32
1971	0.29	0.54	1987	1.91	2.82
1972	0.35	0.66	1988	2.38	3.29
1973	0.43	0.81	1989	3.04	4.21
1974	0.55	1.06	1990	3.37	4.70
1975	0.60	1.17	1991	4.62	6.27
1976	0.87	1.48	1992	5.51	7.28
1977	0.85	1.45	1993	6.69	8.93
1978	0.91	1.45	1994	7.64	9.87
1979	1.02	1.71	1995	8.83	11.82
1980	0.99	1.67	1996	9.01	12.25
1981	1.09	1.84	1997	9.70	12.80
1982	1.04	2.01	1998	10.02	12.91
1983	1.05	2.07	1999	11.21	13.89
1984	1.26	2.39	2000	13.09	16.98
1985	1.24	2.12	2001	12.46	16.49

Source: Economic Survey

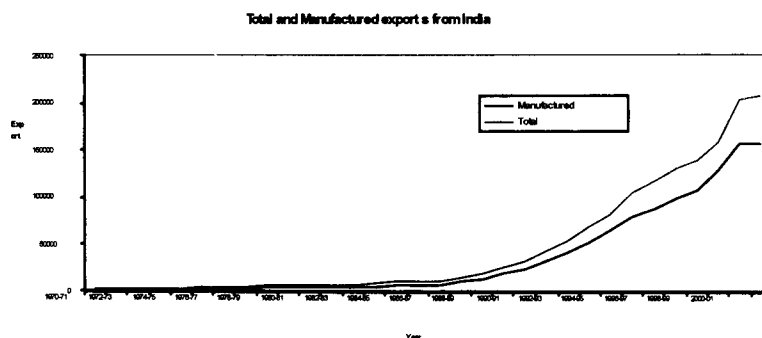
The share of manufactured exports in total exports increased from 53 per cent in 1970 to 76 per cent in 2001-02. The share in 1999-2000 was 81 per cent, the highest share since 1970. During the liberalisation period the average share is about 75 per cent. The average share during 1970 is 55.69 per cent and in 1980s the average share increased to 60.69 per cent. The export share of manufactured goods increased during liberalisation period compared to the pre liberalisation period as given in Table 5.8.

Table 5.8
Manufactured Exports as Percentage of Total Exports

Year	Percentage	Year	Percentage	Year	Percentage
1970-71	53	1981-82	59	1992-93	76
1971-72	54	1982-83	52	1993-94	75
1972-73	54	1983-84	51	1994-95	77
1973-74	54	1984-85	53	1995-96	75
1974-75	52	1985-86	59	1996-97	74
1975-76	51	1986-87	63	1997-98	76
1976-77	59	1987-88	68	1998-99	78
1977-78	59	1988-89	72	1999-00	81
1978-79	63	1989-90	72	2000-01	77
1979-80	60	1990-91	72	2001-02	76
1980-81	59	1991-92	74		

Source: Economic survey

Figure 5.1
Total and Manufactured Exports From India



5.2 Trends in Commodity Composition of India's Exports

The following section examines the trade performance of India in terms of composition of exports. Composition of exports means major item of exports from India.

5.2.1 Major Items of Export From India

In this section, exports performance of major item of exports (commodity composition) from India is examined. The commodity composition of trade refers to the relative position of various commodity groups in imports and exports. The commodity composition of India's foreign trade has undergone drastic changes after independence. This section examines the changes that occurred in the commodity composition of India during the reform period in comparison with the pre reform period. The period of study is 1987-2002, because India adopted a new commodity classification system known as the Harmonised System (HS) from April 1987. Thus, time series analysis of specific product which covers years prior to 1987 is rendered difficult. The commodity composition is examined as per the HS system and Standard Industrial Trade Classification (SITC) system. Analysis on SITC classification includes only manufactured goods export and it is included to get the disaggregate level changes in manufactured export sector. The commodity composition of India's

exports can be broadly classified as the primary and manufactured goods export. The share of these two categories in total exports is shown in Table 5.9.

From Table 5.9, it is clear that the commodity composition of export has undergone changes. The share of primary commodity has declined from 26.14 per cent in 1987 to 16.62 per cent in 2001-02. At the same time, the share of manufactured goods increased from 67.79 per cent in 1987 to 75.59 in 2001, i.e., the commodity composition of export shows a change from traditional to the industrial sector. The export import ratio is given in Appendix II and it shows that the ratio is very low for oil items and for non oil products it shows an improvement in favour of exports during post reform period. The ratio of total export and import also shows an increasing trend and has better performance during post reform period. The following section examines the performance of major item of exports from India.

Table 5.9
Share of Primary and Manufactured Goods Exports
in India's Total Exports

Year	Primary Commodities	Manufactured Goods
1987	26.14	67.79
1988	23.21	72.37
1989	23.38	72.06
1990	23.83	71.62
1991	23.13	73.60
1992	20.90	75.73
1993	22.10	74.90
1994	19.80	77.49
1995	22.82	74.69
1996	24.01	73.54
1997	21.96	75.83
1998	20.86	77.64
1999	17.72	80.70
2000	15.99	77.05
2001	16.12	75.59

Source: Economic Survey

The share of primary products declined from 26.14 per cent in 1987-88 to 16.12 in 2001-02 as given in Table 5.10. The share declined considerably after 1995. The share of agriculture and allied products also shows the same trend. The highest share is contributed by the marine products export. But the share of marine products declined compared to the 1987- 88 periods in 2001-02. The share of tea and coffee also declined sharply.

Table 5.10
Share of Agricultural and Allied Products Export to Total Exports from India

Products	1987-88	1990-91	1991-92	1995-96	1999-00	2001-02
Primary Products	26.14	23.83	23.13	22.82	17.72	16.12
Agriculture and Allied Products	21.18	18.49	17.93	19.13	15.23	13.36
Tea	3.84	3.29	2.75	1.10	1.12	0.82
Coffee	1.67	0.77	0.75	1.41	0.90	0.52
Rice	2.16	1.42	1.72	4.30	1.96	1.51
Cotton Raw including Waste	0.70	2.60	0.69	0.19	0.05	0.02
Tobacco	0.86	0.81	0.86	0.42	0.63	0.39
Cashew including Cashew Nut Shell Liquid	2.01	1.37	1.53	1.16	1.54	0.85
Spices	2.15	0.72	0.84	0.75	1.11	0.71
Oil Meals	1.36	1.87	2.09	2.21	1.03	1.08
Fruits and Vegetables	0.82	0.65	0.79	0.50	0.40	0.47
Processed Fruits, Juices, misc. Processed Items	1.11	0.65	0.43	0.83	0.53	0.68
Marine Products	3.40	2.95	3.28	3.18	3.21	2.77
Sugar and Mollases	0.07	0.12	0.36	0.48	0.03	0.85
Meat and Meat Preparations	0.56	0.43	0.52	0.59	0.51	0.57
Others	0.47	0.84	1.30	2.01	2.21	2.12

Source: Computed from Director General of Commercial Intelligence & Statistics (DGCI&S)

The annual average growth rate of exports of agriculture and allied product from India is shown in Table 5.11. The annual average growth rate of export declined during 1996-02 for majority of these products. Coffee, raw cotton, spices and oil meals show negative growth rate in 1996-02 period. Sugar and molasses have the highest average growth rate in 1990s. During the pre reform period the highest growth rate is shown by oil meals and raw cotton.

Table 5.11
Annual Average Growth Rate of Agriculture and Allied Products Exports
From India (%)

Products	1987-90	1991-95	1996-02	1991-02
Primary Products	7.32	15.32	-2.33	6.50
Agriculture and Allied Products	6.37	17.61	-2.98	7.31
Tea	3.08	-8.63	8.53	-0.05
Coffee	-8.35	29.31	-9.90	9.71
Rice	4.78	49.27	1.35	25.31
Cotton Raw including Waste	19.03	15.01	-20.16	6.92
Tobacco	12.03	15.27	-0.58	7.34
Cashew including Cashew Nut Shell Liquid	4.27	6.74	3.09	4.92
Spices	-11.27	19.08	-1.21	8.93
Oil Meals	26.02	24.35	-10.08	7.13
Fruits and Vegetables	9.80	4.13	5.88	5.01
Processed Fruits, Juices, misc. Processed Items	-11.65	38.07	4.11	21.09
Marine Products	9.91	15.58	2.36	8.97
Sugar and Mollases	9.28	17.59	23.69	9.64
Meat and Meat Preparations	8.83	17.60	8.78	13.19
Others	57.96	33.77	4.00	18.89

Source: Computed from Director General of Commercial Intelligence Statistics (DGCI&S)

The share of iron ore and mica declined in the period after 1995-96. Table 5.12 shows that the share of ores and minerals declined from 4.96 per cent in 1987-88 to 2.76 per cent in 2001-02. The share of iron ore also declined to 0.92 per cent in 2001-02 from 3.54 per cent in 1987-88.

Table 5.12
Share of Ores, Mineral and Petroleum in Total Exports (%)

Products	1987-88	1990-91	1991-92	1995-96	1999-00	2001-02
Ores and Minerals	4.96	5.34	5.20	3.70	2.49	2.76
Iron Ore	3.54	3.22	3.26	1.62	0.74	0.92
Mica	0.15	0.11	0.08	0.03	0.03	0.03
Others	1.27	2.01	1.86	2.05	1.72	1.82
Petroleum Products	4.14	2.88	2.32	1.43	0.11	4.76
Others	1.92	1.67	0.95	1.06	1.48	3.53

Source: Computed from Director General of Commercial Intelligence & Statistics (DGCI&S)

The export of ores and minerals and petroleum products from India also shows a decline in growth rate during 1996-02 periods. The export growth rate of ores and minerals and mica show decline in 1990s. Table 5.13 shows that the growth rate of ores and minerals declined from 13.11 per cent in 1987-90 to 1.61 per cent in 1996-02 periods. The growth rate of iron ore also declined to -1.07 per cent in 1996-02 period from 8.27 per cent in 1987-90 period.

Table 5.13
Exports of Ores and Minerals from India
(Annual Average Growth Rate (%))

Items	1987-90	1991-95	1996-02	1991-02
Ores and Minerals	13.11	5.94	1.61	3.78
Iron Ore	8.27	-1.47	-1.07	-1.27
Mica	-4.27	-10.88	13.03	1.07
Others	31.51	15.96	4.63	10.29

Source: Computed from Director General of Commercial Intelligence
& Statistics (DGCI&S)

Table 5.14 shows that export share of manufactured goods increased from 67.79 per cent in 1987-88 to 80.90 per cent in 1999-2000. It shows a marginal decline during the period 2001-02. Gems and jewellery have the highest share in total manufactured export (20.37 per cent) in 1999-00 and 16.67 per cent in 2001-02 period. Handicrafts accounts for a major share of export (23.34 per cent) in 2000-01. This is followed by engineering goods (15.68 per cent) and readymade goods (11.38 per cent) in the export share of manufactured goods in the same year. Textile yarn fabrics and chemicals and allied product also had a major share in the export from India.

Table 5.14
Share of Manufactured Goods Exports in Total Exports (%)

Products	1987-88	1990-91	1991-92	1995-96	1999-00	2001-02
Manufactured Goods	67.79	71.62	73.60	74.69	80.70	75.59
Leather and Manufactures	7.98	7.99	7.10	5.51	4.32	4.35
Chemicals and Allied Products	4.69	7.20	8.28	7.42	9.26	9.22
a) Drugs, Pharmaceutical and Fine Chemicals	2.08	3.11	3.52	3.21	4.53	4.67
b) Others	2.61	4.09	4.76	4.21	4.73	4.55
Plastic and Linoleum Products	0.42	0.61	0.63	1.84	1.64	2.21
Rubber, Glass, Paints, Enamels and Products	1.44	1.64	1.51	2.02	1.85	2.22
Engineering Goods	9.53	12.40	12.61	13.81	13.99	15.68
Readymade Garments	11.61	12.32	12.31	11.56	12.94	11.38
Textile Yarn, Fabrics, Made-ups, etc.,	8.96	8.49	10.10	11.08	11.38	10.08
a) Cotton Yarn, Fabrics, Made-ups, etc.,	7.30	6.45	7.27	8.10	8.39	6.92
b) Natural Silk Yarn, Fabrics, Made-ups, etc.,	0.88	0.72	0.79	0.42	0.65	0.63
c) Others	0.78	1.31	2.03	2.56	2.34	2.54
Jute Manufactures	1.54	0.92	0.89	0.58	0.34	0.29
Coir and Manufactures	0.19	0.15	0.16	0.20	0.13	0.14
Handicrafts	20.21	18.94	18.96	19.28	23.54	18.76
a) Gems and Jewellery	16.67	16.12	15.33	16.59	20.37	16.67
b) Carpets (Handmade excluding Silk)	2.10	1.59	2.28	1.32	1.35	0.84
c) Works of Art (excluding Floor Coverings)	1.44	1.23	1.35	1.36	1.82	1.25
Sports Goods	0.37	0.26	0.18	0.23	0.18	0.16
Others	0.86	0.70	0.87	1.16	1.13	1.09

Source: Computed from Director General of Commercial Intelligence & Statistics (DGCI&S)

The average growth rate of manufactured goods was 12.88 per cent in 1987-90 periods and it increased to 13.59 per cent in 1991-1995 periods and declined to 6.45 per cent in 1996-02 periods. Table 5.15 shows the highest exports growth rate during 1987-90 is shown by chemical and allied product (28.17 per cent). But the growth rate declined in the subsequent years. During the reform period plastic and linoleum products show the highest growth rate. Negative exports growth rate is shown by jute products and carpets in 1990s.

Table 5.15
Annual Average Growth Rate of Manufactured Goods Exports From India (%)

Products	1987-90	1991-95	1996-02	1991-02
Manufactured Goods	12.88	13.59	6.45	10.02
Leather and Manufactures	7.93	5.36	3.89	4.62
Chemicals and Allied Products	28.17	14.07	9.06	11.56
a) Drugs, Pharmaceutical and Fine Chemicals	27.02	15.50	10.99	13.24
b) Others	29.39	13.09	7.62	10.35
Plastic and Linoleum Products	23.47	43.01	14.54	28.77
Rubber, Glass, Paints, Enamels and Products	12.59	21.08	8.90	14.99
Engineering Goods	19.12	17.25	7.95	12.60
Readymade Garments	12.67	11.58	6.30	8.94
Textile Yarn, Fabrics, Made-ups, etc.,	14.08	18.21	2.48	10.34
a) Cotton Yarn, Fabrics, Made-ups, etc.,	11.04	19.92	0.11	10.01
b) Natural Silk Yarn, Fabrics, Made-ups, etc.,	7.77	-1.81	17.99	8.09
c) Others	41.02	18.08	7.72	12.90
Jute Manufactures	-3.48	1.39	-2.00	-0.30
Coir and coir Manufactures	5.85	17.27	3.14	10.21
Handicrafts	10.18	11.39	8.20	9.79
a) Gems and Jewellery	10.24	12.44	9.46	10.95
b) Carpets (Handmade excluding Silk)	13.77	1.48	-2.42	-0.47
c) Works of Art (excluding Floor Coverings)	8.67	14.59	3.66	9.12
Sports Goods	-6.26	20.82	-2.49	9.17
Others	11.04	20.40	5.93	13.17

Source: Computed from Director General of Commercial Intelligence (DGCI&S)

5.2.2 Share of Manufactured Goods Export from India in World Trade

The share of manufactured goods exports from India in world exports is given in Table 5.16. The share of India in world leather products (611), which was 10.1 per cent in 1980, declined to 2.20 per cent in 1999. The highest share in 1999 is contributed by pearl and precious stone (12.15 per cent). The share of organic chemicals, textile yarn, fabrics, made up articles, manmade fabrics, pearl and precious stone show an increase since 1980. Medicinal and pharmaceutical products also show an increase in world share in 2002.

Table 5.16
Share of Manufactured Goods Export of India in Total World Exports (%)

Code	Commodities	1980	1985	1990	1993	1995	1999	2002
51	Organic chemicals	0.05	0.08	0.33	0.49	0.65	0.89	1.3
52	Inorganic chemicals	0.17	0.11	0.23	0.27	0.32	0.00	0.3
53	Dying tanning and colouring material	0.82	0.44	1.17	1.38	1.19	1.24	1.4
54	Medicinal and pharmaceutical product	0.79	0.32	1.20	0.93	1.01	0.98	11.6
55	Essential oils and perfume material, toilets, polishing and cleaning preparation	1.12	0.43	1.14	0.59	0.48	0.31	0.4
57	Explosives and pyrotechnic product	0.12	0.12	0.14	0.36	0.36	0.52	0.6
58	Artificial resins & plastic material cellulose esters & ethers	0.01	0.03	0.04	0.08	0.21	0.11	0.2
59	Chemical material and product n.e.s	0.05	0.07	0.23	0.25	0.42	0.39	0.7
61	Leather, leather manufactures, n.e.s & dressed fur skins	6.79	6.78	6.29	3.30	3.29	3.51	3.4
611	Leather	10.01	7.94	4.81	2.27	2.45	2.20	3.0
612	Manufactures of leather or of composition leather n.e.s etc.	6.35	8.61	13.42	6.73	6.42	6.95	5.0
613	Fur skins, tanned or dressed etc.	0.08	0.00	0.00	0.00	0.00	0.00	0.0
65	Textile yarn, fabrics, made up articles n.e.s and related product	2.34	1.95	2.07	2.55	2.86	3.37	3.60
652	Cotton fabrics woven	5.30	3.56	3.67	4.18	4.43	4.92	4.1
653	Fabrics, woven of manmade fibres	0.47	0.26	0.71	1.00	1.29	1.47	2.7
654	Textile fabrics woven, other than of cotton	6.40	4.29	2.30	1.98	1.90	2.99	4.1
667	Pearls, precious and semi-precious stone	3.12	9.6	9.83	11.49	11.41	12.15	13.6
67	Iron and steel	0.13	0.13	0.27	0.79	0.64	0.69	1.6
69	Manufacture of metals n.e.s	0.60	0.58	0.52	0.64	0.58	0.60	0.9
71	Power generating machinery and equipment	0.25	0.12	0.15	0.19	0.15	0.03	0.1
72	Machinery specialised for particular industries	0.11	0.09	0.20	0.14	0.16	0.13	0.3
73	Metal working machinery	0.21	0.13	0.19	0.19	0.16	0.07	0.4
74	General industrial machinery & equipment n.e.s and machine part thereof	0.11	0.12	0.10	0.11	0.11	0.03	0.00
75	Office machinery and ADP equipment	0.01	0.08	0.09	0.07	0.10	0.05	0.00
76	Telecommunication and sound recording and reproducing apparatus	0.04	0.01	0.03	0.04	0.07	0.00	0.00
77	Electrical machinery, apparatus and appliances n.e.s	0.22	0.08	0.13	0.09	0.10	0.00	0.00
78	Road vehicles (including air cushion –vehicles	0.16	0.05	0.11	0.17	0.20	0.05	0.1
79	Other transport equipment	0.08	0.35	0.02	0.01	0.01	0.00	0.1
84	Articles of apparel and clothing accessories	1.82	2.35	2.34	2.14	2.57	2.82	2.9
	Other export	0.19	0.15	2.36	0.30	0.29	0.32	0.4
	Total export (including others)	0.42	0.45	0.55	0.63	0.64	0.59	0.8

Source: Economic survey

5.2.3 India's Export Performance by Chapters and Sections

India's export performance by Chapters and Sections is given in Table 5.17. India follows the Harmonised System since 1987 and has divided the total

exports into 21 sections and 99 chapters, to make the comparison with international level data.² The classification which consists of 99 chapters (including chapter 77 reserved for future use) is represented by 2-digit codes, 1253 HS heading represented by 4-digit codes and 5062 HS subheading represented by 6-digit codes. The 8-digit codes of HS comprising nearly 17035 items have been derived from division of 5062 HS to capture data on commodities of national importance. Descriptions of chapters and sections are given in Appendix III.

Table 5.17
Percentage of Different Sections of Exports to Total Exports

Sections	1986-87	1989-90	1990-91	1991-92	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2001-02
Total of Section I	5.22	3.13	3.59	4.02	4.92	3.92	4.19	4.28	3.85	3.86	3.61
Total of Section II	16.67	10.83	9.68	9.84	7.75	11.17	9.72	9.71	11.50	8.81	6.89
Total of Section III	0.28	0.29	0.27	0.41	0.60	0.85	0.59	0.51	0.51	0.71	0.40
Total of Section IV	3.98	3.42	3.21	3.71	3.12	3.76	5.25	4.38	2.67	2.29	3.06
Total of Section V	9.13	7.62	7.51	6.98	5.02	4.54	4.23	3.44	2.45	2.14	7.25
Total of Section VI	3.96	8.37	7.83	8.61	7.84	7.74	8.56	9.44	9.06	9.55	9.71
Total of Section VII	0.85	1.12	1.20	1.14	2.60	2.47	2.21	2.08	1.89	1.97	2.64
Total of Section VIII	5.18	5.06	5.37	4.71	4.29	3.84	3.26	3.38	3.46	2.90	3.06
Total of Section IX	0.16	0.11	0.08	0.09	0.17	0.12	0.13	0.10	0.07	0.08	0.08
Total of Section X	0.21	0.21	0.18	0.20	0.38	0.48	0.43	0.33	0.38	0.44	0.57
Total of Section XI	23.74	24.01	27.31	27.32	27.32	25.61	27.42	26.85	27.21	27.04	23.62
Total of Section XII	2.52	2.45	2.85	2.68	2.18	1.92	1.76	1.59	1.85	1.74	1.61
Total of Section XIII	0.30	0.37	0.43	0.57	0.99	1.02	0.98	0.94	0.91	1.06	1.15
Total of Section XIV	16.79	19.18	16.14	15.37	17.16	16.64	14.20	15.31	17.86	20.52	16.75
Total of Section XV	1.96	4.07	4.07	4.56	5.51	5.58	5.83	6.31	5.38	6.26	6.52
Total of Section XVI	4.74	5.31	5.24	4.82	4.65	5.00	5.70	5.82	5.31	5.05	6.46
Total of Section XVII	1.56	1.90	2.22	2.77	2.93	2.91	2.89	2.66	2.29	2.21	2.33
Total of Section XVIII	0.56	0.68	0.46	0.42	0.37	0.38	0.44	0.45	0.50	0.67	0.82
Total of Section XIX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Total of Section XX	0.31	0.29	0.35	0.32	0.55	0.53	0.53	0.49	0.51	0.52	0.53
Total of Section XXI	0.01	0.01	2.00	1.47	0.01	0.01	0.00	0.01	0.01	0.01	2.89
GRAND TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Computed from Director General of Commercial Intelligence & Statistics (DGCI&S)

² The DGCI&S has adopted a new commodity classification system known as Harmonised System (HS) from April 1987. The classification consist of 99 chapters, including chapter 77 reserved for future use, represented by 2 digit codes, 1253 HS heading represented by 4 digit codes and 5062 H.S subheadings represented by 6 digit codes. The 8 digit codes of H.S nearly 11035 in number, have been derived by further subdivision of 5062 H.S sub heading to capture data on commodities of national importance

The section wise analysis of India's exports is given below. Section XI, that is textiles and textile articles, contributes the major share in export. The next major share is contributed by pearls and precious stones (Section XIV). Section I to IV consist of food and food products. Among the food and food product sections, Section II, vegetable product has major share. The share of almost all products shows a decline after 1997-98. Chemicals and chemical products show an increase in export share in 1990s. The share increased from 3.96 per cent in 1986-87 to 9.71 per cent in 2001-02. Export share of arms and ammunition is lowest in total exports in this section.

The export performance of various items in each section is examined in the following section. The item wise performance in each section is given in Appendix IV to Appendix XII. The items in section 1 to section 4 (food and food related products) are given in Appendix IV. Dairy products show highest growth in section I in the period since 1990. In section 2, live tree and other plant groups show highest growth rate. Sugar and confectionary has highest growth rate through out the period since 1987. A majority of the items show increasing growth rate in the post liberalisation period. The growth rate during 1996-99 shows a decline for most of the commodities. The exponential growth rate for post liberalisation period shows that dairy products have the highest growth rate (37.11 per cent).

The export performance of section 6 (chemicals and allied products) Section 7 (plastic and rubber products) and section 8 (leather products) is given in Appendix VII. Among the chemical products, albuminoidal substance (Chapter 35) shows the highest growth rate, 46.98 per cent in 1991-02 periods. The fertiliser has the next highest growth rate. The chemical product also shows an increasing trend in export performance in the post liberalisation period. The export growth rate of plastic and rubber products (chapter 87) increased during

the post liberalisation period of 1990-2002, but annual average growth rate declined during 1996-99 period. Among the leather products, manufactured fur of skin and articles of fur show highest growth rate.

Among the manufacture of wood products (section 9) cork and articles of cork have highest exponential growth rate. Among the textile product export, which constitute the major share of export from India, wool products (Chapter 51) and special woven fabrics (Chapter 58) have the highest growth rate of 32.93 per cent for 1991-02 periods. Knitted textiles (Chapter 60) show negative growth rate after 1995 period. The overall growth rate for the period 1991-2002 is also negative (-0.47 per cent). The growth rate of special yarn twine etc (Chapter 56) also has recorded significant growth rate (32.08 per cent), as in Appendix IX. In Section 12 umbrella, walking and seat sticks products group has the highest average growth rate, 38.03 per cent as in Appendix X.

Section 15, which comprises of base metal products also show an increasing growth rate in the post liberalisation period. Among the base metal products, other base metals (chapter 81) have highest growth rate 39.46 per cent as shown in Appendix XI. Growth rate of most of base metal products is higher compared to other sections. The growth rate of a majority of items range between 17 to 39 per cent in the post liberalisation period.

5.2.4 Manufactured Export Performance of India at Disaggregate Level (as per SITC Classification)

The manufacturing sector occupies a significant place in the development process of Indian economy. In this section, an analysis of manufactured exports at disaggregate level by adopting the Standard Industrial Trade Classification (SITC) division at three digit levels is done. The SITC classification includes more disaggregate division and thus analysis can be done at disaggregate levels.

Disaggregated analysis is presented for Extended Manufacturing³ (E-Mfg henceforth) products covering SITC codes 4 to 8 at two digit levels for the six broad commodity groups or categories (resource-intensive, labour-intensive, scale-intensive, differentiated, science-based and miscellaneous products). This classification is based on the UN-ESCAP classification. The definition given by UN-ESCAP includes manufactured goods as codes given from SITC 5 to 8 except 68. Tendulkar (2000) attempted to include natural resource-intensive products (SITC 4 and 68) and named it as Extended Manufactured goods. This departure from the standard definition is prompted by the fact that most industrialising countries at low levels of per capita income initially export resource-intensive or labour-intensive products depending on their initial endowments. The present study adopted the classification done by Tendulkar, i.e. the extended manufactured goods (SITC 4 to 8).

The classification is adopted from UN-ESCAP (1991) and the details at 3-digit SITC level are given in the Appendix XIII to Appendix XIX. Broadly, resource intensive exports are based on primary agricultural or mineral raw material and labour intensive category covers light manufacturing mostly consumer goods. The scale intensive and differentiated categories of products are expected to be technologically more sophisticated than the first two categories whereas the science based products belong to the hi-tech variety.

5.2.5 Manufactured Goods Export performance as per SITC Classifications

The share of these five categories of manufactured export in total export and the growth rate of (annual average triennium and exponential) labour intensive, science based, resource intensive, scale intensive, differentiated and

³ Suresh D. Tendulkar (2000) Indian Exports and Economic Growth Performance in Asian Perspective, Indian Council for Research in International Economic Relations, Working Paper No. 54, New Delhi

miscellaneous product is given in the following section. The growth rate given for the period 1991-02 is exponential growth rate.

Table 5.18 shows that major share of export is accounted by scale intensive commodities followed by labour intensive commodities. The share of science and differentiated product exports is low compared to other groups.

Table 5.18
Share of Extended Manufactured Export in Total Exports (%)

Products	1988	1990	1991	1996	2001	2002
Differentiated products	1.99	2.20	1.70	1.52	1.85	1.70
Labour intensive	26.06	29.00	30.65	29.83	24.55	22.42
Scale intensive	36.34	28.68	28.17	29.26	30.84	33.37
Resource based	6.30	5.73	5.09	4.84	5.32	5.41
Science based	1.85	2.71	2.58	1.53	2.10	2.10

Source: Computed from World Bank COM-TRADE Database

Table 5.19
Share of Labour Intensive Products in Total Manufactured Goods Exports (%)

Code	1988	1990	1991	1996	2001	2002
651	2.40	2.84	4.15	7.33	4.76	4.55
652	4.76	4.51	4.78	4.10	2.89	2.52
653	0.64	1.23	1.55	1.43	1.85	1.90
654	2.09	1.54	1.60	0.83	0.86	0.87
855	0.18	0.57	0.42	0.24	0.09	0.08
656	0.07	0.12	0.20	0.14	0.24	0.22
657	0.08	0.13	0.17	0.33	0.24	0.24
691	0.12	0.12	0.13	0.30	0.19	0.19
692	0.08	0.15	0.11	0.06	0.06	0.07
695	0.58	0.56	0.53	0.48	0.52	0.48
697	0.34	0.30	0.37	0.54	1.11	0.99
821	0.04	0.02	0.04	0.05	0.15	0.17
831	0.90	1.06	1.24	1.00	0.96	0.84
841	3.19	3.79	3.86	3.98	3.23	2.72
842	6.66	7.87	7.74	6.39	5.13	4.71
851	3.80	4.00	3.63	2.33	1.96	1.56
899	0.13	0.18	0.14	0.28	0.32	0.31
All	26.06	29.00	30.65	29.83	24.55	22.42

Source: Computed from World Bank COM-TRADE Database

Among the labour intensive products, women, girl clothing (842) contribute the major share of export. Textile yarn (651), cotton fabrics (652) other textile fabrics (654), men's, boys clothing (841), footwear (851) also have

major share in labour intensive products. The labour intensive products contributed about 26 per cent share in 1988 and reached to 30.65 per cent in 1991. But it declined to 22.42 per cent in 2002 as given in Table 5.19. The lowest share is shown by container, storage and transshipments (692) and knit crochet fabrics (855)

Table 5.20 shows growth rate of labour intensive products. The growth rate prior to the introduction of economic reform is 16.10 per cent. But it declined to 7.43 per cent in 1991-93. The growth rate further increased to 17.94 per cent in 1994-96. The exponential growth rate over the periods since 1990 is highest in furniture and cushions (821), 26.77 per cent, followed by household equipment (697), 21.35 per cent. The least growth rate is shown by (-7.23 per cent) knit, crochet fabrics (855). The annual average growth rate of exports exhibits decline in 1997-99 triennium for a majority of the products compared to other periods.

Table 5.20
Annual Average Growth Rate of Exports of Labour Intensive Products (%)

Code	1988-91	1991-93	1994-96	1997-99	2000-02	1991-02
651	32.38	23.71	40.76	-1.40	5.56	13.74
652	9.98	6.24	14.60	-0.50	1.07	4.91
653	49.84	17.71	14.27	4.02	24.46	11.45
654	0.60	-3.83	6.33	10.70	12.43	5.29
855	67.09	-9.79	8.56	-20.78	5.89	-7.23
656	59.38	36.25	2.61	42.69	2.03	14.61
657	39.23	38.74	23.39	6.46	1.60	14.36
691	54.76	63.97	16.08	17.31	-4.25	12.63
692	69.63	5.34	-5.20	-7.83	43.33	2.13
695	6.59	9.78	10.21	8.00	10.68	8.73
697	16.84	29.21	19.32	21.92	22.85	21.35
821	18.65	65.84	9.90	35.02	32.28	26.77
831	22.54	15.24	9.62	8.64	3.70	7.26
841	17.64	6.65	20.16	1.42	4.40	8.14
842	16.30	3.01	14.31	4.45	2.82	6.10
851	8.74	-0.46	4.99	2.10	1.05	2.66
899	16.01	20.02	24.61	7.10	14.04	16.84
All	16.10	7.43	17.94	2.17	5.71	8.00

Source: Computed from World Bank COM-TRADE Database

Resource intensive products contribute about 6 per cent of total exports as shown in Table 5.21. The highest export share is shown by leather products (611) followed by lime cement and construction materials (661) in 2002. But the share of leather products declined from 4.73 per cent to 1.23 per cent in 1996 and 1.27 per cent in 2002. The share of a majority of items in resource intensive products also shows a decline in 1996 compared to the before and after periods. The share of animal oil and fats (411), silver, platinum, etc. (681), nickel (685), lead (689) and tin (687) is low among this group.

Table 5.21
Share of Resource Intensive Products in Total Manufactured Goods Exports (%)

Code	1988	1990	1991	1996	2001	2002
411	0.00	0.00	0.00	0.00	0.00	0.00
421	0.00	0.00	0.00	0.03	0.03	0.08
422	0.07	0.32	0.42	0.66	0.43	0.27
431	0.01	0.05	0.10	0.12	0.09	0.13
611	4.73	3.53	2.27	1.23	1.38	1.27
612	0.43	0.51	0.50	0.36	0.43	0.39
641	0.05	0.08	0.10	0.28	0.40	0.42
661	0.13	0.33	0.50	1.05	1.01	1.07
662	0.03	0.05	0.05	0.08	0.14	0.14
663	0.20	0.12	0.12	0.11	0.12	0.12
681	0.02	0.00	0.02	0.01	0.01	0.01
682	0.02	0.04	0.04	0.08	0.40	0.73
683	0.00	0.00	0.01	0.01	0.01	0.01
684	0.51	0.68	0.94	0.74	0.82	0.74
685	0.00	0.01	0.01	0.01	0.00	0.00
686	0.00	0.00	0.00	0.01	0.01	0.01
687	0.00	0.01	0.01	0.05	0.01	0.03
689	0.08	0.00	0.00	0.01	0.01	0.00
All	6.30	5.73	5.09	4.84	5.32	5.41

Source: Computed from World Bank COM-TRADE Database

The growth rate of resource intensive product for 1991-02 period shows vegetables, fat, oils etc. (421) has highest growth rate. The compound growth rate of copper (682), silver and platinum (681) and zinc (686) also shows better performance as given in Table 5.22.

Table 5.22
Annual Average Growth Rate of Resource Based Products Exports (%)

Code	1988-91	1991-93	1994-96	1997-99	2000-02	1991-02
411	42.75	-13.07	22.67	55.28	16.52	21.38
421	28.45	13.46	86.06	75.70	91.80	44.53
422	16.50	37.92	27.29	15.02	-21.16	11.25
431	19.46	30.52	55.60	8.25	15.37	14.32
611	-12.61	-14.01	6.67	-7.23	30.23	1.44
612	16.15	-5.03	21.72	12.77	9.73	9.38
641	34.49	33.93	66.69	10.36	32.16	23.84
661	71.70	60.04	15.46	4.69	18.42	17.21
662	49.54	44.34	9.19	4.54	41.78	15.70
663	-8.04	-3.89	25.14	9.33	13.16	11.78
681	18.80	16.39	17.83	19.83	-25.39	15.70
682	14.29	34.86	28.35	-1.35	11.90	22.99
683	84.61	47.32	33.43	-12.31	16.20	16.39
684	36.34	18.85	18.96	26.56	13.36	8.46
685	71.52	9.23	11.29	-38.53	25.77	-6.76
686	-35.30	37.12	13.05	71.84	36.39	27.34
687	76.15	61.83	17.11	-2.85	53.19	23.09
689	23.30	37.81	19.47	8.52	2.34	13.95
All	2.70	3.16	17.02	4.22	19.80	9.24

Source: Computed from World Bank COM-TRADE Database

Differentiated export product share is given in Table 5.23. The share of this sector ranges from 1.5 per cent to 2.2 per cent. Differentiated products use sophisticated technology than labour and resource intensive products. It mainly comprises of machinery and equipments. The important sector, which contributes to the major share, is telecommunication equipment (724). But the share shows a decline over the period since 1990. Its share declined from 0.61 per cent in 1988 to 0.23 per cent in 2002. The export share of steam turbine (712), engine, motors and non electrical (714) and other power generating machines (718) is very low compared to other products within this group.

The growth rate of differentiated products is 9.03 per cent in 1991-02 periods. The highest growth rate (exponential) has been given in Table 5.24 is exhibited by agricultural machinery (712), 36.18 per cent. The growth rate is lower in railway vehicles (731), -0.66 per cent. The average growth rate is negative for majority of products in 1997-99 compared to other period. But in

2000-02, the growth rate of total differentiated products reached to 28.45 per cent from -3.22 per cent in 1997-99. The growth rate of majority of product increased during the post reform period.

Table 5.23
Share of Differentiated Products in Total Manufactured Exports (%)

Code	1988	1990	1991	1996	2001	2002
711	0.09	0.09	0.11	0.07	0.05	0.04
712	0.00	0.00	0.00	0.03	0.05	0.08
714	0.00	0.00	0.01	0.04	0.08	0.04
716	0.08	0.16	0.13	0.21	0.31	0.27
718	0.02	0.01	0.01	0.02	0.04	0.04
722	0.02	0.02	0.01	0.09	0.09	0.16
723	0.12	0.07	0.06	0.06	0.08	0.06
724	0.61	0.79	0.58	0.38	0.30	0.23
725	0.04	0.03	0.03	0.04	0.03	0.02
728	0.34	0.55	0.39	0.33	0.50	0.46
731	0.22	0.22	0.17	0.06	0.07	0.05
733	0.10	0.03	0.04	0.03	0.04	0.03
735	0.29	0.17	0.10	0.07	0.15	0.17
812	0.06	0.07	0.06	0.07	0.07	0.05
All	1.99	2.20	1.70	1.52	1.85	1.70

Source: Computed from World Bank COM-TRADE Database

Table 5.24
Annual Average Growth Rate of Exports of Differentiated Products (%)

Code	1988-91	1991-93	1994-96	1997-99	2000-02	1991-02
711	18.97	-12.15	44.19	-12.14	16.51	3.21
712	20.48	28.01	48.36	77.56	23.06	36.18
714	27.11	32.82	33.54	14.67	99.59	23.59
716	48.95	17.46	33.95	0.98	32.04	16.33
718	-17.06	23.17	29.43	-6.11	57.30	22.23
722	15.38	54.25	62.52	-14.16	70.96	26.01
723	-10.64	21.12	20.34	8.00	69.63	5.87
724	11.40	-16.24	18.29	-10.83	19.67	1.96
725	4.62	15.56	23.86	-11.86	19.22	8.62
728	19.90	-11.56	21.78	4.39	27.38	11.07
731	2.14	-12.81	-4.05	12.33	8.44	-0.66
733	-4.11	18.10	11.08	11.59	7.72	8.63
735	-7.17	-13.08	13.06	18.63	35.99	14.28
812	25.15	18.36	12.88	-0.70	9.14	8.89
All	6.25	-4.90	17.26	-3.22	28.45	9.03

Source: Computed from World Bank COM-TRADE Database

Science based industry's share also ranges from 1.53 per cent to 2.71 per cent. This sector uses more sophisticated technology. The sector includes arms and ammunitions, pigment paints, medicines, perfumery, soap, cleaners, polish

etc. Perfumery and cosmetics (553), pigments and paints (533) contributed the major share in this group. But the share of these groups shows a decline during the post liberalisation period as given in Table 5.25.

Table 5.25
Share of Science Based Products in Total Manufactured Exports (%)

Code	1988	1990	1991	1996	2001	2002
533	0.48	0.40	0.25	0.08	0.21	0.22
541	0.24	0.41	0.36	0.71	1.09	1.17
551	0.27	0.33	0.39	0.26	0.18	0.19
553	0.66	0.89	0.73	0.34	0.48	0.39
554	0.20	0.67	0.85	0.13	0.10	0.12
891	0.00	0.00	0.00	0.00	0.02	0.01
All	1.85	2.71	2.58	1.53	2.10	2.10

Source: Computed from World Bank COM-TRADE Data base

Science based products also show an increase in export growth rate since 1990. The overall compound growth rate is 10.04 per cent for the 1990-02 period. The highest growth rate is shown by arms and ammunition (891), 23.57 per cent. Soap, cleaners, polish (554) show a negative growth rate in 1991-02 period as given in Table 5.26.

Table 5.26
Annual Average Growth Rate of Science Based Products Exports (%)

Code	1988-91	1991-93	1994-96	1997-99	2000-02	1991-02
533	-8	-31	18	6	59	7.07
541	29	13	34	15	22	22.57
551	25	-4	26	0	9	6.38
553	15	-12	8	8	14	5.56
554	154	41	-14	-6	26	-6.21
891	10	138	50	103	96	23.51
All	26	-5	17	9	21	10.04

Source: Computed from World Bank COM-TRADE Data base

The scale intensive commodities contribute a major share of exports of manufactured goods. Pearl and precious stone (667) shows highest share of exports among scale intensive products. Table 5.27 shows that share have increased for majority of the products in post reform period.

Table 5.27
Share of Scale Intensive Products in Total Manufactured Exports (%)

Code	1988	1990	1991	1996	2001	2002
512	0.16	0.19	0.26	0.74	0.41	0.32
513	0.12	0.09	0.14	0.40	0.51	0.65
514	0.95	0.76	0.99	0.83	0.64	0.65
515	0.16	0.19	0.32	0.33	0.57	0.50
531	1.25	1.41	1.70	1.67	1.28	1.24
532	0.02	0.03	0.03	0.03	0.03	0.04
581	0.01	0.04	0.04	0.05	0.04	0.04
621	0.00	0.05	0.03	0.04	0.08	0.09
629	0.14	0.17	0.13	0.21	0.24	0.27
642	0.02	0.03	0.03	0.13	0.17	0.19
664	0.06	0.04	0.03	0.11	0.15	0.17
665	0.12	0.12	0.13	0.13	0.19	0.19
666	0.01	0.01	0.01	0.02	0.03	0.04
667	29.32	21.40	18.89	17.13	18.34	18.97
671	0.92	0.33	0.56	0.69	0.27	0.30
672	0.08	0.21	0.12	0.33	0.24	0.28
673	0.02	0.06	0.06	0.48	0.44	1.04
674	0.07	0.22	0.05	0.70	0.79	1.44
675	0.06	0.08	0.38	0.12	0.36	0.90
676	0.19	0.48	0.71	0.95	0.54	0.59
677	0.01	0.00	0.01	0.02	0.01	0.01
679	0.35	0.32	0.36	0.48	0.62	0.62
693	0.17	0.13	0.14	0.11	0.16	0.14
694	0.29	0.15	0.17	0.20	0.24	0.25
892	0.19	0.15	0.14	0.18	0.18	0.18
893	0.22	0.35	0.36	0.66	0.63	0.60
894	0.26	0.29	0.25	0.34	0.23	0.20
897	1.18	1.41	2.17	2.25	3.58	3.60
All	36.34	28.68	28.17	29.26	30.84	33.37

Source: Computed from World Bank COM-TRADE Database

The triennium average growth rate of exports of scale intensive products is given in Table 5.28. It shows that the compound growth rate is 10.74 per cent during 1991-2002. The highest export growth rate (exponential) in the scale intensive product is shown by flat-rolled plated iron (674) and flat - rolled iron (673) with growth rate of 32.96 per cent and 32.81 per cent respectively. Paper, paper board, cut, etc. (642), glass (664) and flat-rolled alloy steel (675) also made improvement in the growth rate during 1991-02 periods. The triennium average growth rate for a majority of products shows higher growth rate in 1990s

compared to the earlier period of 1988-91. But the growth rate during 1997-99 triennium shows a decline in its performance compared to other triennia in 1990s.

Table 5.28
Annual Average Growth Rate of Exports of Scale Intensive Products (%)

Code	1988-91	1991-93	1994-96	1997-99	2000-02	1991-02
512	32	10	92	-11	7	17.45
513	19	56	38	10	47	24.79
514	13	11	18	1	10	7.18
515	44	34	19	14	20	18.35
531	23	18	13	1	7	7.33
532	34	-1	28	12	13	12.49
581	88	27	14	11	1	10.56
629	15	7	30	10	20	16.15
642	22	45	43	1	35	27.17
664	-10	38	60	19	22	25.55
665	16	22	8	11	25	11.67
667	-5	12	5	17	5	9.10
671	3	60	3	-18	23	2.87
672	65	10	-3	-16	67	6.93
673	70	19	22	33	50	32.81
674	16	15	29	15	52	32.96
675	15	94	28	96	52	25.48
676	72	57	6	-14	23	5.04
677	35	552	107	72	70	13.47
679	21	22	18	1	29	15.43
693	4	32	11	31	3	10.88
694	-6	33	5	12	18	12.40
892	1	9	22	8	11	12.11
893	32	75	-2	4	13	12.02
894	9	11	21	-5	3	7.39
897	36	25	18	18	19	17.32
All	1	17	8	12	11	10.74

Source: Computed from World Bank COM-TRADE Database

Table 5.29
Share of Miscellaneous Products in Total Exports

Code	1988	1990	1991	1996	2001	2002
571	0.01	0.00	0.01	0.06	0.20	0.36
895	0.05	0.04	0.07	0.20	0.22	0.19
896	0.01	0.01	0.01	0.01	0.01	0.01

Source: Computed World Bank COM-TRADE Database

The Miscellaneous group, given in Table 5.29, consists of polymers of ethylene (571), office stationary (895), work of art, antique (896). The export share of these groups shows an increasing trend since 1990.

The miscellaneous products like polymers of ethylene, office stationary and work of art show better export performance in the pre and post liberalisation triennium as shown in Table 5.30.

Table 5.30
Annual Average Growth Rate of Exports of Miscellaneous Products (%)

Code	1988-91	1991-93	1994-96	1997-99	2000-02
571	46.52	51.80	61.27	38.93	101.32
895	24.84	82.95	22.16	4.70	13.01
896	-7.55	15.91	14.78	17.24	27.48

Source: Computed from World Bank COM-TRADE Database

5.3 Structure of Major Imports to India

Petroleum and petroleum products constitute the major share of import to India. Capital goods contribute a major share among the non bulk group imports. The non bulk group has the share of about 60 per cent in the total imports to India. The bulk items, which constitute petroleum and consumption goods, contribute about 40 per cent of imports. Machinery except electrical and electronics (5.77 per cent) and pearls, precious and semi precious stones (8.99 per cent) in 2001-02 also form a major share of imports to India. The import share of crude fertilizers, manufactured fertilizers, pearl, precious and semi precious stones, organic and inorganic chemicals shows increase in import share after 1990, it is given in Table 5.31.

Table 5.31

Share of Major Items of Imports to Total Imports in India (%)

Commodities	1987-88	1990-91	1991-92	1995-96	1999-00	2001-02
Bulk Imports	40.91	45.06	44.11	39.03	39.55	39.39
A. Petroleum, Crude and Products	18.18	25.04	27.43	20.52	25.39	27.23
B. Bulk Consumption Goods	6.65	2.31	1.42	2.64	4.87	3.98
Cereals and Cereal Preparations	0.30	0.42	0.36	0.07	0.45	0.04
Edible Oils	4.36	0.75	0.52	1.84	3.74	2.64
Pulses	1.13	1.11	0.53	0.56	0.16	1.29
Sugar	0.87	0.02	0.00	0.18	0.52	0.01
C. Other Bulk Items	16.09	17.71	15.27	15.87	9.30	8.19
Fertilizers	2.28	4.09	4.92	4.59	2.82	1.31
a) Crude	0.63	0.80	0.95	0.43	0.41	0.32
b) Sulphur and Unroasted Iron Pyrites	0.81	0.64	0.64	0.39	0.23	0.11
c) Manufactured	0.84	2.64	3.32	3.77	2.17	0.88
Non Ferrous Metals	2.87	2.55	1.75	2.46	1.10	1.26
Paper, Paperboards, Manufactures. incl. News Prints	1.21	1.06	1.02	1.29	0.90	0.87
Crude Rubber, incl. Synthetic and Reclaimed	0.54	0.52	0.38	0.59	0.29	0.34
Pulp and Waste Paper	1.07	1.06	0.62	0.75	0.51	0.57
Metalliferous Ores, Metal Scrap, etc.	2.17	3.54	2.46	2.24	1.76	2.22
Iron and Steel	5.93	4.89	4.12	3.94	1.92	1.62
Non-Bulk Imports	59.09	54.94	55.89	60.97	60.45	60.61
A. Capital Goods	29.52	24.24	21.81	28.17	18.05	18.12
Manufactures of Metals	0.72	0.70	0.67	0.76	0.82	0.79
Machine Tools	0.95	1.09	0.89	1.01	0.53	0.37
Machinery except Electrical and Electronic	11.75	8.72	7.51	10.70	5.53	5.77
Electrical Machinery except Electronic	4.92	3.94	3.24	1.05	0.88	1.15
Electronic Goods	-	-	-	4.78	5.63	7.34
Computer Goods	-	-	-	0.33	0.40	0.40
Transport Equipment	3.42	3.87	1.91	3.01	2.29	1.19
Project Goods	7.76	5.92	7.58	6.52	1.99	1.10
B. Mainly Export Related Items	15.07	15.29	18.45	14.34	18.36	16.01
Pearls, Precious and Semi-Precious Stones	9.07	8.65	10.08	5.74	10.94	8.99
Organic and Inorganic Chemicals	4.86	5.30	7.10	7.00	5.77	5.39
Textile Yarn, Fabrics, Made-ups, etc.	0.84	1.02	0.71	0.98	1.08	1.45
Cashew Nuts	0.29	0.31	0.56	0.62	0.56	0.18
C. Others	14.50	15.41	15.63	18.47	24.04	26.48
Artificial Resins and Plastic Materials, etc.	2.55	2.53	2.93	2.19	1.45	1.31
Professional, Scientific Controlling Instruments, Photographic Optical	2.25	2.45	2.10	1.82	1.70	2.02
Coal, Coke and Briquettes, etc.	0.98	1.83	2.17	2.52	2.03	2.21
Medicinal and Pharmaceutical Products	0.75	1.08	1.17	1.11	0.75	0.82
Chemical Materials and Products	0.86	0.66	0.71	0.67	0.73	0.86
Non-Metallic Mineral Manufactures	0.47	0.47	0.46	0.41	0.33	0.83
Others	6.64	6.38	6.11	9.74	17.06	18.44

Source: Computed from Director General of Commercial Intelligence & Statistics (DGCI&S)

Table 5.32
Annual Average Growth Rate of Major Items of Imports to India (%)

Commodities	1987-90	1991-95	1996-2002	1991-2002
Bulk Imports	28.96	20.44	13.91	16.87
A. Petroleum, Crude and Products	41.39	19.12	23.77	21.66
B. Bulk Consumption Goods	-5.14	59.04	27.14	41.64
Edible Oils	-13.33	96.05	31.17	60.66
Pulses	40.68	14.76	91.17	56.44
C. Other Bulk Items	29.74	22.27	1.14	10.74
Fertilizers	58.28	28.59	-3.52	11.08
a) Crude	35.43	10.03	9.07	9.51
b) Sulphur and Unroasted Iron Pyrites	17.18	18.13	-2.84	6.69
Non Ferrous Metals	22.42	25.59	2.34	12.91
Paper, Paperboards including News Prints	19.36	32.73	5.10	17.66
Crude Rubber, including Synthetic and Reclaimed	24.77	31.44	2.98	15.92
Pulp and Waste Paper	25.41	19.29	8.09	13.18
Metalliferous Ores, Metal Scrap, etc.	48.31	19.82	13.82	16.55
Iron and Steel	18.93	19.44	-2.69	7.37
Non-Bulk Imports	21.96	26.10	12.39	18.62
A. Capital Goods	17.15	28.24	4.54	15.31
Manufactures of Metals	23.51	25.93	13.49	19.14
Machine Tools	31.23	25.55	-2.53	10.23
Machinery except Electrical and Electronic	13.37	30.05	1.48	14.47
Electrical Machinery except Electronic	17.61	11.84	14.79	13.45
Transport Equipment	36.17	38.47	0.94	18.00
Project Goods	16.23	26.64	-8.10	7.69
B. Mainly Export Related Items	27.79	22.52	15.01	18.42
Pearls, Precious and Semi-Precious Stones	26.38	18.42	22.82	20.82
Organic and Inorganic Chemicals	31.88	31.62	7.91	18.68
Textile Yarn, Fabrics, Made-ups, etc.	33.57	26.10	20.09	22.82
Cashew Nuts	30.69	44.31	-3.82	18.06
C. Others	27.61	28.77	20.57	24.30
Artificial Resins and Plastic Materials, etc.	25.23	21.54	4.05	12.00
Professional, Scientific Controlling	30.83	18.42	15.41	16.78
Coal, Coke and Briquettes, etc.	55.36	32.35	10.25	20.29
Medicinal and Pharmaceutical Products	42.38	25.01	7.93	15.69
Chemical Materials and Products	15.17	24.13	18.58	21.10
Non-Metallic Mineral Manufactures	26.51	21.13	34.93	28.66
Others	24.13	36.36	27.94	31.77
Total Imports	24.77	23.60	12.34	17.46

Source: Computed from Economic Survey

The imports of majority of the items shows an increase in growth rate during the earlier two periods compared to 1996-02 period. Consumption goods show the higher growth rate compared to other goods as shown in Table 5.32.

The annual average growth rate is also highest for the manufactured goods among the bulk goods. Among the non bulk group cashew nuts, organic and inorganic chemicals, machine tools and transport equipment show the highest growth rate.

5.3.1 Import Performance of Manufactured Goods at Disaggregate Level

The import performance of manufactured goods as per SITC classification is examined in the following part. The import performance is examined only for the post liberalisation period at the disaggregate level. The growth rate of import is given in the Appendix XIX to Appendix XIV. The import growth rate (annual average) of labour intensive products declined in the second half of 1990s. The growth rate (exponential) is highest for furniture, cushion etc (821), 68.68 per cent and majority of the items show significant growth rate during 1990-02 period. The import growth rate is lowest for trunk, suit cases, bags, etc. (831) as in Appendix XXV.

Resource intensive product also shows significant import growth rate in the post liberalisation period. The highest import growth rate (exponential) is shown by silver, platinum (681) and fixed vegetable, fat, oil etc. (421). The import growth rate shows higher growth rate during the first half of 1990s compared to the second half of 1990s.

Import of scale intensive products also shows that the growth rate of a majority of items is higher in the 1991-95 period compared to the 1996-02 period. Some of the items show a negative growth rate (annual average) in the 1996-02 period. The highest growth rate is shown by gold, silverware and jewels (897). The lowest growth rate in the period 1991-02 periods is shown by flat-rolled alloy steel (675) -0.67 per cent, Tubes, pipes, etc. (679) 0.45 per cent and pig iron spiegeleisn, etc (671) 0.95 per cent.

The growth rate of import of differentiated products given in Appendix XXI also shows that in the 1996-02, the import of majority of items decreased compared to 1991-95 period. The import of engines, motors, non electrical (714) shows the highest growth rate (exponential) (50.23 per cent) during post liberalisation period.

The import of science based products does not show much difference in the two periods of post liberalisation. The highest growth rate is shown by arms and ammunition (891), 69.14 per cent followed by perfumery and cosmetics (553), 51.46 per cent.

5.4 Direction of Exports of India

Direction of foreign trade refers to the relative share of various countries or country group in imports and exports. This section examines the share of various individual countries and regional group in exports from India

5.4.1 Country Wise Direction of Exports of India

The export share of India in various countries (Table 5.33) shows that USA is the major destination for India's export. The share of export to USA has an increasing trend during the period since 1980. The export share to Japan, Germany and UK is also more than 5 per cent. But the share of these countries declined in 1990s.

Table 5.33
India's Exports by Destination (Percentage Share)

Year	USA	Japan	Germany	U.K.	Hong Kong	Italy	Belgium	France	Bangladesh
1980-81	11.97	9.02	4.50	5.37	1.67	2.01	2.13	1.90	0.83
1981-82	10.53	9.46	3.85	4.78	1.99	1.59	2.42	1.66	0.50
1982-83	14.97	8.48	4.14	5.01	1.91	1.67	2.19	1.61	0.62
1983-84	14.99	8.72	4.14	5.20	1.50	1.81	1.64	1.63	0.91
1984-85	18.07	10.68	4.68	4.79	1.93	1.89	2.05	1.86	1.18
1985-86	18.68	10.72	5.86	5.60	3.29	2.49	2.75	2.17	1.32
1986-87	18.60	10.28	6.73	6.39	2.84	3.18	3.09	2.41	1.19
1987-88	18.40	10.64	6.10	5.68	4.03	2.67	4.37	2.10	1.29
1988-89	16.15	9.86	6.39	5.77	3.23	2.74	4.34	2.24	1.66
1989-90	14.71	9.33	7.79	6.51	3.29	3.07	3.87	2.34	1.68
1990-91	16.32	9.24	7.10	6.35	3.44	3.24	3.73	2.35	0.22
1991-92	18.93	7.75	7.67	6.51	4.13	3.35	3.67	2.54	1.92
1992-93	17.93	7.83	6.89	6.19	5.62	2.71	3.87	2.26	1.93
1993-94	19.03	6.94	6.63	6.41	5.76	3.26	3.75	2.21	2.45
1994-95	17.35	6.96	6.21	6.30	5.73	3.19	3.50	2.34	3.30
1995-96	19.57	5.99	5.64	6.10	5.52	2.79	3.23	0.21	2.60
1996-97	19.40	5.42	5.49	6.10	5.50	3.18	3.45	2.17	2.25
1997-98	21.62	4.97	5.56	5.55	5.62	3.17	3.84	2.49	3.00
1998-99	22.76	4.57	4.71	5.52	6.76	3.04	3.63	2.43	1.73
1999-00	20.88	4.03	4.28	5.16	5.93	2.94	3.30	2.29	2.10

Source : Computed from IMF Direction of Trade Statistics

The annual average growth rate of exports to major countries is given in Table 5.34. Table shows that for most of the countries the growth rate has increased. The growth rate of exports to USA remains almost same for pre and post reform periods. The export growth rate of the countries, which has very small growth rate in 1980-85, have a better performance during the post reform period. The export growth rate of Hong Kong, Sri Lanka, Iran, Indonesia, and Netherlands show better performance during the post reform period. Thus the direction of trade also shows an improved performance during the post reform period.

Table 5.34
Annual Average Growth Rate of India's Exports by Direction(%)

Countries	1980-85	1986-90	1991-95	1996-2002	1980-90	1991-2002
Australia	8.07	22.33	32.18	2.69	15.20	19.07
Bangladesh	17.82	35.19	24.49	8.81	26.50	21.30
Belgium	11.87	43.54	24.57	17.48	27.71	21.42
Hong Kong	9.52	43.24	42.80	14.00	26.38	30.00
Indonesia	-11.63	72.29	40.00	31.63	30.33	40.95
France	6.90	30.96	27.14	8.59	18.93	18.90
Kuwait	5.98	0.41	51.69	7.41	3.20	32.01
Germany	6.50	38.30	21.37	4.77	22.40	13.99
Iran	2.35	69.32	35.56	4.83	35.84	21.90
Netherlands	6.67	32.85	32.10	5.69	19.76	20.37
Italy	7.26	38.44	28.49	5.19	22.85	18.14
Japan	17.83	21.42	20.10	-6.48	16.62	8.29
Saudi Arabia	7.62	14.59	36.35	25.63	11.11	31.59
Nepal	12.64	4.29	48.26	8.33	8.46	30.51
Switzerland	0.13	30.74	19.20	12.18	15.44	16.08
Singapore	4.68	34.72	41.77	-3.96	19.70	21.44
Sri Lanka	-7.13	35.28	43.87	10.71	21.20	29.13
Egypt	10.45	14.02	27.19	20.55	12.24	24.24
U.K	6.67	32.73	25.97	4.14	19.70	16.27
U.S.A	23.03	19.69	31.54	13.29	21.36	23.43
U.S.S.R	11.02	24.17	3.73	-8.58	17.60	-1.74
U.A.E	12.52	26.41	41.22	26.52	19.47	34.69

Source: Computed from Economic Survey

The export to regional group like OPEC, OECD, Eastern Europe and developing country is shown in Table 5.35. The major share of India's export is to the OECD countries. More than 50 per cent of the exports are marketed in to this region. Developing countries are the next important destination for the export from India, this accounts for about 25 per cent of the exports. Eastern European countries, which were a good market for India's goods prior to 1990s, declined in the 1990s. The share declined from 16.55 in 1987-88 to 2.86 per cent in 2001-02. The OPEC countries show an increase in its share during 1990s compared to the 1987-88 period. The share of this country group was 6.14 in 1987-88 and it increased to 11.92 per cent in 2001-02.

Table 5.35
Share of Various Regional Group in Total Exports from India

Year	OECD Countries	OPEC	Eastern Europe	Developing Countries
1987-88	58.91	6.14	16.55	14.22
1988-89	58.21	5.90	16.59	16.78
1989-90	55.91	6.66	19.28	15.61
1990-91	56.48	5.62	17.87	17.08
1991-92	57.86	8.74	10.93	20.08
1992-93	60.47	9.65	4.39	22.85
1993-94	56.88	10.71	4.50	26.07
1994-95	58.65	9.22	4.01	26.47
1995-96	55.69	9.68	4.21	28.93
1996-97	55.58	9.65	3.28	29.99
1997-98	55.66	10.08	3.67	29.46
1998-99	57.99	10.69	3.17	27.76
1999-00	57.32	10.58	3.51	28.41
2000-01	52.68	10.88	2.96	29.20
2001-02	49.34	11.92	2.86	30.88

Source: Computed from IMF Direction of Trade statistics

Share of OECD countries in total exports from India shows a decline in post reform period for majority of countries. European Union has the highest share. Among the OECD countries USA has the highest share. Japan also contributes major share. The growth rate of exports is highest to Canada as given in Table 5.36.

Table 5.36
Share of OECD Countries in Total Exports From India (%)

Countries	1987-88	1990-91	1991-92	1995-96	1996-97	1999-00	2001-02	Compound growth rate 1991-02
OECD Countries	58.91	56.48	57.86	55.69	55.58	57.32	49.34	15.14
<i>European Union</i>	25.10	27.49	27.02	27.39	25.86	25.48	22.47	14.68
Belgium	3.09	3.87	3.73	3.52	3.26	3.71	3.17	15.22
France	2.42	2.35	2.38	2.35	2.14	2.44	2.16	15.99
Germany	6.76	7.83	7.11	6.22	5.66	4.72	4.08	9.63
Italy	3.18	3.08	3.25	3.19	2.79	3.04	2.75	15.43
Netherlands	1.78	1.98	2.09	2.42	2.55	2.41	1.97	15.88
U K	6.48	6.53	6.37	6.32	6.12	5.53	4.93	13.53
<i>North America</i>	19.69	15.59	17.41	18.32	20.64	24.37	20.76	19.21
Canada	1.06	0.86	1.06	0.96	1.05	1.57	1.33	21.77
U S A	18.63	14.73	16.35	17.36	19.59	22.80	19.43	19.05
<i>Asia & Oceania</i>	11.60	10.44	10.51	8.34	7.34	5.85	4.54	7.58
Australia	1.15	0.99	1.13	1.18	1.15	1.10	0.95	14.26
Japan	10.29	9.33	9.24	6.97	5.99	4.58	3.45	6.15
<i>Other OECD Countries</i>	2.52	2.95	2.92	1.63	1.74	1.62	1.57	9.02
Switzerland	1.30	1.24	1.23	0.89	0.90	0.96	0.93	14.87

Source: Reserve Bank of India Bulletin

The share of OPEC countries in the total exports from India is given in Table 5.37. Among the OPEC countries, India exported a major share to Eastern Europe and Russia during the period 1987-88. The share of these countries declined in the 1990s. Share to Indonesia and UAE show an increasing trend during the period since 1987-88. The share to Iran, Iraq and Kuwait show a decline in exports from India in 1990s but in the later years of 1990s share increased.

Table 5.37
Share of OPEC Countries in Total Exports From India (%)

Countries	1987-88	1990-91	1991-92	1995-96	1996-97	1999-00	2001-02	Compound growth rate 1991-02
OPEC	6.14	5.62	8.74	9.68	9.65	10.58	11.92	19.05
Indonesia	0.17	0.60	0.82	2.12	1.86	0.88	2.37	20.53
Iran	0.89	0.43	0.69	0.49	0.58	0.41	0.58	12.68
Iraq	0.11	0.13	0.10	0.00	0.01	0.13	0.47	57.85
Kuwait	0.68	0.23	0.29	0.43	0.46	0.42	0.47	17.71
Saudi Arabia	1.77	1.29	1.97	1.52	1.72	2.02	1.06	13.18
U A E	1.98	2.42	4.13	4.49	4.41	5.66	5.69	20.17
Eastern Europe	16.55	17.87	10.93	4.21	3.28	3.51	2.86	6.78
Romania	0.39	0.29	0.07	0.09	0.05	0.03	0.03	5.49
Russia	12.52	16.14	9.18	3.29	2.42	2.57	1.82	5.12

Source: Reserve Bank of India Bulletin

Exports share of India to developing countries is given in Table 5.38. Among the developing countries the highest share is to Asian countries. The share to Asian countries shows an increasing trend since 1987-88. The compound growth rate during the reform period is 22.06 per cent. The share to African countries also exhibited an increasing trend. Among the African countries Sudan, Benin and Egypt show the highest growth rate during 1991-02 periods. The share to SAARC countries shows a decrease in its performance after 1996-97. Among the SAARC countries the highest share goes to Bangladesh. The share to other SAARC countries also shows an increase since 1987-88. The compound growth rate shows that Pakistan and Sri Lanka has the highest growth rate. Among the Asian countries the major share of exports from India is to Hong Kong.

Table 5.38
Share of Developing Countries in Total Exports from India (%)

Countries	1987-88	1990-91	1991-92	1995-96	1996-97	1999-00	2001-02	Compound growth rate 1991-02
Developing Countries	14.22	17.08	20.08	20.58	25.95	28.41	29.15	22.06
<i>Asia</i>	11.94	14.38	16.88	22.98	24.30	22.28	23.58	19.05
a) S A A R C	2.59	2.94	3.48	5.41	5.08	3.79	4.62	18.25
Bangladesh	1.19	1.68	1.81	3.30	2.60	1.73	2.29	17.84
Bhutan	0.00	0.01	0.01	0.05	0.07	0.02	0.02	11.37
Maldives	0.02	0.03	0.03	0.05	0.03	0.02	0.06	17.67
Nepal	0.60	0.27	0.43	0.50	0.50	0.41	0.49	15.60
Pakistan	0.12	0.23	0.22	0.24	0.47	0.25	0.33	21.43
Sri Lanka	0.66	0.72	0.98	1.26	1.43	1.36	1.44	19.08
b) Other Asian Developing Countries	9.35	11.44	13.40	17.57	19.22	18.50	18.95	19.23
Hong Kong	2.85	3.29	3.44	5.73	5.57	6.82	5.40	21.10
South Korea	0.93	1.01	1.34	1.41	1.55	1.29	1.08	16.05
Malaysia	0.58	0.83	1.13	1.24	1.59	1.21	1.77	20.35
Singapore	1.74	2.09	2.18	2.84	2.92	1.83	2.22	11.21
Thailand	0.52	1.36	1.11	1.49	1.34	1.22	1.44	15.06
<i>Africa</i>	2.01	2.17	2.47	4.76	4.25	4.22	5.16	24.32
Benin	0.07	0.07	0.06	0.04	0.05	0.08	0.13	29.69
Egypt	0.51	0.54	0.45	0.52	0.47	0.64	1.06	24.53
Kenya	0.23	0.20	0.23	0.77	0.50	0.32	0.36	17.89
Sudan	0.14	0.12	0.09	0.10	0.08	0.19	0.28	34.11
Tanzania	0.14	0.16	0.27	0.26	0.20	0.22	0.21	12.12
Zambia	0.03	0.12	0.15	0.11	0.10	0.06	0.06	3.53

Source: Reserve Bank of India Bulletin

5.4.1 Commodity Wise Direction of Exports of India

In the following section the direction of exports of some of the important manufactured goods is examined. Exports to countries, which has the major share, is only considered for the analysis.

Results given in Table 5.39 shows that the major share of exports of leather products from India is to Germany, USA, Italy and U.K. these countries has the share of 15.85, 14.91 13.53 and 12.82 per cent respectively in 2001-02. But the annual average growth rate of these countries shows a decline since 1987-88. During the reform period the highest growth rate is shown by Hong

Kong (26.58) per cent. The growth rate shows a decline for a majority of the countries during the 1990s.

Table 5.39
Direction of Exports of Leather and Leather Products

Countries	Share				Annual average growth rate			
	1987-88	1991-92	1995-96	2001-02	1987-90	1991-95	1996-2002	1991-2002
France	5.88	4.83	5.05	4.63	20.73	14.06	8.76	11.17
Germany	21.73	21.93	22.83	15.85	27.72	13.85	0.98	6.83
Hong Kong	2.60	2.39	3.39	6.35	28.96	24.40	28.40	26.58
Italy	11.62	9.73	12.60	13.53	23.01	17.97	12.95	15.23
Netherlands	1.72	1.71	2.19	3.15	26.06	21.85	11.87	16.41
Portugal	1.20	1.51	1.35	1.92	34.53	11.03	19.28	15.53
Russia	16.19	12.60	2.66	0.83	20.06	-16.16	-1.63	-8.24
Spain	1.09	2.18	2.89	5.28	50.58	22.71	23.21	22.98
U.K.	10.18	11.42	11.28	12.82	29.78	14.93	8.59	11.47
U.S.A.	11.39	13.89	16.81	14.91	32.45	19.88	3.48	10.93
Others	16.41	17.81	18.96	20.73	28.42	14.24	10.60	12.25

Source: Reserve Bank of India Bulletin

The highest share of Gems and Jewellery goes to U.S.A. The share was about 35.98 per cent in 2001-02. Hong Kong and Belgium also had a good share in Gem and Jewellery export from India. The highest average growth rate of export is shown by Japan, Hong Kong and Thailand during the period 1991-02. The annual average growth rate of exports to these major destination countries declined during the post reform period as given in Table 5.40.

Table 5.40
Direction of Exports of Gems and Jewellery

Countries	Share				Annual average growth rate			
	1987-88	1991-92	1995-96	2001-02	1987-90	1991-95	1996-2002	1991-2002
Belgium	13.70	16.78	13.66	11.80	38.84	35.96	16.54	25.37
Hong Kong	11.62	14.19	23.96	23.04	34.38	28.79	33.25	31.22
Israel	2.03	2.02	2.60	3.53	25.30	11.15	5.27	7.95
Japan	18.69	16.86	14.07	5.22	41.14	32.93	33.11	33.03
Singapore	1.01	1.54	1.81	1.66	24.79	17.89	13.21	15.34
Switzerland	2.31	1.99	1.24	1.65	62.20	25.65	15.89	20.33
Thailand	1.76	3.48	4.35	3.25	16.71	6.65	47.70	29.04
U.A.E.	1.09	4.15	1.78	7.42	30.12	16.06	27.15	22.11
U.K.	2.10	2.12	1.59	2.33	21.87	22.63	19.52	20.93
U.S.A.	39.86	32.40	31.06	35.98	20.40	20.99	22.44	21.78
Others	5.82	4.47	3.89	6.45	29.10	21.18	17.68	19.27

Source: Reserve Bank of India Bulletin

Russia was the major destination country for the exports of chemicals and allied products from India. Germany and U.S.A also had good share during 1987-88 period but the share of these countries show a decline during the period since 1987-88. Table 5.41 shows that the annual average growth rate of these countries also declined after 1987-88.

Table 5.41
Direction of Exports of Chemicals & Allied Products

Countries	Share				Annual average growth rate			
	1987-88	1991-92	1995-96	2001-02	1987-90	1991-95	1996-2002	1991-2002
China,	0.25	0.05	1.03	2.76	36.49	19.78	14.14	16.70
Germany	11.04	7.71	1.47	3.88	87.31	32.00	6.83	18.27
Hong Kong	1.64	2.69	7.99	5.14	37.43	27.90	16.39	21.62
Italy	3.05	2.16	4.01	2.46	51.13	37.67	8.67	21.85
Netherlands	2.54	2.38	2.80	2.31	63.30	3.82	11.53	8.02
Russia	23.99	29.09	4.26	2.87	64.16	30.34	26.08	28.02
U.A.E.	1.78	1.95	6.18	2.87	45.70	26.17	15.49	20.34
U.K.	4.99	4.37	2.79	4.28	51.56	23.45	19.38	21.23
U.S.A.	11.87	11.90	5.39	3.88	49.21	30.06	18.43	23.72
Others	38.82	37.54	11.73	13.81	50.55	21.97	17.26	19.40

Source: Reserve Bank of India Bulletin

U.S.A continues to be the major destination for engineering goods exports from India. The share of engineering goods exports to majority of these countries shows an increase since 1987-88. The annual average growth rate during 1990s shows that the growth rate during 1996-2002 declined for majority of the countries. Compared to the pre reform period, the growth rate of engineering goods exports to major countries given in Table 5.42 declined during the reform period.

Table 5.42
Direction of Exports of Engineering Goods

Countries	Share				Annual average growth rate			
	1987-88	1991-92	1995-96	2001-02	1987-90	1991-95	1996-2002	1991-2002
Bangladesh	4.21	2.68	4.66	3.86	44.87	26.69	20.93	23.55
Germany	3.28	3.77	4.71	4.21	44.64	55.32	14.64	33.13
Hong Kong	1.00	1.06	3.20	1.71	117.88	21.36	28.37	25.18
Italy	0.84	2.98	1.72	2.48	85.72	36.94	15.72	25.36
Malaysia	0.98	3.05	3.03	3.96	39.77	33.09	14.72	23.07
Singapore	6.11	4.59	6.38	5.10	65.81	31.61	17.92	24.14
Sri Lanka	2.55	2.79	3.35	2.30	86.04	37.72	17.48	26.68
U.A.E.	1.81	4.49	6.21	6.65	37.19	35.38	10.20	21.64
U.K.	5.49	5.19	7.31	5.23	38.88	42.82	15.94	28.16
U.S.A.	10.24	10.03	13.73	16.27	38.12	18.64	21.23	20.05
Others	63.50	59.37	45.69	48.24	39.40	26.17	17.32	21.35

Source: Reserve Bank of India Bulletin

The direction of exports of cotton yarn and fabrics is highest to U.S.A. The share remains almost the same for the period since 1987-88. The share shows an increase during the reform period for these major countries of exports from India. Table 5.43 also shows that exports to Japan have the highest growth rate. The growth rate of Germany and U.A.E show negative growth rate during 1996-02 periods. Compared to other periods the growth rate of other countries also declined during 1996-02 periods.

Table 5.43
Direction of Exports of Cotton Yarn, fabrics, made up

Countries	Share				Annual average growth rate			
	1987-88	1991-92	1995-96	2001-02	1987-90	1991-95	1996-2002	1991-2002
Bangladesh	5.65	9.62	10.75	5.40	28.41	22.68	2.07	11.44
Germany	7.68	6.86	6.32	3.83	54.22	60.10	-5.63	24.25
Hong Kong	2.34	3.72	4.61	4.03	24.18	21.78	12.82	16.89
Italy	7.31	5.09	5.07	5.25	43.87	27.92	9.18	17.70
Japan	3.01	3.72	3.69	3.61	126.58	57.74	22.65	38.60
Korea,	3.61	4.57	3.62	4.29	46.49	44.44	1.87	21.22
Mauritius	1.11	1.63	3.07	2.49	72.91	16.03	5.79	10.44
U.A.E.	1.98	5.40	3.08	2.50	31.06	18.49	-1.27	7.71
U.K.	13.59	11.26	9.12	5.57	29.53	30.93	12.33	20.78
U.S.A.	14.82	12.96	12.49	15.98	26.52	30.54	10.79	19.76
Others	38.91	35.18	38.18	49.53	30.81	28.46	6.97	16.74

Source: Reserve Bank of India Bulletin

Table 5.44 shows that a major share of Readymade garments from India go to U.S.A. U.K and Germany also is major sources of destination for readymade garment exports. The share shows an increase during the period since 1987-88 for a majority of these countries. But the growth rate of exports of these countries showed a decline in its performance. The growth rate of exports to U.S.A decreased from 46.14 per cent in 1987-90 to 14.83 per cent during 1996-02 periods.

Table 5.44
Direction of Exports of Readymade Garments

Countries	Share				Annual average growth rate			
	1987-88	1991-92	1995-96	2001-02	1987-90	1991-95	1996-2002	1991-2002
Canada	2.72	3.25	3.33	4.36	33.47	22.11	12.86	17.06
France	6.30	6.52	7.14	6.76	32.06	16.58	7.97	11.88
Germany	13.88	13.27	12.25	7.24	24.48	15.03	13.64	14.27
Italy	5.39	3.84	3.42	3.01	6.79	6.90	3.38	4.98
Japan	1.91	4.36	3.21	1.66	29.80	23.23	12.63	17.45
Netherlands	3.92	3.67	4.37	3.76	11.80	7.50	31.63	20.66
Russia	10.92	5.05	2.59	6.64	103.39	13.88	36.92	26.45
U.A.E.	0.98	5.00	3.19	7.28	31.91	18.84	12.42	15.34
U.K.	11.12	10.11	9.85	8.44	28.99	26.09	12.02	18.42
U.S.A.	30.42	27.29	31.02	29.15	46.14	22.41	14.83	18.28
Others	12.44	17.66	19.64	21.69	32.12	19.92	13.40	16.37

Source: Reserve Bank of India Bulletin

Highest share of Jute exports from India is to U.S.A. The share increased from 14.20 per cent in 1987-88 to 19.29 per cent in 2001-02 periods. The share to Belgium shows an increasing performance since 1991. During the 1990s the share of these countries increased compared to pre reform period. The annual average growth rate for the period 1991-02 shows Saudi Arabia has the highest growth rate. The average growth rate shows a decline for a majority of these countries during the 1990s as given in Table 5.45.

Table 5.45
Direction of Exports of Jute Manufactures

Countries	Share				Annual average growth rate			
	1987-88	1991-92	1995-96	2001-02	1987-90	1991-95	1996-2002	1991-2002
Australia	2.07	2.20	1.69	3.26	57.20	24.88	1.64	12.20
Belgium	6.06	10.65	19.24	17.95	53.05	21.21	11.87	16.12
Egypt	1.71	3.33	3.43	5.81	2.47	24.16	23.52	23.81
Germany	2.79	1.53	3.42	2.64	48.00	25.11	22.98	23.95
Italy	0.64	0.81	1.16	2.07	14.62	4.23	12.39	8.68
Japan	4.76	4.28	3.98	4.48	63.26	8.83	16.01	12.75
Saudi Arabia	1.59	3.38	2.64	4.13	14.26	46.98	12.83	28.35
Turkey	0.69	2.07	5.43	4.73	12.07	14.41	2.47	7.90
U.K.	7.89	6.90	7.61	9.01	30.05	8.40	22.14	15.90
U.S.A.	14.20	19.32	17.13	19.29	8.22	13.17	15.11	14.23
Others	57.61	45.52	34.28	26.64	13.93	8.43	11.18	9.93

Source: Reserve Bank of India Bulletin

Direction of exports of carpets to major countries is given in Table 5.46. U.S.A is the major source of exports of carpets from India. The share of U.S.A is 44.63 per cent in 2001-02. The share of export to U.S.A shows an increase since 1987-88. Germany, which was also a major market in 1987-88, shows a decline in its share in the subsequent period. The share of Japan also increased since 1987-88. The highest average annual growth rate is also shown by this country. The growth rate of export of carpet also shows a decline during 1990s as given in Table 5.46.

Table 5.46
Direction of Exports of Carpets

Countries	Share				Annual average growth rate			
	1987-88	1991-92	1995-96	2001-02	1987-90	1991-95	1996-2002	1991-2002
Australia	1.19	1.04	2.03	1.33	29.32	3.16	7.47	5.51
Canada	3.84	2.51	1.90	2.14	28.11	23.44	3.91	12.79
France	2.16	1.85	2.70	3.02	34.01	6.93	-5.49	0.16
Germany	35.14	36.39	30.26	16.95	50.62	4.37	3.52	3.91
Italy	2.29	3.10	2.79	1.68	40.60	20.50	0.66	9.68
Japan	0.72	3.11	5.34	3.21	12.10	39.37	11.39	24.11
Spain	0.12	0.42	0.80	1.44	41.93	17.41	-5.72	4.79
Sweden	2.49	2.85	3.00	2.56	35.38	16.30	14.45	15.29
U.K.	3.01	3.04	3.24	6.36	38.79	13.93	10.72	12.18
U.S.A.	30.46	31.25	33.63	44.63	25.39	12.72	2.42	7.10
Others	18.57	14.43	14.31	16.66	34.50	11.45	4.05	7.42

Source: Reserve Bank of India Bulletin

Conclusion

In this chapter, the trends in export performance of India in terms of commodity composition and direction of exports is made. Manufactured goods export have the major share in total exports from India. The share shows an increasing trend in the case of manufactured goods where as primary products shows decreasing trend. Thus there is a structural change in favour of manufactured exports. The analysis concludes that the manufactured exports of India show a better performance for most of the commodities exported and in terms of diversification of exports during post liberalisation period.

Impact of Trade Liberalisation on India's Exports

Thesis

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by

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Chapter VI

Impact of Trade Liberalisation on India's Exports

- 6.1 Determinants of India's Exports
- 6.2 Pre and Post Reform Period Determinants of India's Exports
- 6.3 Error Correction Models for Determinants of India's Exports

Introduction

In this chapter an analysis of the impact of trade liberalisation on India's Exports is made. India's export growth witnessed a change since mid 1980s and especially after 1990s. This increase in export growth being coincidental with India's trade liberalisation efforts is often attributed to price responsiveness of exports, improvements in incentive structure towards trade, increasing capability to export due to industrialisation or changes in development strategy. These factors influencing exports can be classified as demand and supply factors. Still now there is controversy regarding the determining factors of exports. This chapter examines the role of both demand and supply factors in determining the exports from India during the pre and post liberalisation period. With the introduction of trade reform measures, trade policy also plays an important role in the determination of export performance. This chapter also examines the impact of trade reform on the aggregate exports of India.

6.1 Determinants of India's Exports

The impact of trade policy on the export performance of India is analysed along with the other major factors, which determine the export performance. The period of analysis is from 1970 to 2002. Three alternative measures of trade policies have been used to identify the role of trade policy. They are liberalisation as a dummy variable (0 for period before liberalisation and 1 for post liberalisation), openness measured as the $[(\text{export} + \text{import}) / \text{GDP}]$ and tariff rate. The export performance can be related to various demand and supply factors and in order to examine the impact of these variables during the pre and post liberalisation, period from 1980 to 2002 is selected. To examine the long run impact of trade policy the period from 1970 to 2002 is considered.

The demand and supply factors identified to examine the determinants of India's exports along with the trade policy indicators such as openness index liberalisation dummy and tariff rate are explained in this section. The demand side variables selected are Real Effective Exchange Rate and world demand. The main supply side variables are the relative price, capability to export, domestic demand and FDI. As stated above we make an analysis of export performance with reference to total export and manufactured export separately. Export values are derived by deflating with respective unit value index of export. The factors identified as determinants and the theoretical relationship with the export are discussed below.

Real Effective Exchange Rate (REER)

One of the important determinants of exports is exchange rate. Reform measures in exchange rate will have a significant influence on exports. For the present analysis real effective exchange rate is selected. Theoretically a negative relationship is expected in the case of REER and exports. The index of REER worked out and published by RBI is used for the present analysis¹.

World Demand

The world demand is an important factor in export growth of a country as it gives an expanding market for the products. The present study used real world GDP as a measure of world demand and assumes a theoretically positive relationship. The data on world GDP are collected from the World Bank database.

Relative prices

The present study used Unit Value Index of exports to WPI as a measure

¹REER is generally defined in terms of the price indices of domestic economy and the trading partner economy to the exchange rate of the domestic economy with respect to the trading partner calculated in terms of numeraire as SDR.

of relative price. The WPI and Unit Value index for total export and manufactured export have been collected from the Economic Survey. It is often used as an indicator of competitiveness and especially of profitability. Higher the unit value index of exports higher will be the incentives to export. Thus a positive influence is expected on the exports.

Domestic demand

Rise in domestic demand leads to a fall in exports. Thus there is a negative correlation between domestic demand and exports. In the present study aggregate domestic demand defined as the sum of government expenditure, private consumption expenditure and total investment as proxy for domestic demand in total exports and private consumption expenditure as a proxy in manufactured exports are used. The data have been collected from the publication of Central Statistical Organisation.

Capability to exports

Capability to export is often measured in terms of GDP, investment or installed capacities in manufacturing. Growing manufacturing production is expected to provide an expanding base for export growth. The capability to export in the present study is measured in terms of real GDP. The total GDP is used for the analysis of total export and GDP originating from manufacturing is used for the analysis of manufacturing export.

Foreign Direct Investment

The role of FDI in export promotion in developing countries is ambiguous and depends on the motive behind such investment. Thus, assessment of the role of foreign Direct Investment (FDI) in a host country's export performance is important. FDI promotes exports of host countries by (a) augmenting domestic capital formation (b) helping transfer of technology and introduction of new products for exports, (c) facilitating access to new and large foreign markets, and

(d) providing training for the local workforce and upgrading technical and management skills. On the other hand, it is sometimes apprehended that FDI may (a) lower or replace domestic savings and investment; (b) transfer technologies that are low level or inappropriate for the host country's factor endowment; (c) target primarily the host country's domestic market and thus would not increase exports; (d) inhibit the expansion of indigenous firms that might become exporters; and (e) not help in developing the host country's dynamic comparative advantages by focusing solely on local cheap labour and raw materials. But the role of FDI has increased in the liberalised period and is considered as one of the factors influencing exports. Thus it is also selected. For the present analysis the net inflow of FDI collected from World Investment Report is used.

Tariff Rates

The effective tariff rate measured by import duties expressed as a percentage of the value of imports is used as a measure of tariff rate. An increase in tariff rates on imports is similar to a tax on exports. As such, a negative relationship between the two is expected. Data is collected from Monthly Abstract of Statistics.

Liberalisation

The impact of trade liberalisation on India's export is also measured using the dummy variable. The pre reform period is measured by using value 0 (zero) and post reform by value 1 (one).

Openness

The openness index shows the outward orientation of the economy. The index measured as the share of export plus import to GDP is shown in Table 6.1. The openness index shows whether the outward orientation of the economy increased during liberalisation period compared to the pre liberalisation period. From table it is clear that the openness index has increased for India. Figure 6.1 also shows the similar trend.

Figure 6.1
Openness Index of India

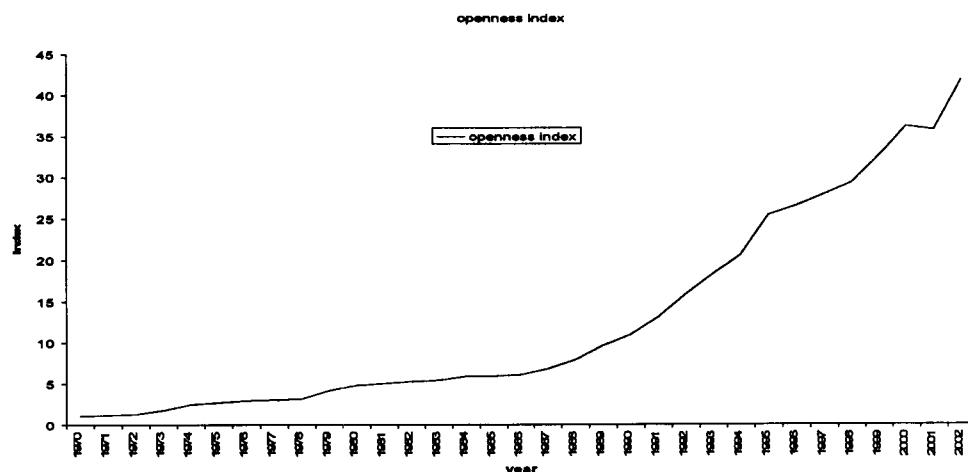


Table 6.1
Openness Index of India

Year	Index	Year	Index	Year	Index
1970	1.07	1981	5.04	1992	15.867
1971	1.15	1982	5.27	1993	18.283
1972	1.29	1983	5.43	1994	20.601
1973	1.76	1984	5.87	1995	25.460
1974	2.49	1985	5.94	1996	26.569
1975	2.70	1986	6.07	1997	27.964
1976	2.93	1987	6.81	1998	29.378
1977	3.05	1988	7.88	1999	32.637
1978	3.18	1989	9.60	2000	36.246
1979	4.16	1990	10.93	2001	35.826
1980	4.80	1991	13.093		

Source: Computed from Economic Survey

The growth rate of the variables used for the analysis is given in Table 6.2. It shows that the growth rate of manufactured exports is higher than the total export growth rate in three sub periods since 1970. The annual average growth rate of total exports is 11.09 per cent during 1991-2002 periods, which is higher than the two other periods. The export growth rate during 1980s is lowest compared to other two periods. Table shows that the export growth rate during liberalisation is higher compared to other periods.

Table 6.2
Annual Average Growth Rate of Factors Determining India's Exports (%)

Variables	1970-79	1980-90	1991-2002
Total export	6.86	5.32	11.09
Manufactured export	8.71	7.54	12.31
REER	-3.89	-1.72	-1.42
World Demand	14.36	8.26	6.97
Total GDP	2.71	5.80	5.64
GDP (manufacturing)	4.62	6.98	6.57
Relative Price	9.63	20.06	12.33
FDI	-0.19	21.89	46.06
Aggregate demand	-2.57	3.11	8.85
Personal consumption expenditure	-4.15	-4.00	-2.43

Source: Computed by the researcher

The import growth rate also shows an improvement during 1990s over the other two periods. During 1970s and 1980s the import growth rate is high compared to the export growth rate. The export growth rate is higher than import growth rate during liberalisation. The manufactured export growth rate during 1991-2002 is 12.31 per cent, which is higher than the earlier two periods growth rate. The world demand proxied by the world GDP shows that the growth rate decreased during 1980s and 1990s compared to the growth rate in 1970s. The growth rate increased during post liberalisation period compared to the pre reform period. The growth rate of total GDP of India increased in 1990s. The growth rate of FDI was negative during 1970-80 but it increased at a higher rate during the reform period.

6.1.1 Empirical Models and the Results

The following demand and supply models are used to examine the determinants of exports in India.

$$Y_d = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + U_t \quad (1)$$

$$Y_s = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + U_t \quad (2)$$

Where in equation (1) x_1 – REER, x_2 - World demand, x_3 - Lag of exports, and x_4 - trade policy measures and in equation (2) x_1 - Relative price, x_2 – GDP, x_3 - Domestic Demand, x_4 – trade policy measures x_5 - lag of export supply, and

* Sources of tables not specified in chapters are computed by the Researcher

X_6 – Foreign direct investment. The depended variables , Y_d and Y_s are exports (total exports and manufactured exports respectively in the corresponding models)and where d and s denotes the equation for demand and supply respectively. The data on total exports and manufactured exports is collected from Director General of Commercial Intelligence and Statistics (DGCI&S) and deflated using unit value index of exports.

The determinants of the exports are examined for the two periods i.e. for 1980-2002 and 1970-2002. The first section deals with the determinants in the pre and post liberalisation periods and the second section tries to discern the long run impact of trade policy. The first section used multiple regression models and the second section used cointegration and error correction models for the analysis of determinants of aggregate export and manufactured export separately. The result of the analysis of determinants is given in the following section.

6.2 Pre and Post Reform Period Determinants of India's Exports

The determining factor of exports is analysed for the pre and post reform period using multiple regression analysis. Three separate models are used for the analysis with openness index and tariff rates, i.e., trade policy measures proxied by openness and tariff rates are used independently and jointly in three models. The determining factors and the models are as defined earlier and separate analysis is done for the total and manufactured exports. The model used for the analysis is given below.

$$Y_d = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + U_t \quad (1)$$

$$Y_s = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + U_t \quad (2)$$

Where Y_d and Y_s are exports (y is total and manufactured exports respectively in the corresponding analysis and d and s stands for demand and supply equations), x_1 - REER and x_2 -World demand in equation (1) and

x_1 -relative price, x_2 - GDP, x_3 -FDI and X_4 - domestic demand in equation (2). X_3 and x_5 in equation (1) and (2) are trade policy variables. Three alternative models are estimated with demand and supply factors for total and manufactured exports respectively. In model 1- openness, model 2-tariff and in model 3-both variables are used for the analysis. Variables are used in logarithmic form.

6.2.1 Pre and Post Reform Period Determinants of India's Total Exports

The multiple regression analysis for the total exports with demand factor given in Table 6.3 shows that all the variables have the theoretically expected sign in three models except for a few time periods. Openness has positive and significant relationship in all models. World demand shows positive relation in all three models for both post reform and pre reform period. But it has more significant impact during liberalisation period. REER and tariff rate have the expected negative influence in all models.

Table 6.3
Multiple Regression Results for Determinants of India's Aggregate Exports with Demand Factors

Models	Year	Constant	REER	World Demand	Openness	Tariff	R-square
Model 1	1980-90	7.571 (4.513)	-0.706 (-2.497)	0.296 (2.657)	0.871 (5.253)	-	0.9928 <i>0.9901</i>
	1991-02	0.318 (0.154)	0.318 (0.612)	0.148 (0.640)	0.805 (2.618)	-	0.9603 <i>0.94337</i>
	1980-02	-0.311 (-0.336)	-0.589 (3.962)	0.063 (0.443)	0.850 (4.499)	-	0.9867 <i>0.9847</i>
Model 2	1980-90	5.761 (2.681)	-0.490 (-1.345)	0.416 (3.419)	-	-0.421 (-4.118)	0.958 <i>0.9436</i>
	1991-02	-0.684 (-0.247)	0.120 (0.168)	0.741 (7.819)	-	-0.0003 (0.008)	0.9397 <i>0.913</i>
	1980-02	-1.167 (-0.821)	0.442 (1.900)	0.640 (11.186)	-	-0.040 (-1.211)	0.9807 <i>0.9776</i>
Model 3	1980-90	6.600 (3.874)	-0.555 (-1.953)	0.032 (0.153)	0.591 (2.374)	-0.183 (-1.435)	0.9953 <i>0.992</i>
	1991-02	0.477 (0.224)	0.414 (0.757)	0.049 (0.1857)	0.882 (2.671)	-0.026 (-0.781)	0.9603 <i>0.9339</i>
	1980-02	0.536 (0.504)	-0.476 (2.916)	0.0317 (0.227)	0.835 (4.546)	-0.034 (-1.479)	0.987 <i>0.9842</i>

Figures in brackets are t values and figures in italics are Adjusted R^2

The multiple regression analysis with supply factors as given in Table 6.4 shows that relative price has the expected positive relation. It appears as more significant during the liberalisation period than the pre reform period. Capability to export (measured in terms of GDP) and FDI also shows positive impact during both the periods. Openness shows positive and significant impact in all models. Tariff reduction has increased India's export in both period but they are not significant. Domestic demand shows the expected negative impact during the post reform period.

Table 6.4
Multiple Regression Result for Determinants of India's Aggregate Exports with Supply Factors

Models	Year	Intercept	Relative price	GDP	FDI	Domestic demand	Openness	Tariff	R-Square
Model 1	1980-90	5.761 (0.606)	-0.189 (-0.310)	-0.384 (-0.836)	0.003 (0.035)	0.199 (0.313)	1.077 (3.778)	-	0.985 <i>0.972</i>
	1991-02	-5.448 (-1.003)	0.913 (3.295)	0.104 (0.2441)	0.073 (1.26)	-0.952 (-3.652)	0.498 (1.348)	-	0.991 <i>0.983</i>
	1980-02	-0.916 (-0.466)	0.441 (7.109)	0.012 (0.069)	0.001 (0.137)	-0.461 (-6.65)	0.906 (10.160)	-	0.991 <i>0.988</i>
Model 2	1980-90	-5.907 (-0.555)	0.264 (0.461)	1.0872 (2.280)	0.014 (1.269)	-0.256 (-0.431)		-0.558 (-3.615)	0.984 <i>0.970</i>
	1991-02	-9.838 (1.431)	1.133 (0.1758)	0.402 (0.171)	0.153 (0.0276)	1.146 (0.168)		-0.039 (0.014)	0.995 <i>0.991</i>
	1980-02	-13.29 (-4.043)	-0.0029 (-0.020)	1.359 (6.537)	0.025 (1.344)	-0.007 (-0.051)		-0.081 (-2.104)	0.987 <i>0.984</i>
Model 3	1980-90	-0.707 (-0.066)	-0.081 (-0.137)	0.310 (0.420)	0.0067 (0.578)	0.104 (0.169)	0.624 (1.322)	-0.292 (-1.178)	0.993 <i>0.984</i>
	1991-02	-8.524 (-1.825)	1.089 (4.510)	0.309 (0.858)	0.139 (2.422)	-1.107 (-4.913)	0.106 (0.298)	-0.036 (-2.020)	0.995 <i>0.989</i>
	1980-02	-0.827 (-0.40)	0.421 (5.270)	0.003 (0.016)	0.0019 (0.224)	0.443 (5.310)	0.886 (8.647)	-0.008 (-0.42)	0.992 <i>0.989</i>

Figures in brackets are t values and figures in italics are Adjusted R²

6.2.2 Pre and Post Reform Period Determinants of India's Manufactured Exports

The multiple regression models for the determinants of manufactured exports in India show that world demand, exchange rate and openness have the theoretically expected sign among the demand side factors as given in Table 6.5.

World demand shows significant impact during the post liberalisation period in manufactured exports. Tariff rate also has the expected negative influence in both periods. Openness index also has positive impact in all models.

Table 6.5
Multiple Regression Result for Determinants of India's Manufactured Exports with Demand Factors

Model	Year	Constant	REER	World demand	Tariff	Openness	R-square
Model 1	1980-90	15.0463 (4.05290)	-2.3263 (-3.7135)	0.30792 (1.24602)	-	0.57258 (1.5591)	0.987 <i>0.982</i>
	1991-02	0.74543 (0.42420)	-0.06000 (0.13547)	0.22891 (1.16222)	-	0.73613 (2.81008)	0.972 <i>0.960</i>
	1980-02	1.23940 (0.9397)	-0.0049 (-0.0231)	0.25692 (1.26389)	-	0.60717 (2.24957)	0.990 <i>0.989</i>
Model 2	1980-90	12.9889 (3.77768)	-2.0012 (-3.4291)	0.23825 (1.22242)	-0.3839 (-2.3441)	-	0.969 <i>0.956</i>
	1991-02	-0.46164 (-0.1815)	-0.168 (-0.2681)	0.81823 (5.6894)	-0.04604 (0.36373)	-	0.972 <i>0.962</i>
	1980-02	1.717913 (0.86261)	-0.22771 (-0.7834)	0.61742 (7.18861)	-0.0995 (-1.1925)	-	0.987 <i>0.985</i>
Model 3	1980-90	12.93853 (3.40941)	-1.99733 (-3.1552)	0.26524 (0.56317)	-0.0355 (-0.0640)	0.3982 (1.3980)	0.987 <i>0.980</i>
	1991-02	1.019242 (0.50792)	-0.10625 (0.21868)	0.16617 (0.61459)	-0.76931 (2.6350)	0.03681 (0.3647)	0.973 <i>0.954</i>
	1980-02	1.032375 (1.93457)	-0.3579 (-0.1006)	1.245885 (0.25819)	-1.88178 (0.55255)	0.53255 (0.0445)	0.991 <i>0.989</i>

Figures in brackets are t values and figures in italics are Adjusted R²

Among the supply side factors relative price, capability to export, domestic demand and openness show the theoretically expected sign in three models for almost all periods. Though FDI shows positive and significant relationship in all models, it shows negative impact in model 1 and model 2 during 1980-90 but for all other periods it shows positive impact. Capability to export shows significant impact on India's manufactured exports. Openness index also shows positive influence during both periods but the influence is more significant during the post reform period as given in Table 6.6. But the result shows that openness index has negative impact during the pre reform period in model 1 but it has positive impact in all periods in model 3.

Table 6.6
Determinants of India's Manufactured Export Commodities with Supply
Factors for Post Reform Period

Models	Year	Constant	Relative price	GDP	FDI	Domestic demand	Tariff	Openness	R-square
Model 1	1980-90	12.493 (0.800)	-0.244 (-3.046)	0.946 (2.011)	-0.0325 (-2.889)	-1.695 (-1.637)		-0.835 (-4.304)	0.979 <i>0.961</i>
	1991-02	-27.192 (-2.340)	0.012 (0.114)	1.460 (5.449)	0.061 (1.046)	1.654 (1.406)		0.272 (1.751)	0.985 <i>0.971</i>
	1980-02	0.462 (0.071)	0.168 (2.072)	1.046 (4.047)	0.0411 (2.463)	-0.836 (-2.011)		0.141 (2.204)	0.994 <i>0.992</i>
Model 2	1980-90	23.923 (0.683)	0.260 (1.955)	-0.5677 (-0.363)	0.017 (0.896)	-1.652 (-0.839)	1.161 (1.932)	-	0.974 <i>0.952</i>
	1991-02	-11.238 (-1.353)	0.065 (0.534)	0.445 (0.681)	0.070 (1.192)	-0.844 (1.083)	-1.140 (1.917)	-	0.986 <i>0.973</i>
	1980-02	-7.014 (-1.452)	0.142 (2.567)	0.741 (3.667)	0.026 (2.133)	0.125 (0.334)	-0.636 (4.982)	-	0.993 <i>0.991</i>
Model 3	1980-90	15.656 (0.6534)	-0.246 (-2.732)	0.745 (0.636)	-0.031 (-2.212)	-1.824 (-1.365)	-0.795 (-2.621)	0.109 (0.191)	0.984 <i>0.965</i>
	1991-02	-23.73 (-2.494)	0.156 (1.398)	0.431 (0.792)	0.01 (-0.182)	2.290 (2.297)	-0.241 (-1.91)	1.026 (2.057)	0.989 <i>0.971</i>
	1980-02	-7.232 (-1.393)	0.145 (2.384)	0.741 (3.558)	0.025 (1.973)	0.141 (0.352)	-0.009 (0.1479)	0.6521 (3.827)	0.994 <i>0.992</i>

Figures in brackets are t values and figures in italics are Adjusted R²

6.2.3 Post Reform period Determinant of Manufactured Exports-Commodity wise

The multiple regression results of the determinants of major items of manufactured exports are given below. The item wise analysis is done for the post reform period only. For the present analysis the period since 1987 is selected for commodity wise analysis due to the adoption of H.S code. That is the pre reform period has only a few years to make a significant analysis. The demand and supply factors are as defined earlier. Two separate models with openness and tariff rates are estimated with demand and supply factors.

As per Table 6.7 world demand has positive and significant impact for most of the products. REER also has the expected sign during post reform period for most of the products. Openness also shows positive impact for most of the products but the impact is not significant for most of the products. It has negative impact on textile products and jute manufactures. Tariff has favourable and significant impact for most of the products.

Table 6.7
Determinants of Exports of Major Manufactured Commodities with Demand Factors for Post Reform Period

Commodities	Model 1					Model 2				
	Intercept	REER	World Demand	Openness	R Square	Intercept	REER	World Demand	Tariff	R Square
Manufactured Goods	-12.13 <i>-2.06</i>	-0.43 <i>-0.94</i>	1.28 <i>2.89</i>	0.15 <i>0.55</i>	0.98	-9.82 <i>-2.68</i>	-0.77 <i>-1.67</i>	1.13 <i>4.53</i>	-0.25 <i>-1.64</i>	0.98
Leather and Manufactures	-7.38 <i>-0.95</i>	-0.59 <i>-0.98</i>	0.84 <i>1.43</i>	0.21 <i>0.58</i>	0.77	-4.15 <i>-0.74</i>	-0.56 <i>-0.81</i>	0.58 <i>1.52</i>	0.05 <i>0.21</i>	0.76
Chemicals and Allied Products	-27.12 <i>-2.43</i>	-1.22 <i>-1.40</i>	1.95 <i>2.31</i>	0.10 <i>0.19</i>	0.95	-24.43 <i>-3.09</i>	-1.28 <i>-1.30</i>	1.74 <i>3.23</i>	-0.03 <i>-0.09</i>	0.95
Engineering Goods	-15.52 <i>-1.48</i>	-1.09 <i>-1.34</i>	1.18 <i>1.49</i>	0.29 <i>0.60</i>	0.94	-11.70 <i>-1.79</i>	-1.70 <i>-2.09</i>	0.94 <i>2.11</i>	-0.45 <i>-1.68</i>	0.96
Readymade Garments	-9.82 <i>-1.25</i>	0.26 <i>0.42</i>	1.05 <i>1.77</i>	0.22 <i>0.61</i>	0.95	-9.06 <i>-1.72</i>	-0.57 <i>-0.87</i>	1.02 <i>2.83</i>	-0.24 <i>-1.13</i>	0.96
Textile Yarn, Fabrics, Made-ups, etc.,	-22.26 <i>-2.54</i>	-0.66 <i>-0.98</i>	2.18 <i>3.31</i>	-0.22 <i>-0.54</i>	0.96	-16.67 <i>-2.65</i>	-0.54 <i>-0.69</i>	1.76 <i>4.09</i>	-0.05 <i>-0.19</i>	0.96
Jute Manufactures	-26.57 <i>-2.36</i>	-0.62 <i>-0.71</i>	2.54 <i>2.99</i>	-1.60 <i>-3.06</i>	0.54	-9.75 <i>-0.98</i>	-1.37 <i>-1.10</i>	1.15 <i>1.69</i>	0.73 <i>1.79</i>	0.29
Handicrafts	-11.83 <i>-0.58</i>	-2.00 <i>-1.26</i>	1.57 <i>1.02</i>	0.07 <i>0.07</i>	0.73	-7.56 <i>-1.56</i>	0.49 <i>0.80</i>	0.99 <i>2.99</i>	-0.31 <i>-1.55</i>	0.97
a) Gems and Jewellery	-7.54 <i>-1.02</i>	-0.10 <i>-0.17</i>	0.95 <i>1.70</i>	0.33 <i>0.96</i>	0.96	-9.57 <i>-1.73</i>	0.76 <i>1.10</i>	1.04 <i>2.75</i>	-0.32 <i>-1.42</i>	0.96
b) Carpets (Handmade excl. Silk)	-10.42 <i>-1.23</i>	0.34 <i>0.52</i>	1.07 <i>1.67</i>	0.30 <i>0.77</i>	0.96	6.50 <i>0.83</i>	-1.74 <i>-1.79</i>	0.44 <i>0.82</i>	-0.02 <i>0.06</i>	0.46
Total Export	12.97 <i>1.20</i>	-1.65 <i>-1.97</i>	0.06 <i>1.08</i>	0.30 <i>0.59</i>	0.48	-8.99 <i>-2.01</i>	-1.07 <i>-1.91</i>	1.02 <i>3.32</i>	-0.25 <i>1.35</i>	0.97

Figures in Italics are t values

Multiple regression result for the manufactured exports with supply factor is given in Table 6.8. Most of the supply factors also have favourable impact on the exports of manufactured products from India. Capability to exports measured by GDP shows positive impact. Net inflow of FDI also shows favourable impact. Domestic demand shows the expected negative sign for most of the products. Among the supply factor also openness and tariff shows favourable impact.

Table 6.8
Determinants of Exports of Major Manufactured Commodities with Supply Factors during Post Reform Period

Commodities	Model 1							Model 2						
	Intercept	Openness	Relative price	GDP	FDI	Domestic credit	R Square	Intercept	Tariff	Relative price	GDP	FDI	Domestic credit	R Square
Manufactured Goods	-12.53 <i>-2.35</i>	0.98 <i>2.57</i>	0.09 <i>1.11</i>	2.66 <i>6.34</i>	0.00 <i>0.08</i>	-0.68 <i>-1.36</i>	0.95	-10.56 <i>-1.41</i>	-0.10 <i>0.57</i>	0.06 <i>0.84</i>	1.72 <i>7.05</i>	0.05 <i>1.25</i>	-0.02 <i>-0.03</i>	0.99
Leather and Manufactures	-25.26 <i>-2.83</i>	1.07 <i>1.67</i>	0.10 <i>0.76</i>	2.40 <i>3.42</i>	0.03 <i>0.43</i>	0.79 <i>0.94</i>	0.92	-23.00 <i>-2.25</i>	-0.18 <i>-0.77</i>	0.06 <i>0.59</i>	1.41 <i>4.24</i>	0.03 <i>0.50</i>	1.41 <i>1.71</i>	0.89
Chemicals and Allied Products	-3.63 <i>-0.28</i>	2.46 <i>2.70</i>	0.30 <i>1.59</i>	4.30 <i>4.28</i>	-0.03 <i>-0.33</i>	-3.48 <i>-2.91</i>	0.98	2.00 <i>0.14</i>	-0.64 <i>-1.94</i>	0.06 <i>0.41</i>	2.16 <i>4.50</i>	0.15 <i>1.75</i>	-2.38 <i>-2.00</i>	0.98
Engineering Goods	-19.59 <i>-1.41</i>	1.83 <i>1.84</i>	0.18 <i>0.90</i>	3.74 <i>3.42</i>	0.06 <i>0.56</i>	-1.23 <i>-0.95</i>	0.97	-15.91 <i>-0.94</i>	-0.18 <i>-0.48</i>	0.09 <i>0.57</i>	1.98 <i>3.58</i>	0.05 <i>0.51</i>	0.00 <i>0.00</i>	0.96
Readymade Garments	-16.90 <i>-2.06</i>	0.95 <i>1.61</i>	0.18 <i>1.52</i>	2.67 <i>4.13</i>	0.01 <i>0.18</i>	-0.41 <i>-0.53</i>	0.95	-15.32 <i>-1.60</i>	-0.09 <i>-0.43</i>	-0.03 <i>-0.35</i>	1.65 <i>5.27</i>	-0.05 <i>-0.99</i>	-0.49 <i>-0.63</i>	0.98
Textile Yarn, Fabrics, Made-ups, etc.,	-6.27 <i>-0.70</i>	2.55 <i>3.95</i>	0.31 <i>2.38</i>	3.78 <i>5.33</i>	0.20 <i>3.06</i>	-2.62 <i>-3.09</i>	0.95	-0.93 <i>-0.06</i>	-0.38 <i>-1.10</i>	0.06 <i>0.43</i>	1.40 <i>2.78</i>	0.06 <i>0.65</i>	-1.08 <i>-0.86</i>	0.97
Jute Manufactures	-11.59 <i>-0.66</i>	3.87 <i>3.07</i>	-0.26 <i>-1.01</i>	4.22 <i>3.05</i>	0.15 <i>1.22</i>	-2.44 <i>-1.48</i>	0.71	-3.24 <i>-0.13</i>	-0.72 <i>-1.30</i>	0.31 <i>1.29</i>	0.70 <i>0.86</i>	-0.05 <i>-0.34</i>	-0.32 <i>-0.16</i>	0.41
Handicrafts	-8.12 <i>-0.78</i>	0.72 <i>0.96</i>	0.17 <i>1.12</i>	0.90 <i>1.10</i>	-0.13 <i>-1.81</i>	0.48 <i>0.49</i>	0.98	-9.85 <i>-0.97</i>	-0.24 <i>-1.04</i>	0.07 <i>0.69</i>	1.49 <i>4.48</i>	-0.10 <i>-1.76</i>	-0.23 <i>-0.28</i>	0.98
a) Gems and Jewellery	-13.78 <i>-1.40</i>	0.83 <i>1.17</i>	0.23 <i>1.57</i>	1.07 <i>1.37</i>	-0.17 <i>-2.44</i>	0.84 <i>0.91</i>	0.98	-15.72 <i>-1.58</i>	-0.24 <i>-1.06</i>	0.11 <i>1.11</i>	1.78 <i>5.46</i>	-0.13 <i>-2.34</i>	-0.50 <i>-0.62</i>	0.98
b) Carpets (Handmade excl. Silk)	23.99 <i>1.29</i>	0.98 <i>0.73</i>	-0.03 <i>-0.11</i>	-1.73 <i>-1.18</i>	0.12 <i>0.94</i>	-0.13 <i>-0.07</i>	0.60	22.04 <i>1.15</i>	-0.09 <i>-0.22</i>	-0.18 <i>0.96</i>	-0.79 <i>-1.27</i>	0.18 <i>1.65</i>	-0.79 <i>-0.51</i>	0.56
Total Export	-16.33 <i>-2.66</i>	1.37 <i>3.11</i>	0.11 <i>1.22</i>	3.11 <i>6.43</i>	0.02 <i>0.39</i>	-0.69 <i>-1.20</i>	0.95	-13.56 <i>-1.44</i>	-0.15 <i>-0.72</i>	0.10 <i>1.03</i>	1.81 <i>5.86</i>	0.06 <i>1.12</i>	0.20 <i>0.27</i>	0.98

Figures in Italics are t values

6.3 Error Correction Models for Determinants of India's Exports

This section examines the long run determinants of India's exports. The demand and supply factors along with trade policy variable identified earlier are used for the analysis. In order to examine the long run impact of trade policy and other variables the Error Correction model is used. Error correction model combines long run information with short run adjustment. In order to examine long run impact of the variables, the Vector Error Correction model is used in the present analysis. The analysis is done for total exports and manufactured exports for the period from 1970 to 2002.

The analysis is divided into two parts. In the first part, the cointegration results and in the second part, results of Error Correction models are given. The models used for the analysis is given as follows. Error terms for the Error correction models are generated from the cointegration vectors. Therefore, in the first step cointegration equations are estimated. The variables are as defined earlier. In the cointegration analysis four alternative models are estimated with alternative three trade policy variables. In the first model –openness, In the second model- tariff, in the third model- trade policy dummy and in the fourth model- all policy variables simultaneously are used. In order to estimate the cointegration vectors the first condition is that the variables should be stationary. Stationarity is tested using Augmented Dickey fuller Tests. The results are given below.

6.3.1 Augmented Dickey Fuller (ADF) Test for Stationarity

One of the important pre conditions for the estimation of time series data is that the variables used for the analysis should be stationary. There exists different methods for the estimation of stationarity of the variables. In the present study variables are tested for stationarity using Augmented Dickey fuller test (ADF). The ADF tests is used for both demand and supply variables for total exports and manufactured exports separately. The model used for the analysis is given below, where Δ is the difference operator, t is the time trend, ε is the random error, m is the maximum lag length, X_t is the variables. Null hypotheses s that $\beta = 0$, exists unit root. It will be rejected if β is negative and statistically significant.

$$\Delta X_t = \alpha_0 + \beta X_{t-1} + \delta t + \sum_{i=1}^m \theta_i \Delta X_{t-i} + \varepsilon_t$$

Results for unit root test of the variables are given in Table 6.9. The results at the level and at first difference levels are given. The analysis is done with trend, constant and with trend and constant. The unit root test results (Augmented Dickey Fuller test) show that all the variables are non stationary at the level and stationary at first difference level. Akaike Information Criteria (AIC) and Schwarz-Bayesian Criteria (SBC) are used for determining the lag length. As the variables are stationary the cointegration equations can be estimated using the variables

identified. Cointegration analyses are done to examine the long run influence.

Table 6.9
Augmented Dickey Fuller (ADF) Unit Root Test of the Variables

Variables	No deterministic trend	Constant	Constant & Trend
Unit root at Level			
Total export	4.5379(4)	1.2371(3)	-2.2348(4)
Manufactured export	4.7542(3)	-2.3996(3)	1.0036(4)
REER	-0.1892(3)	-0.7769(3)	-1.0079(5)
World demand	6.1222(4)	-2.9062(3)	0.8898(4)
Openness	6.1863(4)	-1.5505(3)	0.0442(4)
Tariff	-1.1813(3)	-1.1850(5)	0.5106(4)
Relative price (m)	-0.3174(4)	-1.8735(4)	-1.3206(3)
Relative price	-0.2968(5)	-1.2181(4)	-2.2798(5)
GDP (m)	7.1094(4)	-2.4282(4)	-0.1246(4)
GDP	9.5550(4)	0.6772(5)	-2.4489(4)
FDI	0.0463(4)	-3.4723(5)	-1.5905(5)
Domestic demand	0.9879(4)	-1.2248(4)	-2.7665(3)
Domestic demand (m)	-5.429(4)	-1.3403(5)	-0.7513(5)
First Difference			
Total export	-3.1546(2)**	-4.4690(3)**	-4.9614(3)**
Manufactured export	-3.576(1)**	-5.1852(2)**	-4.8747(2)**
REER	-4.4355(2)**	-4.3842(2)**	-4.4175(1)**
World demand	-2.7600(3)**	-5.9553(2)**	-5.5040(3)**
Openness	-1.6931(3)**	-3.6688(3)*	-3.7381(1)**
Tariff	-3.6465(2)**	-4.3149(2)*	-3.7481(1)**
Relative price	-4.8192(2)**	-5.1143(2)**	-5.0591(2)**
Relative price(m)	-4.8475(3)**	-5.1078(2)**	-5.1090(2)**
GDP	-1.8644(4)	-5.7815(4)**	-5.8878(3)**
GDP(m)	-1.9926(2)*	-3.8205(2)*	-3.9040(2)**
FDI	-6.2136(1)**	-6.0902(2)**	-6.2238(2)**
Domestic demand(m)	-3.1294(2)**	-5.3516(2)**	-5.1846(2)**
Domestic demand	-5.1295(4)**	-5.2694(4)**	-5.1565(3)**

*significant at 1 % level, ** at 5% level, figures in bracket the lag length and m in brackets denotes manufactured goods.

6.3.2 Granger Causality Tests

Granger Causality is estimated to test the direction of causality between the variables and exports. The results of Grange Causality test for total exports and manufactured exports are given in Table 6.10. The sign, ($\Leftrightarrow$), shows feed back effects and the sign ($\Rightarrow$) unidirectional effects.

The variables are defined as TEX- Total Exports, MEX- Manufactured Exports, DD- Domestic demand, RP- Relative Price, NF- Net inflow of FDI, GDP- Gross Domestic Products, TARIFF- Tariff rate, WDD – World Demand, REE- Real

Effective Exchange Rate, OPE- Openness and TP-Trade policy dummy. Y is the explanatory variable and X is total exports and manufactured exports respectively. The World demand, Net inflow of FDI and Tariff have feed back effect on total Exports and manufactured exports and all other variables has unidirectional effects in both case as per Table 6.10. The results show that selected variables have effects on the exports.

Table 6.10
Granger Causality Test Result for Total Exports and Manufactured Exports

Null Hypothesis:	F-Statistic	Probability	Inferences
Total Exports			
DD does not Granger Cause TEX	0.190554	0.16894	Y⇒ X
TEX does not Granger Cause DD	0.095112	0.06998	
GDP does not Granger Cause TEX	4.97898	0.01477	
TEX does not Granger Cause GDP	0.8958	0.42051	X⇔Y
NF does not Granger Cause TEX	1.27946	0.29513	
TEX does not Granger Cause NF	5.05511	0.01398	
OPE does not Granger Cause TEX	10.3519	0.00049	Y⇒ X
TEX does not Granger Cause OPE	0.99135	0.38467	Y⇒ X
REER does not Granger Cause TEX	1.12587	0.33968	
TEX does not Granger Cause REER	0.19136	0.82699	
RP does not Granger Cause TEX	4.6961	0.01815	Y⇒ X
TEX does not Granger Cause RP	0.16798	0.84628	X⇔Y
TARIFF does not Granger Cause TEX	0.25147	0.77953	
TEX does not Granger Cause TARIFF	3.91273	0.0327	
TP does not Granger Cause TEX	2.26734	0.12369	Y⇒ X
TEX does not Granger Cause TP	0.65256	0.52903	X⇔Y
WD does not Granger Cause TEX	4.57442	0.01985	
TEX does not Granger Cause WD	0.93983	0.40357	
Manufactured Exports			
GDP does not Granger Cause MEX	4.87749	0.0159	Y⇒ X
MEX does not Granger Cause GDP	0.56043	0.57771	X⇔Y
NF does not Granger Cause MEX	2.18743	0.13242	
MEX does not Granger Cause NF	4.67142	0.01848	
OPE does not Granger Cause MEX	7.00072	0.0037	Y⇒ X
MEX does not Granger Cause OPE	0.09381	0.91077	Y⇒ X
DD does not Granger Cause MEX	1.44558	0.25393	
MEX does not Granger Cause DD	0.84548	0.44082	
REER does not Granger Cause MEX	1.35009	0.27679	Y⇒ X
MEX does not Granger Cause REER	0.15387	0.85816	Y⇒ X
RP does not Granger Cause MEX	3.30773	0.0525	
MEX does not Granger Cause RP	0.63032	0.54036	
TARIFF does not Granger Cause MEX	0.75216	0.48133	X⇔Y
MEX does not Granger Cause TARIFF	4.15415	0.02719	X⇔Y
WD does not Granger Cause MEX	1.67759	0.20642	
MEX does not Granger Cause WD	2.9989	0.06731	

6.3.3 Cointegration Result

As the variables are stationary, it can be used for testing cointegration of the model. The results of the analysis are given in this section. The first difference of the variables is used for the analysis as all variables are stationary at first difference. In the first model –openness, in the second model- tariff, in the third model- trade policy dummy and in the fourth model- all policy variables are used. The cointegration vector for the demand side variable for total exports is given in Table 6.11.

Table 6.11
Johansen and Juselius (JJ) Cointegration Test For Total Exports with Demand Factors

Models	Null hypotheses	Alternative hypotheses	Trace statistic	Null hypotheses	Alternative hypotheses	Max-eigenvalue	Eigenvalue
Model 1	$r=0$	$r>0$	322.039**	$r=0$	$r=1$	264.1949**	0.9998
	$r\leq 1$	$r>1$	57.844**	$r=1$	$r=2$	36.07627**	0.6876
	$r\leq 2$	$r>2$	21.768**	$r=2$	$r=3$	14.18246*	0.3671
	$r\leq 3$	$r>3$	7.5855**	$r=3$	$r=4$	7.585578**	0.2170
Model 2	$r=0$	$r>0$	348.0300**	$r=0$	$r=1$	275.7556**	0.9998
	$r\leq 1$	$r>1$	72.27448**	$r=1$	$r=2$	34.49895**	0.6713
	$r\leq 2$	$r>2$	37.77553**	$r=2$	$r=3$	23.35699**	0.5292
	$r\leq 3$	$r>3$	14.41854**	$r=3$	$r=4$	14.41854**	0.3719
Model 3	$r=0$	$r>0$	321.08**	$r=0$	$r=1$	276.1535**	0.999865
	$r\leq 1$	$r>1$	44.93425**	$r=1$	$r=2$	28.36174**	0.599441
	$r\leq 2$	$r>2$	16.57251*	$r=2$	$r=3$	16.26327*	0.408221
	$r\leq 3$	$r>3$	0.309244	$r=3$	$r=4$	0.309244	0.009926
Model 4	$r=0$	$r>0$	426.715**	$r=0$	$r=1$	291.6054**	0.99991
	$r\leq 1$	$r>1$	135.110**	$r=1$	$r=2$	66.48418**	0.88289
	$r\leq 2$	$r>2$	68.6257**	$r=2$	$r=3$	32.58300**	0.65043
	$r\leq 3$	$r>3$	36.0427**	$r=3$	$r=4$	19.33970	0.46412
	$r\leq 4$	$r>4$	16.70309*	$r=4$	$r=5$	15.47246*	0.39293
	$r\leq 5$	$r>5$	1.230631	$r=5$	$r=6$	1.230631	0.03892

*significant at 1 % level , ** significant at 5 % level

The result shows that in model 1, trace test indicates four significant cointegration equations at both 5% levels and max-eigenvalue test at 5% and 1% level three and one equations respectively. In Model 2, Trace test and Max-eigenvalue test indicates four cointegration equations at 5% levels. In model 3,

Trace test indicates 5 cointegration equations at the 5% level and one at the 1% level and Max-eigenvalue test indicates two significant cointegration equations at 5% and one at 1% levels. In model 4, trace tests shows four equations at 5% level and at 1% level one cointegration equation.

The model adequacy test given in Table 6.12 also shows that the variable has satisfied the entire test. The unit root test for residuals in three models also shows that it is stationary at level as given in Table 6.13 and the variables are cointegrated.

Table 6.12

Model Adequacy Test for Total Exports with Demand Factors

Test	Model 1	Model 2	Model 3	Model 4
AR 1- 2 F(2, 25)	1.77 (0.1910)	1.6963 (0.2038)	1.7721 (0.1907)	2.6315 (0.0935)
ARCH 1 F(1, 25)	0.11698 (0.7352)	0.29515 (0.5918)	1.2009 (0.2836)	0.081817 (0.7774)
Normality Chi ² (2)	3.5196 (0.1721)	5.4682 (0.0650)	1.4844 (0.4761)	0.034522 (0.9829)
RESET F(1, 26)	1.4449 (0.2402)	0.63691 (0.4321)	0.16522 (0.6877)	1.1942 (0.2853)

Figures in brackets are p values

Table 6.13

Unit Root Test of Residual For Total Exports with Demand Variable

Models	No deterministic trend	Constant only	Constant and trend
Model 1	-2.3282*	-3.8331**	-4.5365**
Model 2	-3.8951**	-3.8302**	-4.3720**
Model 3	-4.4394**	-4.3612**	-4.3766**
Model 4	-4.3474**	-4.2521**	-4.3043*

*significant at 1 % level ,** significant at 5 % level

The regression results for the period 1970-2002 are also given for each model. The result shows that the openness index has positive and significant impact on India's exports. World demand and lagged value of exports also show positive impact as given in Table 6.14. Tariff rate has the expected negative sign and liberalisation dummy has positive impact on the total exports from India.

Table 6.14
Regression Result of Determinants For Total Exports with Demand Factors for
1970-2002

Variables	Model 1	Model 2	Model 3	Model 4
Constant	0.033112 (0.1960)	0.0041253 (0.8854)	0.028037 (0.28010)	-0.0017023 (0.9512)
REER	-0.30740 (0.2111)	-0.38682 (0.1181)	-0.35866 (0.1697)	-0.48385 (2.0556)
World demand	0.19986 (0.20100)	0.17266 (0.2622)	0.17435 (0.3030)	0.067598 (0.6730)
Lag of export	0.19834 (0.2639)	0.15702 (0.3606)	0.12634 (0.4976)	0.13746 (0.4310)
Tariff	-0.018683 (0.1940)	-	-	-0.022540 (0.11240)
Openness		0.27317 (2.0892)	-	0.35319 (2.0300)
Liberalisation dummy		-	0.026791 (0.3988)	0.027809 (0.3579)

Figures in brackets are t values

The cointegration result for the supply side variable given in Table 6.15 shows Trace test has three significant cointegration equations at the 5% level and three cointegration equation at 1 % level. Max-eigenvalue test indicates twq cointegration equations at both 5% and 1% levels. In model 2, Trace test indicates four cointegration equations at 5% and Max-eigenvalue test indicates two cointegration equations at both 5% and one at 1% level. In model 3 and in model 4, Trace test indicates one and three cointegration equation at the 5% level and three equations at 1% level respectively. The max-eigenvalue test shows three equations at the 5% level in model 3 and two equations at the 5% level and four significant equations at 1% level in model 4.

Table 6.15
Johansen and Juselius (JJ) Cointegration Test for Total Exports With Supply Factors

Models	Null hypotheses	Alternative hypotheses	Trace statistics	Null hypotheses	Alternative hypotheses	Max-eigenvalue	Eigenvalue
Model 1	$r=0$	$r>0$	372.545**	$r=0$	$r=1$	275.4863**	0.999862
	$r\leq 1$	$r>1$	97.0592**	$r=1$	$r=2$	41.03378**	0.733843
	$r\leq 2$	$r>2$	56.0254**	$r=2$	$r=3$	23.75508	0.535267
	$r\leq 3$	$r>3$	32.2703*	$r=3$	$r=4$	15.87416	0.400746
	$r\leq 4$	$r>4$	16.3964*	$r=4$	$r=5$	9.862031	0.272492
	$r\leq 5$	$r>5$	6.53426*	$r=5$	$r=6$	6.534206*	0.190048
Model 2	$r=0$	$r>0$	389.744**	$r=0$	$r=1$	284.4344**	0.999896
	$r\leq 1$	$r>1$	105.311**	$r=1$	$r=2$	39.84475**	0.723436
	$r\leq 2$	$r>2$	65.4662**	$r=2$	$r=3$	26.92661	0.580462
	$r\leq 3$	$r>3$	38.5396**	$r=3$	$r=4$	23.81469*	0.536160
	$r\leq 4$	$r>4$	14.72495	$r=4$	$r=5$	12.61609	0.334336
	$r\leq 5$	$r>5$	2.108860	$r=5$	$r=6$	2.108860	0.065765
Model 3	$r=0$	$r>0$	362.851**	$r=0$	$r=1$	287.1069**	0.999905
	$r\leq 1$	$r>1$	75.7450*	$r=1$	$r=2$	27.55585**	0.588892
	$r\leq 2$	$r>2$	48.1892*	$r=2$	$r=3$	25.45562**	0.560074
	$r\leq 3$	$r>3$	22.73358	$r=3$	$r=4$	13.51745	0.353413
	$r\leq 4$	$r>4$	9.216131	$r=4$	$r=5$	8.820449	0.247633
	$r\leq 5$	$r>5$	0.395683	$r=5$	$r=6$	0.395683	0.012683
Model 4	$r=0$	$r>0$	475.815**	$r=0$	$r=1$	313.5513**	0.999960
	$r\leq 1$	$r>1$	162.263**	$r=1$	$r=2$	45.52966*	0.769775
	$r\leq 2$	$r>2$	116.734**	$r=2$	$r=3$	43.22444*	0.752003
	$r\leq 3$	$r>3$	73.5095*	$r=3$	$r=4$	26.44647**	0.573913
	$r\leq 4$	$r>4$	47.0632	$r=4$	$r=5$	25.29759	0.557826
	$r\leq 5$	$r>5$	21.7655	$r=5$	$r=6$	15.09748*	0.385543
	$r\leq 6$	$r>6$	6.66805	$r=6$	$r=7$	6.301458*	0.183944
	$r\leq 7$	$r>7$	0.36659	$r=7$	$r=8$	0.366592	0.011756

*significant at 1 % level ,** significant at 5 % level

The model adequacy test shows that it satisfies all tests in four models. The unit root test for the residual is also stationary at level as given in Tables 6.16 and 6.17.

Table 6.16
Model Adequacy Test for Total Exports with Supply Factors

Tests	Model 1	Model 2	Model 3	Model 4
AR 1- 2 F(2, 23)	0.2309 (0.7956)	1.0757 (0.3576)	1.0954 (0.3512)	0.62712 (0.5438)
ARCH 1 F(1, 23)	0.54658 (0.4672)	0.89691 (0.3535)	0.91346 (0.3491)	0.1313 (0.7207)
Normality Chi ² (2)	0.2785 (0.8700)	2.7365 (0.2546)	1.2444 (0.5368)	0.28337 (0.8679)
Xi ² F(12, 11)	0.37638 (0.9481)	0.31362 (0.9724)	0.44794 (0.9049)	0.39108 (0.9398)
RESET F(1, 24)	0.41538 (0.5254)	0.96448 (0.3359)	1.2734 (0.2703)	0.62466 (0.4378)

Figures in brackets are p values

Table 6.17
Unit Root Test for Total Exports with Supply Factors

Models	No deterministic trend	Constant only	Constant and trend
Model 1	-5.5128**	-5.3767**	-5.5846**
Model 2	-4.1644**	-4.1335**	-4.2753*
Model 3	-4.3581**	-4.3091**	-4.3415*
Model 4	-5.9235**	-5.8207**	-5.9568**

*Significant at 1 % level ,** significant at 5 % level

The regression result for supply side factors shows that relative price has the expected negative and significant influence in all four models as shown in Table 6.18. FDI, lag of export, openness, liberalisation, capability to exports and tariff influence exports positively. Among the three variables openness has positive and significant impact in the model.

Table 6.18
Regression Result of Determinants for Total Exports with Supply Factors for 1970-2002

Variables	Model 1	Model 2	Model 3	Model 4
Constant	0.03080 (0.4249)	0.07992 (2.0391)	0.08196 (1.0409)	0.02150 (0.5897)
Relative price	0.47920 (2.018)	0.19760 (0.3493)	0.24301 (0.2481)	0.39857 (0.0644)
GDP	0.11901 (0.8250)	0.24482 (0.6860)	0.34559 (0.5706)	0.01095 (0.9841)
FDI	0.00371 (0.7251)	0.010146 (0.4030)	0.00803 (0.5114)	0.00538 (0.6248)
Domestic demand	0.51740 (0.0120)	0.20490 (0.3263)	0.25203 (0.2246)	0.43431 (2.0477)
Lag of Export	0.05409 (0.7573)	0.17169 (0.382)	0.11397 (0.5777)	0.07803 (0.6741)
Openness	0.50554 (2.0105)	-	-	0.51041 (2.0114)
Tariff	-	-0.017204 (0.2984)		-0.018130 (0.2333)
Liberalisation dummy	-	-	0.017633 (0.5952)	0.00276 (0.9263)

Figures in brackets are t values

Cointegration vectors of demand side variables for manufactured exports given in Table 6.19 shows in model 1, Trace test has four cointegration equations at 5% and max-eigenvalue test shows three cointegration equation at 5% level

and one equation at 1% level. Trace test and max test indicates four significant cointegration equations at 5% levels in model 2. Trace test and max-eigenvalue test show two cointegration equations at 5% and one equation at 1% level in model 3. In model 4, Trace test indicate four equations at the 5% level and three equations at 5% and one at 1% level by the Max Eigenvalue test. The Trace test and Max test show that the variables are integrated.

Table 6.19
Johansen and Juselius (JJ) Cointegration Test for Demand Side Factors of Manufactured Exports

Models	Null hypotheses	Alternative hypotheses	Trace statistic	Null hypotheses	Alternative hypotheses	Max-eigenevalue	Eigenvalue
Model 1	$r=0$	$r>0$	164.09**	$r=0$	$r=1$	101.537**	0.9621
	$r\leq 1$	$r>1$	62.560**	$r=1$	$r=2$	37.4699**	0.7014
	$r\leq 2$	$r>2$	25.090**	$r=2$	$r=3$	17.1588*	0.4250
	$r\leq 3$	$r>3$	7.9313**	$r=3$	$r=4$	7.93135**	0.2257
Model 2	$r=0$	$r>0$	207.66**	$r=0$	$r=1$	105.5088**	0.966744
	$r\leq 1$	$r>1$	102.15**	$r=1$	$r=2$	62.83095**	0.868244
	$r\leq 2$	$r>2$	39.322**	$r=2$	$r=3$	25.62624**	0.562489
	$r\leq 3$	$r>3$	13.696**	$r=3$	$r=4$	13.69671**	0.357141
Model 3	$r=0$	$r>0$	162.828**	$r=0$	$r=1$	109.4793**	0.970742
	$r\leq 1$	$r>1$	53.349**	$r=1$	$r=2$	35.87232**	0.685626
	$r\leq 2$	$r>2$	17.4773*	$r=2$	$r=3$	17.02033*	0.422498
	$r\leq 3$	$r>3$	0.456994	$r=3$	$r=4$	0.456994	0.014634
Model 4	$r=0$	$r>0$	301.737**	$r=0$	$r=1$	132.8854**	0.986249
	$r\leq 1$	$r>1$	168.85**	$r=1$	$r=2$	86.89195**	0.939370
	$r\leq 2$	$r>2$	81.960**	$r=2$	$r=3$	46.11703**	0.774096
	$r\leq 3$	$r>3$	35.843**	$r=3$	$r=4$	22.57608*	0.517252
	$r\leq 4$	$r>4$	13.26730	$r=4$	$r=5$	12.39014	0.329467
	$r\leq 5$	$r>5$	0.877161	$r=5$	$r=6$	0.877161	0.027899

*significant at 1 % level , ** significant at 5 % level

The model adequacy test is satisfied in all four models as given in Table 6.20. The residuals are stationary at level, which shows that the variables are integrated as exhibited in Table 6.21.

Table 6.20
Model Adequacy Test for Demand Side Variable of Manufactured Exports

Test	Model 1	Model 2	Model 3	Model 4
AR 1- 2 F (2, 24)	0.031159 (0.9694)	0.13011 (0.8786)	0.2597 (0.7734)	0.18091 (0.8357)
ARCH 1 F (1, 24)	0.10627 (0.7473)	0.47856 (0.4957)	0.25994 (0.6148)	0.0113 (0.9163)
Normality Chi ² (2)	0.70692 (0.7023)	0.73381 (0.6929)	0.41598 (0.8122)	0.55232 (0.7587)
RESET F (1, 25)	0.86428 (0.3614)	0.4536 (0.5068)	0.60362 (0.4445)	1.8484 (0.1872)

Figures in brackets are p values

Table 6.21
Unit Root Test of Residuals for Demand Side Factors of Manufactured Exports

Models	No deterministic trend	Constant only	Constant and trend
Model 1	-4.5084**	-4.3938**	-4.3691*
Model 2	-4.4017**	-4.3076**	-4.3395*
Model 3	-4.5238**	-4.4137**	-4.2896*
Model 4	-4.4800**	-4.3780**	-4.2369*

*Significant at 1 % level , ** significant at 5 % level

The regression result for the manufactured export is given in Table 6.22. It shows that REER has negative and significant influence as theoretically expected.

Table 6.22
Regression Result for Manufactured Exports with Demand Factors for 1970-2002

Variables	Model 1	Model 2	Model 3	Model 4
Constant	0.022718 (0.4827)	0.03724 (0.1955)	0.03368 (0.2421)	0.014270 (0.6728)
REER	-0.65783 (2.0249)	-0.5977 (2.0377)	-0.66398 (2.0276)	-0.73294 (1.0217)
World demand	0.19662 (0.2715)	0.22868 (0.1973)	0.18229 (0.3338)	0.13206 (0.5025)
Lag of export	0.11326 (0.5007)	0.13649 (0.4179)	0.11163 (0.5130)	0.08265 (0.6371)
Openness	0.15715 (0.3939)			0.23613 (0.2504)
Tariff		-0.0081749 (0.6449)		-0.01352 (0.4962)
Liberalisation dummy			0.02309 (0.5043)	0.02431 (0.5054)

Figures in brackets are t values

World demand proxied by world GDP is positive. Openness and liberalisation dummy and tariff reduction show positive influence on export. positively. Thus the three-trade policy variables have favourable impact on the manufactured export from the country.

In model 1, with supply side variables for manufactured export given in Table 6.23 shows Trace test has five cointegration equations at both 5% levels and Max Eigenvalue test indicates two and one equation at 5% and 1% level respectively.

Table 6.23
Johansen and Juselius (JJ) Cointegration Test for Manufactured Exports
With Supply Side Factors

Models	Null hypotheses	Alternative hypotheses	Trace statistics	Null hypotheses	Alternative hypotheses	Max-eigenvalue	Eigenvalue
Model 1	$r=0$	$r>0$	106.527**	$r=0$	$r=1$	39.39517**	0.7193
	$r\leq 1$	$r>1$	67.132**	$r=1$	$r=2$	30.01433*	0.6202
	$r\leq 2$	$r>2$	37.117**	$r=2$	$r=3$	15.88181	0.4008
	$r\leq 3$	$r>3$	21.236**	$r=3$	$r=4$	10.87054	0.2957
	$r\leq 4$	$r>4$	10.365**	$r=4$	$r=5$	10.36555**	0.2842
Model 2	$r=0$	$r>0$	266.639**	$r=0$	$r=1$	116.8994**	0.9769
	$r\leq 1$	$r>1$	149.740**	$r=1$	$r=2$	53.89564**	0.8242
	$r\leq 2$	$r>2$	95.844**	$r=2$	$r=3$	35.52844**	0.6821
	$r\leq 3$	$r>3$	60.316**	$r=3$	$r=4$	34.04614**	0.666
	$r\leq 4$	$r>4$	26.271**	$r=4$	$r=5$	18.06788*	0.4416
	$r\leq 5$	$r>5$	8.202232	$r=5$	$r=6$	8.202232**	0.2324
Model 3	$r=0$	$r>0$	212.2922**	$r=0$	$r=1$	116.2815**	0.9765
	$r\leq 1$	$r>1$	96.01072**	$r=1$	$r=2$	37.33480*	0.7001
	$r\leq 2$	$r>2$	58.67593**	$r=2$	$r=3$	28.96490*	0.6071
	$r\leq 3$	$r>3$	29.71103*	$r=3$	$r=4$	17.39854	0.4295
	$r\leq 4$	$r>4$	12.31249	$r=4$	$r=5$	11.79728	0.3165
	$r\leq 5$	$r>5$	0.515217	$r=5$	$r=6$	0.515217	0.0164
Model 4	$r=0$	$r>0$	355.4347**	$r=0$	$r=1$	141.5530**	0.989603
	$r\leq 1$	$r>1$	213.8818**	$r=1$	$r=2$	72.20394**	0.902622
	$r\leq 2$	$r>2$	141.6779**	$r=2$	$r=3$	50.36083**	0.802998
	$r\leq 3$	$r>3$	91.31703**	$r=3$	$r=4$	36.85635*	0.695448
	$r\leq 4$	$r>4$	54.46068**	$r=4$	$r=5$	26.50094	0.574661
	$r\leq 5$	$r>5$	27.95974	$r=5$	$r=6$	17.46852	0.430787
	$r\leq 6$	$r>6$	10.49121	$r=6$	$r=7$	9.602102	0.266366
	$r\leq 7$	$r>7$	0.889112	$r=7$	$r=8$	0.889112	0.028274

*significant at 1 % level , ** significant at 5 % level

In model 2, Trace test indicates five cointegration equations at 5% levels and five and one at 5% and 1% respectively by the Max-eigenvalue test. Trace test indicates three cointegration equations at the 5% level and one cointegration equation at 1% level. Max-eigenvalue test indicates one cointegration equations at 5% level and two cointegration equations at 1% level in model with trade policy variables. In model 4, Trace test indicates five cointegration equations at 5% level and three and one at 5% and 1% levels respectively by Max-eigenvalue test.

All the model adequacy test is also satisfied in these models also. The residuals of error terms are also stationary at level. The results are given in Table 6.24 and 6.25.

Table 6.24
Model Adequacy Test for Manufactured Exports with Supply Factors

Tests	Model 1	Model 2	Model 3	Model 4
AR 1- 2 F(2, 24)	2.2972 (0.1242)	2.7084 (0.0888)	3.012 (0.0698)	2.4781 (0.1093)
ARCH 1 F(1, 24)	0.14742 (0.7047)	1.5063 (0.232)	1.9598 (0.1755)	0.72979 (0.4031)
Normality Chi ² (2)	1.2966 (0.5229)	0.05763 (0.9716)	0.16988 (0.9186)	0.8556 (0.651)
RESET F(1, 25)	0.62577 (0.4370)	1.5698 (0.2228)	1.4795 (0.2362)	0.03615 (0.8510)

Figures in brackets are p values

Table 6.25
Unit Root Test of Residuals for Manufactured Exports with Supply Factors

Models	No deterministic trend	Constant only	Constant and trend
Model 1	-3.3852**	-3.3131*	-3.0106**
Model 2	-3.7160**	-3.6343*	-3.343*
Model 3	-3.6081**	-3.5878*	-3.2442**
Model 4	-3.2977**	-3.2387*	-2.9335**

*significant at 1 % level ,** significant at 5 % level

The trade policy measured by openness, liberalisation dummy and effective tariff rate have positive impact on the manufactured exports among the supply side variables. The domestic demand shows a positive relation as against expected theoretically negative influence. Capability to exports and FDI show

positive impact on the manufactured exports as given in Table 6.26.

Table 6.26
Regression Result for Manufactured Exports with Supply Factors

Variables	Model 1	Model 2	Model 3	Model 4
Constant	0.022513 (0.5284)	0.049009 (0.18860)	0.045256 (0.2428)	0.010054 (0.7933)
Relative price	0.042801 (0.4830)	0.085344 (0.1858)	0.082596 (0.1996)	0.038 (0.5375)
GDP	0.74447 (2.0652)	0.81635 (1.0651)	0.81163 (2.0657)	0.77438 (1.0606)
FDI	0.01362 (.2282)	0.019016 (0.1208)	0.018589 (0.1282)	0.013380 (0.2444)
Domestic demand	0.84629 (2.0256)	0.26930 (0.3712)	0.29478 (0.3091)	0.83860 (2.02980)
Lag of export	-0.05192 (0.7503)	0.05610 (0.7434)	0.039081 (0.821)	-0.06934 (0.6809)
Openness	0.52288 (3.0352)	-	-	0.59647 2.0246
Tariff	-	-0.0072417 (0.6971)	-	-0.01726 (0.3520)
Liberalisation dummy	-	-	0.014518 (0.6505)	0.012809 (0.6752)

Figures in brackets are t values

6.3.4 Error Correction Models

In the present study error correction model is used to examine the long run relationship between variables. The principle behind the model is that there often exists a long run equilibrium relationship between economic variables. In the short run, there may be disequilibrium, with the error correction mechanism, a portion of the disequilibrium in one period is corrected in the next period.

The error correction model used in the present study is

$$\Delta Y_t = \theta_0 + \sum_{i=1}^{k-1} \theta_i \Delta Y_{t-i} + \alpha \beta' Y_{t-k} + \epsilon_t$$

Where Δ is the difference operator, Y_t is vector of time series variables (demand and supply factors respectively), θ_0 is the intercept and matrix β consists of r cointegration vectors, and ϵ is the error term. The variables are as

defined earlier. All variables, including error term are lagged by one year period in error correction model.

The coefficients of variables in the Vector Error Correction are not possible to interpret directly. For the interpretation of coefficients of the variables, impulse response function or variance decomposition can be used but the present analysis tries to examine whether these variable have any significant impact in determining India's exports in the long run. The error term which captures the long run influence is only considered in the present analysis.

Results of Vector Error correction models for total exports and manufactured exports are given below. The demand and supply factors are the same as given above. Three separate models are given for both manufactured and total exports. In the first model openness, in second model tariff and in third model trade policy dummy is included. All variables are lagged by one. In all models Ec is the error term, TEX – Total exports, $REER$ - Real Effective Exchange Rate, WD – World Demand, OPE - Openness index, RP - relative price, DD - Domestic Demand, NF - Net Flow and MEX – Manufactured Export. Three separate models are given for total exports and manufactured exports with demand and supply factors. In model 1- openness index, in model 2- tariff rate and in model 3 Trade policy dummy is used for the analysis.

Error correction model for the determinants of total exports with demand factors is shown in Table 6.27 to Table 6.29. In model 1, error terms of world demand and openness have significant impact. In model 2, with tariff all variables have significant impact. In model 3, $REER$ and world demand show significant impact. Trade policy dummy also shows insignificant impact.

Table 6.27
Error Correction Model for Total Exports with Demand Factors – Model 1

Variables	TEX	REER	WD	OPE
TEX	1.076990 (2.81273)	-0.045904 (-0.15062)	0.293407 (0.63361)	-0.044849 (-0.10877)
REER	1.122950 (2.49639)	-0.115696 (-0.32314)	0.395128 (0.72632)	0.493912 (1.01964)
WD	-0.346804 (-0.98426)	-0.499276 (-1.78026)	-0.551311 (-1.29379)	-0.319922 (-0.84317)
OPE	-0.737494 (-1.94997)	0.809627 (2.68949)	0.238430 (0.52128)	0.208969 (0.51309)
Ec	-1.747905 (-3.29363)	-0.392186 (-0.92846)	-0.964803 (-1.50326)	-1.087415 (-1.90282)
Constant	-0.011867 (-0.76430)	-0.000751 (-0.06074)	-0.018021 (-0.95974)	-0.013800 (-0.82539)
R-square	0.638698	0.590143	0.418082	0.503596

Figures in brackets are t values

Table 6.28
Error Correction Model for Total Exports with Demand Factors – Model 2

Variables	TEX	REER	WD	TARIFF
TEX	-0.053216 (-0.16469)	0.274323 (1.29002)	0.163925 (0.68504)	-1.576604 (-0.67490)
REE	0.770040 (1.68432)	-0.375840 (-1.24921)	-0.030623 (-0.09045)	3.661082 (1.10770)
WD	-0.272078 (-0.76427)	0.061042 (0.26055)	0.080594 (0.30571)	3.806332 (1.47897)
TARIFF	0.008208 (0.34523)	0.040131 (2.56488)	0.057303 (3.25457)	-0.725767 (-4.22240)
Ec	-1.675770 (-1.34255)	- 1.669700 (-2.02558)	0.912930 (0.75888)	-0.108347 (-4.44817)
Constant	-0.001151 (-0.06077)	- 0.004134 (-1.33163)	-0.010586 (-2.75467)	-0.206072 (-1.50479)
R-square	0.393261	0.529506	0.633600	0.795960

Figures in brackets are t values

Table 6.29
Error Correction Model for Total Exports with Demand Factors – Model 3

Variables	TEX	REER	WD	TP
TEX	0.710462 (2.25608)	0.367980 (1.47558)	0.719253 (3.63993)	-0.538764 (-0.61702)
REER	1.637121 (3.29411)	0.163805 (0.41621)	1.272245 (4.07968)	-0.575324 (-0.41750)
WD	-0.555605 (-2.32987)	0.076741 (0.40637)	-0.261844 (-1.74986)	0.267307 (0.40426)
TP	-0.023431 (-0.25774)	0.008875 (0.12329)	-0.090246 (-1.58206)	0.006067 (0.02407)
Ec	0.109953 (0.22271)	1.040569 (2.66155)	-1.964635 (-6.34188)	-0.483936 (-0.35352)
Constant	-0.007856 (-0.48467)	0.001487 (0.11585)	-0.010141 (-0.99705)	0.030178 (0.67146)
R-square	0.629251	0.583685	0.839249	0.083941

Figures in brackets are t values

Error correction model for total exports with supply factors are given in Table 6.30 to 6.32. In model 1, error terms of domestic demand, Relative price and Capability to exports have significant impact. But Error terms of openness index are not significant. In model 2, only net inflow of FDI and GDP shows significant impact. In model 3, with trade policy dummy error terms of liberalisation dummy, relative price, and net inflow have significant impact.

Table 6.30
Error Correction Model for Total Exports With Supply Factors – Model 1

Variables	TEX	DD	NF	RP	GDP	OPE
TEX	-0.469946 (-1.28374)	2.001776 (1.63029)	-8.341911 (-1.03686)	1.878685 (1.55328)	0.261589 (1.80396)	-0.478724 (-0.90590)
DD	1.104077 (2.27897)	-1.600851 (-0.98517)	5.948668 (0.55871)	-1.086874 (-0.67903)	-0.307845 (-1.60417)	0.898017 (1.28408)
NF	-0.059716 (-3.17313)	-0.065107 (-1.03143)	-0.575958 (-1.39255)	-0.076062 (-1.22329)	0.004797 (0.64345)	-0.031949 (-1.17605)
RP	-0.970932 (-2.09023)	1.167476 (0.74933)	-8.338652 (-0.81682)	0.547786 (0.35693)	0.347204 (1.88699)	-0.845737 (-1.26127)
GDP	0.862856 (1.58351)	5.681842 (3.10880)	8.481658 (0.70825)	5.338872 (2.96551)	-0.311499 (-1.44317)	0.370570 (0.47111)
OPE	0.624086 (2.37872)	-1.740415 (-1.97776)	3.974602 (0.68931)	-1.799985 (-2.07652)	-0.112376 (-1.08131)	0.457818 (1.20881)
Ec	-2.997024 (-3.16482)	-8.260325 (-2.60063)	4.911339 (0.23598)	-7.364787 (-2.35390)	-0.481516 (-1.28366)	-0.900951 (-0.65906)
Constant	-0.000636 (-0.04954)	0.007023 (0.16321)	-0.115324 (-0.40905)	-0.006700 (-0.15808)	0.004196 (0.82566)	-0.011054 (-0.59693)
R-square	0.793136	0.816376	0.758173	0.809849	0.822305	0.489254

Figures in brackets are t values

Table 6.31
Error Correction Model for Total Exports with Supply Factors – Model 2

Variables	TEX	DD	NF	RP	GDP	TARIFF
TEX	0.284631 (0.86794)	1.573963 (1.41864)	-6.101691 (-1.42810)	1.281983 (1.12784)	0.221411 (2.58252)	-2.344127 (-0.54792)
DD	-0.227259 (-0.63689)	-3.310248 (-2.74203)	1.731404 (0.37242)	-2.162059 (-1.74809)	-0.397801 (-4.26425)	1.847848 (0.39695)
NF	-0.020706 (-0.98600)	0.066038 (0.92948)	-0.010396 (-0.03799)	0.019093 (0.26230)	0.011304 (2.05891)	0.222622 (0.81258)
RP	0.282291 (0.75341)	2.792204 (2.20269)	-5.574133 (-1.14186)	1.595736 (1.22872)	0.440757 (4.49957)	-1.528958 (-0.31279)
GDP	0.622761 (0.67144)	7.359799 (2.34542)	32.38080 (2.67961)	5.772365 (1.79553)	-0.123450 (-0.50911)	0.308547 (0.02550)
TARIFF	-0.004485 (-0.16138)	-0.093286 (-0.99224)	0.434847 (1.20107)	-0.064231 (-0.66685)	-0.016223 (-2.23308)	-0.832238 (-2.29565)
Ec	-0.950429 (-0.72516)	0.242427 (0.05467)	41.34040 (2.42097)	-0.529370 (-0.11653)	-0.240703 (-0.70248)	2.013059 (0.11773)
Constant	0.005360 (0.29648)	-0.004888 (-0.07992)	-0.355866 (-1.51090)	-0.014378 (-0.22946)	0.005217 (1.10390)	-0.145054 (-0.61505)
R-square	0.649704	0.683638	0.856084	0.645615	0.868927	0.616382

Figures in brackets are t values

Table 6.32
Error Correction Model for Total Exports with Supply Factors – Model 3

Variables	TEX	DD	NF	RP	GDP	TP
TEX	0.216691 (0.79625)	1.209537 (1.25780)	-6.116229 (-1.26768)	0.742939 (0.82280)	0.268055 (2.58464)	-1.075240 (-1.44965)
DD	0.178883 (0.52138)	-1.435361 (-1.18394)	4.065057 (0.66829)	-0.629879 (-0.55332)	-0.324811 (-2.48417)	0.840745 (0.89908)
NF	-0.028783 (-1.44321)	-0.091056 (-1.29208)	-0.249636 (-0.70602)	-0.123393 (-1.86473)	0.005262 (0.69229)	-0.054224 (-0.99755)
RP	-0.069650 (-0.20513)	1.067562 (0.88979)	-6.816557 (-1.13237)	0.202861 (0.18007)	0.360366 (2.78496)	-1.010881 (-1.09234)
GDP	0.640193 (1.02785)	4.691513 (2.13167)	11.22494 (1.01653)	4.160067 (2.01305)	-0.312384 (-1.31606)	-2.870742 (-1.69108)
TP	-0.012461 (-0.11490)	0.260305 (0.67927)	0.857862 (0.44617)	0.274965 (0.76415)	-0.022368 (-0.54122)	0.189385 (0.64072)
Ec	-0.815503 (-1.54829)	1.794171 (0.96400)	-11.93934 (-1.27856)	2.594059 (1.48436)	-0.056115 (-0.27956)	2.278780 (1.58736)
Constant	0.000994 (0.06281)	-0.036171 (-0.64682)	-0.131441 (-0.46848)	-0.050484 (-0.96147)	0.003797 (0.62963)	0.022345 (0.51806)
R-square	0.724170	0.728257	0.790165	0.744303	0.780692	0.341495

Figures in brackets are t values

Error correction model for total export shows openness index and tariff have significant impact among the demand side factors. Trade policy dummy has significant impact among the supply side variables. World demand and REER show significant impact.

Error Correction models for manufactured exports with demand factors shown in Table 6.33 to Table 6.35 give the following results. In model 1, with openness variable, error terms of openness and world demand have significant impact. In model 2, error terms of all three variables have significant impact. But in model 3, with liberalisation dummy all error terms are insignificant

Table 6.33
Error Correction Model for Manufactured Exports with Demand Factors –
Model 1

Variables	MEX	REER	WDD	OPE
MEX	-0.263387 (-0.67427)	0.221267 (0.89908)	0.107500 (0.40751)	0.569906 (2.46648)
REER	-0.675840 (-1.12207)	0.602167 (1.58685)	-0.154643 (-0.38019)	0.586399 (1.64590)
WDD	0.082583 (0.16188)	-0.337638 (-1.05053)	0.142478 (0.41358)	-0.387619 (-1.28456)
OPE	0.542822 (1.21999)	0.102993 (0.36741)	0.019749 (0.06573)	-0.087708 (-0.33325)
Ec	0.473011 (1.90040)	-0.109575 (-0.69876)	0.075021 (1.94633)	0.169118 (1.14868)
Constant	0.008620 (0.17754)	0.010238 (0.33468)	0.048281 (1.47255)	0.121915 (4.24512)
R-square	0.1205695	0.341199	0.750747	0.962579

Figures in brackets are t values

Table 6.34
Error Correction Model for Manufactured Exports with Demand Factors –
Model 2

Variables	MEX	RE	WD	TARIFF
MEX	0.124377 (0.37193)	0.040108 (0.20214)	0.112593 (0.52398)	2.365690 (4.21410)
REER	0.011231 (0.02208)	0.221257 (0.73320)	-0.343813 (-1.05206)	0.701882 (0.82210)
WDD	-0.130273 (-0.28864)	0.004882 (0.01823)	0.262127 (0.90386)	-1.381701 (-1.82367)
TARIFF	-0.017498 (-0.53888)	0.016076 (0.83438)	0.050400 (2.41552)	0.227994 (4.18260)
Ec	0.514085 (3.34441)	-0.227125 (-2.35371)	0.120334 (1.00518)	0.047973 (1.29260)
Constant	0.069242 (1.77717)	-0.009377 (-0.40560)	0.028761 (1.14880)	-0.154250 (-2.35839)
R-square	0.105959	0.241299	0.670767	0.971589

Figures in brackets are t values

Table 6.35
Error Correction Model for Manufactured Exports with Demand Factors –
Model 3

Variables	MEX	REE	WD	TP
MEX	-0.708121 (-0.62724)	-1.631942 (-3.17345)	-0.712217 (-1.06800)	1.240776 (0.47368)
REER	-0.806083 (-0.67268)	-1.381488 (-2.53091)	-1.032244 (-1.45828)	1.086872 (0.39091)
WD	0.610128 (0.57882)	1.415308 (2.94766)	0.894536 (1.43666)	-0.930524 (-0.38047)
TP	0.227041 (0.80990)	0.397238 (3.11082)	0.150911 (0.91133)	-0.380583 (-0.58511)
Ec	-0.287160 (-1.00431)	- 0.034604 (-0.26569)	0.014697 (0.08702)	-0.289382 (-0.43619)
Constant	0.056775 (1.25821)	-0.048918 (-2.37995)	0.022793 (0.85511)	0.061165 (0.58420)
R-square	0.318309	0.643272	0.601617	0.043605

Figures in brackets are t values

Error Correction models with supply factors for manufactured exports show that in model 1 error terms of openness and relative price have significant impact. In model 2 error terms of domestic demand, capability to exports and tariff rate are significant. In model 3, net inflows of FDI, GDP and relative price show significant impact. Error term of trade policy dummy is not significant in this model. The Error Correction models for manufactured exports show openness and tariff have significant impact in most of the models. Liberalisation dummy shows insignificant impact in all models in manufactured exports. The results are given in Tables 6.36 to Table 6.38

Table 6.36
Error Correction Model for Manufactured Exports with Supply Factors – Model 1

Variables	MEX	GDP	OPE	NF	DD	RP
MEX	0.411117 (0.25777)	-0.238092 (-0.36900)	2.593348 (2.11433)	9.414483 (0.44497)	0.167120 (0.81134)	11.09794 (3.52574)
GDP	-1.005599 (-0.78068)	0.192804 (0.36998)	-1.866220 (-1.88387)	-9.993556 (-0.58484)	-0.474257 (-1.17337)	-3.198550 (-1.25816)
OPE	0.173092 (0.17063)	0.098427 (0.23982)	-0.949724 (-1.21731)	-6.844406 (-0.50859)	-0.015730 (-1.11274)	-7.521437 (-3.75666)
NF	-0.002999 (-0.04650)	0.013806 (0.52919)	-0.105325 (-2.12367)	-0.392272 (-0.45853)	-0.033201 (-0.17496)	-0.469151 (-3.68609)
RP	0.067348 (0.23242)	0.038120 (0.32517)	0.462651 (2.07605)	-0.352408 (-0.09168)	0.455317 (1.27052)	1.810063 (3.16501)
Ec	0.102118 (0.16402)	-0.075379 (-0.29927)	0.291192 (2.60816)	-8.063333 (-1.97629)	0.161646 (0.56487)	2.177605 (1.77221)
Constant	0.146365 (2.33946)	0.070568 (2.78803)	0.113827 (2.36570)	0.453898 (0.54689)	-6.59E-05 (-0.00166)	-0.173509 (-1.40519)
R-square	0.524005	0.587399	0.455042	0.588651	0.428451	0.760030

Figures in brackets are t values

Table 6.37
Error Correction Model for Manufactured Exports with Supply Factors – Model 2

Variables	MEX	GDP	TARIFF	NF	RP	DD
MEX	0.717228 (2.22081)	-0.116691 (-0.96360)	-0.744018 (-0.96498)	6.982962 (1.46324)	-2.565236 (-2.80305)	0.097106 (0.88533)
GDP	-0.819964 (-1.25453)	0.372638 (1.52048)	1.509911 (0.96765)	-13.41421 (-1.38891)	7.928584 (3.96953)	-0.304503 (-1.37179)
TARIFF	0.096180 (0.69950)	0.063025 (1.22243)	0.122885 (0.37435)	1.976128 (0.97262)	0.229664 (0.79105)	0.042663 (0.91363)
NF	-0.036518 (-1.78864)	-0.001091 (-0.14255)	0.025499 (0.52315)	-0.207861 (-0.68900)	-1.492766 (-1.24115)	-0.020293 (-2.92664)
DD	-0.843975 (-1.57680)	-0.208944 (-1.04108)	1.018361 (0.79694)	-4.360591 (-0.55133)	-0.797423 (-3.33520)	-0.001143 (-0.00629)
Ec	0.970170 (1.68972)	0.391460 (1.81828)	-0.281590 (-0.20543)	8.354605 (1.98472)	0.348283 (0.38923)	0.611384 (3.13538)
Constant	0.071639 (1.26072)	0.037240 (1.74776)	-0.088689 (-0.65376)	0.925983 (1.10279)	-0.093809 (-0.66647)	-0.023844 (-1.23553)
R-square	0.574605	0.683239	0.224320	0.543875	0.688543	0.743302

Figures in brackets are t values

Table 6.38
Error Correction Model for Manufactured Exports with Supply Factors–
Model 3

Variables	MEX	GDP	TP	NF	PE	RP
MEX	-1.567944 (-0.70247)	-0.402334 (-0.68816)	-3.208377 (-0.67674)	-79.49734 (-3.62933)	0.170879 (1.11262)	8.838577 (1.61974)
GDP	2.213224 (0.67760)	0.693917 (0.81108)	4.135270 (0.59607)	121.6017 (3.79373)	-0.147905 (-0.32256)	-6.721171 (-0.84171)
TP	0.576147 (0.81400)	0.062880 (0.33916)	1.207090 (0.80292)	25.83408 (3.71931)	-0.006062 (-0.72207)	-2.907138 (-1.68006)
NF	0.060608 (0.68394)	0.018896 (0.81406)	0.116218 (0.61745)	2.797264 (3.21661)	-0.117348 (-2.17803)	-0.394684 (-1.82181)
RP	-0.514291 (-0.87093)	0.000772 (0.00499)	-1.047463 (-0.83514)	-23.29389 (-4.01975)	-0.286395 (-0.66909)	2.474912 (1.71438)
Ec	2.258398 (1.28058)	-0.771989 (-1.67119)	-1.438314 (-0.38398)	52.52125 (3.03474)	-0.098721 (-0.61040)	-5.039877 (-1.16895)
constant	0.110237 (1.34115)	0.057217 (2.65758)	0.078110 (0.44741)	0.815419 (1.01091)	-0.057031 (-1.54508)	-0.418513 (-2.08271)
R-square	0.417364	0.788295	0.315005	0.724468	0.543127	0.549307

Figures in brackets are t values

Conclusion

The impact of the trade reform on India's exports is examined in this chapter. The analysis are done for the pre and post reform periods and the long run impact of the trade policy is also examined. The analysis of the factors that determine the export performance during the pre and post reform periods shows that world demand has positive impact on the total and manufactured exports. Exchange rate has the theoretically expected sign in almost all models. Openness, one of the measures of trade policy, shows positive impact in almost all models. Capability to export and domestic demand have the expected relation on both total and manufactured export. FDI has positive impact in total and manufactured exports during the post reform period. The cointegration models show that in total and manufactured exports variables have significant integration. Error correction model for total exports shows that openness index and tariff have significant impact among the demand side factors. Trade policy dummy has significant impact among the supply side variables. Error terms of liberalisation dummy are not significant in most of the models in total and

manufactured exports. The error correction models for manufactured exports show that openness and tariff have significant impact in most of the model. Error correction model shows world demand, REER, FDI, GDP and relative price has significant impact on total and manufactured exports from India in the long run. Among the trade policy variables error terms of openness and tariff have significant impact. The analysis shows that the trade policy variables selected have favourable impact on India's exports in most of the models. Hence the analysis rejects the null hypotheses in most of the cases and concludes that trade liberalisation has favourable impact at the aggregate level.

Impact of Trade Liberalisation on India's Exports

Thesis

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by

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Chapter VII

Trade Liberalisation and Export Performance of Manufacturing Industries in India

- 7.1 Performance of Manufacturing Industries in India
- 7.2 Export Performance of Manufacturing Industries in India
- 7.3 Import Performance of Manufacturing Industries in India
- 7.4 Export Performance of Indian Industries as per International Standard Industrial Classification (ISIC)
- 7.5 Impact of Trade Liberalisation on Export Intensity of Indian Manufacturing Industries

Introduction

Industrial performance has been a subject of debate in India since the introduction of import substitution and industrialization strategy based on public sector as the engine of growth. The policy regime faced by the manufacturing sector in developing countries often acts as a major constraint in attaining high levels of efficiency. In particular, trade and industrial policies play a crucial role in shaping the growth and performance of manufacturing sector. India's economic policies towards industry and manufacturing sector have played a greater role in the development of a diversified industrial base. The linkage between trade liberalisation and productivity growth as an indicator of industrial performance has assumed importance with the trade policy changes. The 1980s saw changes in the external and the industrial sector in matters relating to licensing as well as quantitative restrictions on imports and tariff rates. The 1990s brought about comprehensive trade liberalisation emphasising abolition of non-tariff barriers and reduction in tariff rates. Thus, the industrial sector of the country might have undergone changes in the post liberalisation period. This chapter examines the export performance of Indian manufacturing industries and impact of trade policy on the exports of these industries.

The analysis is divided into two parts, the first part deals with the industry level analysis of exports at two digit level and the second part with three and four digit level export performance of Indian industries. The registered manufacturing industries, which are the major segments of manufacturing industries in India are selected for the analysis at two digit levels as per the classification of Annual Survey of Industries. The Trade and Production data have been used for the analysis of export performance. The data provide exports figures of India from 1976 but for the present analysis data from 1980 is used. Since the ASI is not providing data on export performance of industries but provides data on certain

industrial characteristics only, the Trade and Production database is matched with the ASI code. For the present analysis 15 registered manufacturing industries at the two digit level have been selected. The manufacturing industries along with their code are given in the Appendix XXV. The concordance table is used to match the Trade and Production data and ASI data and it is given in the Appendix XXVI. This chapter also examines the characteristics of the manufacturing sector in India in terms of production, output, investment, inputs, wages and labour employed. The period of analysis is from 1980 to 1999. Variables are adjusted to price changes using appropriate deflators at the relevant part. Three and four digit level export performance is examined using Trade and Production database according to the International Standard Industrial Classifications (ISIC).

7.1 Performance of Manufacturing Industries in India

The performance of manufacturing industries in India in output, wages, number of factories and input during the post reform period in comparison with the pre reform period is examined in this section. The performance of some of the important variables which is selected for the present analysis is only examined.

Table 7.1 shows the number of manufacturing factories in each industry in India. The number of factories is highest in food product industry and lowest in manufacture of leather products. The number of industries has increased for majority of the sectors during the liberalisation period. The beverage and tobacco industry shows a decline in the number since the period from 1980.

The annual average growth rate of number of factories in majority of industry increased during liberalisation period compared to the pre liberalisation period as given in Table 7.2. The annual average growth rate is highest in leather industries compared to other industries during the period 1991-00. Only beverage

and tobacco industries showed negative growth rate during the liberalisation period. The average growth rate during the period 1991-95 is highest for most of the industries compared to the other periods.

Table 7.1
Number of Factories in Indian Manufacturing Industries

Code	1980-81	1985-86	1990-91	1991-92	1995-96	1999-00
20-21	17067	17725	19760	19721	22878	22832
22	8901	8457	8448	8831	7913	3757
23+24+25	11197	10477	10912	10840	13743	10372
26	2889	2835	3537	3772	5696	6632
27	4033	3580	3419	3421	3792	4153
28	4798	4870	5299	5222	6141	6639
29	886	999	1398	1545	1944	2226
30	5479	6402	6914	7251	9206	6892
31	3498	3958	5289	5627	6931	7524
32	6440	8515	9441	9919	11546	11838
33	5779	6077	6014	6097	6820	7076
34	6457	6307	6964	6890	7984	7906
35+36	10417	11714	12733	12771	14304	15215
37	2815	3267	3625	3704	4106	4864
38	1956	1725	1758	1843	2277	2465

Source: Annual Survey of Industries

Table 7.2
Growth Rate of Number of Factories in Indian Manufacturing Industries
(Annual Average Growth Rate-%)

Code	1980-86	1986-90	1991-95	1996-00	1980-90	1991-00
20-21	0.87	2.24	3.07	-0.02	1.48	1.74
22	-0.29	0.69	1.47	-10.50	1.00	-4.17
23+24+25	-1.07	0.85	4.99	-6.03	-0.37	0.31
26	0.23	4.66	10.46	4.34	1.49	8.07
27	-2.23	-0.66	2.13	2.43	-1.29	1.75
28	0.36	1.73	3.11	3.09	0.72	3.19
29	2.51	7.11	7.20	4.91	3.91	6.85
30	4.32	1.62	6.02	-5.04	2.83	1.42
31	2.73	5.98	5.56	2.15	4.31	4.12
32	6.38	2.13	4.17	0.69	4.24	2.80
33	1.15	-0.16	2.58	1.12	0.24	2.01
34	-0.33	2.10	2.87	-0.18	0.52	1.79
35+36	2.74	1.75	2.39	1.82	2.33	2.07
37	3.68	2.21	2.63	4.78	3.31	3.19
38	1.11	0.58	5.44	2.48	1.17	3.51

Source: Annual Survey of Industries

The growth rate of output¹ of registered manufacturing units showed an impressive growth rate during the period 1980-99. Growth rate of manufactured units as a whole is 9.12 and 7.90 per cent per annum during the period 1980-90 and 1991-99 respectively. The average growth rate of wood and wood products and furniture and fixtures showed negative growth rate (-1.53 per cent) during the period 1990-99. Textile products, metal and alloy, leather and metal product industry showed an impressive growth rate during the post reform period compared to the pre- reform period as given in Table 7.3.

Table 7.3
Growth Rate of Gross Outputs of Indian Manufacturing Industries
(Annual Average Growth Rate-%)

Code	1980-85	1986-90	1991-96	1980-90	1991-99
20-21	11.32	9.70	8.08	10.51	6.37
22	9.73	4.73	4.63	7.23	6.40
23+24+25	4.10	6.10	6.20	5.10	7.94
26	6.63	14.87	16.17	10.75	11.39
27	-2.27	12.22	-5.93	4.98	-1.53
28	4.50	8.13	9.74	6.32	7.12
29	9.01	11.30	11.07	10.15	10.13
30	9.18	10.70	9.99	9.94	10.01
31	11.65	8.95	8.80	10.30	9.87
32	11.29	9.32	7.28	10.31	6.09
33	3.26	10.68	9.10	6.97	9.45
34	3.17	7.80	12.20	5.48	10.67
35+36	6.92	10.02	9.35	8.47	7.49
37	6.35	11.20	18.77	8.78	11.97
38	16.12	14.60	23.28	15.36	18.14
All	9.41	8.83	8.68	9.12	7.90

Source: Annual Survey of Industries

The growth rate of Gross Value Added (GVA)² also shows an increasing trend during the period from 1980 to 1999. The average growth rate is 9.41 per cent during post liberalisation against the growth rate of 9.38 in the pre liberalisation period. The annual average growth rate is highest during 1986-90 sub period. The average growth rate of GVA output is highest in manufacture of rubber, plastic, petroleum and coal products in both the periods as given in Table

¹ ASI Gross output deflated by corresponding Whole sale price Index is used for the analysis

² Gross Value added output is also deflated using the same Whole sale Price index as Gross output.

7.4. The least average growth rate is shown by wood and wood product industry during 1991-99 period. For most of the industries, the growth rate of value added output also shows an increase in performance during the post liberalisation period.

Table 7.4
Growth Rate of Gross Value Added Outputs of Indian Manufacturing Industries (Annual Average Growth Rate (%))

Code	1980-85	1986-90	1991-96	1980-90	1990-98
20-21	17.76	8.16	9.09	12.96	15.42
22	15.22	7.66	6.66	11.44	12.15
23-+24+25	0.64	8.16	1.82	4.40	4.18
26	9.68	21.61	19.49	15.64	15.95
27	0.26	13.53	-5.75	6.89	3.88
28	1.96	10.00	10.00	5.98	5.16
29	10.35	14.52	12.79	12.44	11.91
30	9.28	11.83	15.78	10.55	10.70
31	24.79	8.69	12.49	16.74	16.44
32	13.80	10.03	8.22	11.92	11.21
33	3.04	11.76	12.46	7.40	5.58
34	2.59	5.17	15.62	3.88	4.37
35+36	9.06	7.67	9.81	8.36	8.61
37	5.14	9.70	18.75	7.42	6.36
38	25.55	2.45	28.00	14.00	15.97
All	10.08	8.69	10.83	9.38	9.41

Source: Annual Survey of Industries

The growth rate of input³ of Indian manufacturing industry also has similar trend as the value added output. The growth rate of input is also highest during the period 1986-90 for the manufacturing units as a whole in India. During the liberalisation period the input growth rate of almost all industries exhibits an increasing trend as shown in Table 7.5. The transport equipment industry, metal and machinery industries have a tremendous increase in input used in 1991-98 period compared to the 1980-90 period.

³ Raw material price index is used for deflating total input.

Table 7.5
Growth Rate of Inputs in Indian Manufacturing Industries
(Annual Average Growth Rate %)

Code	1980-85	1986-90	1991-96	1980-90	1991-98
20-21	2.58	9.18	5.68	5.58	5.06
22	6.05	6.76	5.28	6.37	7.40
23-+24+25	4.47	6.31	5.71	5.31	7.84
26	8.31	13.59	15.85	10.71	12.30
27	-3.37	5.15	3.83	0.50	4.71
28	6.68	8.00	9.83	8.46	7.22
29	1.69	12.61	8.12	6.66	8.45
30	12.47	12.45	11.42	12.46	12.19
31	13.25	8.50	6.07	11.09	7.72
32	9.76	7.05	8.74	8.53	1.58
33	6.13	8.00	6.18	6.98	6.43
34	0.78	10.59	9.71	5.24	10.37
35+36	4.72	9.27	9.13	6.79	7.66
37	6.37	10.94	15.23	8.45	10.36
38	5.37	13.26	20.61	8.96	16.35
All	6.44	9.87	8.42	8.00	7.10

Source: Computed from Annual Survey of Industries

The growth rate of number of employees in the manufacturing industries in India increased during the post reform period and it is 5.48 per cent during 1991-95, which is the highest growth rate since 1980 for manufacturing units as a whole as given in Table 7.6. The growth rate for the period 1980-85 is negative growth (-0.60) for the manufacturing sector as a whole. Ahluwalia (1991)⁴ also had given similar result for the Indian manufacturing during the same period. The growth rate of employment increased in all other industries except leather, non metallic minerals, machinery and equipment industries.

⁴ I.J.Ahluwalia (1991) *Productivity and Growth in Indian Manufacturing* , Delhi, Oxford University Press

Table 7.6

Growth Rate of Number of Employees in Indian Manufacturing Industries
(Annual Average Growth Rate (%))

Code	1980-85	1986-90	1991-96	1980-90	1991-98
20-21	-5.55	2.82	3.33	-1.36	2.92
22	-2.00	7.33	2.45	2.66	3.25
23+24+25	-2.57	-0.55	2.60	-1.56	1.34
26	2.72	9.22	15.31	5.97	12.17
27	-1.56	-2.19	2.97	-1.88	2.31
28	0.38	0.68	4.63	0.53	2.55
29	4.46	7.91	5.42	6.18	2.47
30	1.99	0.47	6.86	1.23	5.40
31	1.75	5.90	5.77	3.82	4.95
32	4.34	0.20	2.30	2.27	0.49
33	0.82	0.91	3.78	0.87	1.38
34	-0.32	4.11	4.46	1.90	3.32
35+36	1.95	1.54	3.06	1.74	0.99
37	-0.34	0.17	5.55	-0.09	2.40
38	0.89	4.90	10.01	2.89	7.55
All	-0.60	1.82	4.31	0.61	2.92

Source: Computed from Annual Survey of Industries

The growth rate of wages⁵ to the workers for all industries decreased during the period of liberalisation from 1991-00. The growth rate of wage is higher during the period of 1991-95, i.e. immediately after the introduction of liberalisation in 1991 and shows negative growth rate during 1996-00 period for most of the industries. The growth rate of wages to the workers in food and beverage and tobacco industries declined sharply during the reform period compared to the pre reform period. Table 7.7 shows that the growth rate of wages to the worker in leather and wood industries during the liberalisation period shows an impressive growth rate.

⁵ Wages to the worker is deflated using Consumer Price Index.

Table 7.7
Growth Rate of Wages in Indian Manufacturing Industries
(Annual Average Growth Rate (%))

Code	1980-85	1986-90	1991-95	1996-2000	1980-90	1991-2000
20-21	4.96	7.91	4.48	-0.26	6.63	2.61
22	5.05	6.67	2.65	1.34	7.29	1.16
23+24+25	-1.42	1.16	2.21	-7.94	-0.21	-2.02
26	2.86	10.02	15.74	4.36	5.23	11.34
27	1.67	-0.32	4.02	5.11	2.06	22.08
28	2.50	3.49	6.32	-7.88	2.98	0.32
29	3.95	7.91	4.50	-3.23	6.48	1.06
30	4.94	4.23	5.97	0.06	4.84	3.24
31	7.12	7.71	7.15	-0.81	7.76	3.68
32	6.29	1.08	4.81	-2.07	4.48	1.24
33	3.87	1.67	9.00	-4.86	3.05	2.58
34	2.32	4.95	6.38	-4.59	3.04	2.26
35+36	5.38	2.74	5.12	-5.39	4.21	0.68
37	3.23	1.93	8.02	-8.59	3.21	0.27
38	3.36	5.87	11.13	3.97	4.52	7.70
All	2.73	3.13	5.48	-4.17	3.12	1.19

Source: Computed Annual Survey of Industries

7.2 Export Performance of Manufacturing Industries in India

The export performance of registered manufacturing industries in India is examined using the Trade and Production data and ASI data. The concordance table is used for the matching of industries as per ASI classification with that in the Trade and Production database. The concordance table is given in Appendix XXVII. The export performance of 15 Indian industries is examined in terms of growth rate and intensity.

The wood, paper and non metallic mineral industry has highest export growth rate during 1991- 99. The export performance of wood and wood products increased during 1991-95 period compared to the very low rate of growth of the earlier period. The export growth rate of beverage and tobacco, leather and rubber product industry declined during the period of liberalisation. The export growth rate of Indian industry in the first half of 1980s is negative for almost all industries. The annual average growth rate is highest during the post liberalisation period compared to pre reform period as given in Table 7.8.

Table 7.8
Growth Rate of Exports of Indian Manufacturing Industries
(Annual Average Growth Rate (%))

Code	1980-85	1986-90	1991-95	1995-2000	1980-90	1991-2000
20-21	-2.31	7.68	20.67	14.84	2.68	11.95
22	1.74	4.84	-12.37	13.24	3.29	1.88
23+24+25	-3.14	21.11	11.13	6.92	8.98	8.38
26	13.36	22.35	10.12	6.37	17.85	8.16
29	6.14	13.80	4.32	2.61	9.97	3.09
27	-11.26	1.40	38.00	-3.80	-4.93	20.04
28	7.67	10.01	37.75	7.67	8.84	20.22
30	4.36	33.01	15.86	9.95	18.68	12.13
31	61.77	11.15	9.77	-6.59	36.46	0.88
32	-4.33	21.64	34.21	2.98	8.66	19.77
33	-1.57	59.40	22.48	5.23	28.92	12.87
34	-8.84	23.65	12.56	10.00	7.40	10.21
35+36	5.50	19.05	12.13	11.61	12.28	9.39
37	-8.18	18.94	17.64	2.34	5.38	9.02
38	22.47	20.23	13.19	8.01	21.35	9.92

Source: Annual Survey of Industries and Trade and Production Data

7.2.1 Export Intensity of Indian Manufacturing Industries

The export performance of Indian industries is examined in terms of export intensity. The export intensity is defined as the ratio of export to domestic production. The export intensity of almost all industries shows increasing trend since 1980. The export intensity increased after 1990 compared to the earlier period. The textile, leather, metal products and parts and food product industry have higher export intensity. The export intensity of beverage and tobacco industry declined from 11.43 per cent in 1980 to 2.17 in 1999 as given in Table 7.9. This is the only industry in which the export intensity declined over the period from 1980. The number of factories and output of this industry showed a decline during 1980-2000 period. The export intensity is highest in textile industry followed by leather industry in 1991-2000. The export intensity of textile industry increased from 13.3 in 1980-85 to 32.6 in 1996-2000. The export intensity of chemical industry increased to 12.8 in 1996-2000 period from 3.5 in 1980-85.

Table 7.9

Average Export Intensity of Indian Manufacturing Industries

Code	1980-1985	1986-1990	1991-1995	1996-2000	1980-1990	1991-2000
20-21	12.9 <i>1.8</i>	9.7 <i>0.9</i>	13.8 <i>2.9</i>	15.2 <i>1.3</i>	11.5 <i>2.2</i>	14.5 <i>2.3</i>
22	12.5 <i>4.7</i>	5.1 <i>1.5</i>	4.2 <i>1.8</i>	2.9 <i>1</i>	9.2 <i>5.2</i>	3.6 <i>1.6</i>
23+24+25	13.3 <i>1.2</i>	19.1 <i>3.9</i>	30.8 <i>3.2</i>	35 <i>4.3</i>	16 <i>4</i>	32.6 <i>4.1</i>
26	62.2 <i>14.1</i>	99.3 <i>15.8</i>	108.5 <i>13.3</i>	85.5 <i>3.7</i>	79 <i>24</i>	98.3 <i>15.5</i>
29	78.4 <i>14.9</i>	96.7 <i>11.1</i>	83.1 <i>5.2</i>	73.2 <i>3</i>	86.7 <i>15.9</i>	78.7 <i>6.6</i>
27	5.2 <i>1.6</i>	3.3 <i>0.6</i>	8.7 <i>4.3</i>	6.1 <i>3.5</i>	4.4 <i>1.5</i>	7.5 <i>4</i>
28	0.9 <i>0.1</i>	0.9 <i>0.1</i>	2.1 <i>0.9</i>	2.7 <i>0.3</i>	0.9 <i>0.1</i>	2.4 <i>0.7</i>
30	3.5 <i>0.3</i>	6.4 <i>2.5</i>	11.5 <i>1.6</i>	12.8 <i>1.3</i>	4.8 <i>2.2</i>	12.1 <i>1.5</i>
31	2.9 <i>1.7</i>	4.4 <i>0.9</i>	7.4 <i>1.8</i>	4.6 <i>1.2</i>	3.6 <i>1.5</i>	6.2 <i>2.1</i>
32	1.8 <i>0.6</i>	1.6 <i>0.5</i>	5.8 <i>2.3</i>	6.7 <i>0.3</i>	1.7 <i>0.5</i>	6.2 <i>1.7</i>
33	0.9 <i>0.2</i>	2.2 <i>1.3</i>	5.7 <i>1.4</i>	6 <i>1.5</i>	1.5 <i>1.1</i>	5.9 <i>1.4</i>
34	12.5 <i>2.4</i>	11.8 <i>2.8</i>	19.8 <i>3</i>	19.5 <i>1.6</i>	12.2 <i>2.5</i>	19.7 <i>2.4</i>
35+36	3.8 <i>0.2</i>	5.6 <i>0.9</i>	6.9 <i>1.2</i>	8.6 <i>0.4</i>	4.6 <i>1.1</i>	7.6 <i>1.3</i>
37	5.5 <i>1.8</i>	4.5 <i>0.9</i>	9.5 <i>1.3</i>	7.5 <i>1.2</i>	5.1 <i>1.5</i>	8.6 <i>1.6</i>
38	168.8 <i>47.5</i>	302.2 <i>72.7</i>	298.4 <i>29.8</i>	214.7 <i>14.9</i>	229.4 <i>90</i>	261.2 <i>49.7</i>

Figures in italics show standard deviation

Source: Annual Survey of Industries and Trade and Production Data

7.3 Import Performance of Manufacturing Industries in India

The food and food product shows the highest growth rate in imports during the post liberalisation period. The import growth rate (average per annum) is highest during the period shortly after the introduction of liberalisation, i.e., in the period 1991-95. The import growth rate of chemical industry, rubber and plastic industry and basic metal alloy industry declined during the reform period compared to the pre reform period as shown in Table 7.10.

Table 7.10
Growth Rate of Imports of Indian Manufacturing Industries
(Annual Average Growth Rate (%))

Code	1980-85	1986-90	1991-95	1995-2000	1980-90	1991-2000
20-21	1.7	-14.85	54.32	22.04	-7.5	44.13
22	178.4	-1.43	33.36	11.94	78.5	20.69
23+24+25	39.6	17.23	25.59	1.54	27.1	14.66
26	87.2	0.16	42.29	32.95	38.9	36.56
29	16.3	16.41	7.62	5.92	10.8	5.87
27	76.5	17.94	37.59	17.94	44.0	23.50
28	18.3	5.33	12.76	13.65	11.1	7.94
30	14.6	7.39	14.21	5.93	10.6	7.79
31	-12.2	28.91	13.21	8.66	10.6	6.15
32	0.9	8.01	9.49	8.11	4.8	8.18
33	7.6	3.48	13.20	3.24	5.3	6.27
34	37.8	8.72	7.93	5.59	21.6	5.06
35+36	29.1	6.64	18.70	9.57	16.6	10.51
37	5.1	17.78	19.07	-1.58	12.2	9.46
38	-4.9	10.76	127.42	18.76	3.8	77.56

Source: Trade and production data and ASI

7.3.1 Import Intensity of Indian Manufacturing Industries

The import intensity of Indian manufacturing industries is given in the Appendix XXVIII. The import intensity also increased in majority of industries since 1980. The import intensity is higher in paper, chemical, rubber products, metal and alloy, machinery and equipment and metal parts industries. Among these industries the machinery and Equipment (13.49 per cent in 1980 to 28.67 in 1998) and Metal parts industry (14.16 in 1980 to 27.43 per cent in 1998) have highest import intensity and increased enormously in 1990s.

The average import intensity of Indian industries is given in Table 7.11. From table it is clear that the average import intensity of majority of Indian industries increased during the post reform period. The import intensity of food, basic metal and non metallic mineral product industry showed a slightest decline in import performance during the post reform period. Figure given in Appendix XXXVII shows that the export intensity is highest in food, textiles and textile products, beverage and tobacco and leather industry than import intensity.

Table 7.11**Average Import Intensity of Indian Manufacturing Industries**

<i>Code</i>	1980-1985	1986-1990	1991-1995	1996-2000	1980-1990	1991-2000
20-21	8.267 4.157	5.266 2.612	3.586 2.382	7.410 2.765	6.903 3.718	5.286 3.125
22	0.165 0.215	0.338 0.119	0.312 0.179	0.485 0.067	0.244 0.193	0.389 0.161
23+24+25	0.780 0.510	1.894 0.517	3.236 0.969	3.035 0.545	1.286 0.759	3.147 0.770
26	0.098 0.075	0.190 0.082	0.122 0.036	0.218 0.050	0.140 0.088	0.164 0.064
29	0.690 0.659	3.514 1.965	6.956 1.367	6.693 0.429	1.974 1.984	6.839 1.011
27	1.288 1.274	4.360 1.590	4.690 2.627	6.775 3.496	2.685 2.097	5.617 3.040
28	12.362 6.334	15.544 0.425	13.756 3.011	17.220 2.101	13.808 4.785	15.296 3.086
30	15.520 8.097	18.994 3.243	24.410 3.515	20.980 1.703	17.099 6.347	22.886 3.246
31	18.488 13.335	11.358 6.595	26.066 5.912	27.093 4.668	15.247 10.962	26.522 5.093
32	4.353 3.215	2.878 0.283	2.644 0.532	2.943 0.434	3.683 2.407	2.777 0.487
33	12.898 6.784	13.730 1.636	11.142 3.386	12.143 1.904	13.276 4.926	11.587 2.715
34	23.540 14.778	36.870 7.430	29.252 4.362	25.935 1.356	29.599 13.406	27.778 3.641
35+36	16.953 9.703	25.508 5.959	24.224 7.653	28.288 1.348	20.842 9.013	26.030 5.878
37	9.700 5.719	12.452 2.432	12.924 5.356	9.678 2.031	10.951 4.559	11.481 4.338
38	69.543 52.666	58.132 6.399	168.868 102.494	158.280 16.420	64.356 37.931	164.162 73.381

Source: Annual Survey of Industries and Trade and Production Data

7.3.2 Import Penetration in Indian Manufacturing Industries

Import liberalisation would result in a greater access to imported inputs and technologies. Also, increased competition would force domestic producers to adopt cost reducing steps, and should result in domestic industries becoming more competitive. If this happens, import penetration would decrease. If, however, domestic industries do not become competitive, and continue to be high cost industries, then import penetration may rise. Competitiveness of the import competing sector is the crucial factor in determining whether import penetration would rise or not. The import penetration ratio is defined as the ratio

of import to domestic availability. The domestic availability is defined as production plus import minus export. It can be represented as

$$MPR_i = M_i / (P_i + M_i - X_i)$$

Where MPR is the import penetration ratio, M is the imports, P is the production, X is the exports and i is the ith industry. This ratio gives the joint impact of tariff and non tariff barriers. The average import penetration ratio of 15 industries is given in Table 7.12. The import penetration ratio of most of the industries shows an increasing trend in post reform period.

Table 7.12
Average Import Penetration Ratio of Indian Manufacturing Industries

Code	1980-1985	1986-1990	1991-1995	1996-1999	1980-1990	1991-1999
20-21	8.5 <i>4.3</i>	5.5 <i>2.6</i>	4.0 <i>2.6</i>	8.0 <i>2.7</i>	7.1 <i>3.8</i>	5.7 <i>3.2</i>
22	0.2 <i>0.2</i>	0.4 <i>0.1</i>	0.3 <i>0.2</i>	0.5 <i>0.1</i>	0.3 <i>0.2</i>	0.4 <i>0.2</i>
23+24+25	0.9 <i>0.6</i>	2.3 <i>0.7</i>	4.5 <i>1.4</i>	4.5 <i>1.0</i>	1.5 <i>0.9</i>	4.5 <i>1.2</i>
26	0.4 <i>0.4</i>	-2.9 <i>6.2</i>	-2.5 <i>5.1</i>	1.6 <i>0.7</i>	-1.1 <i>4.3</i>	-0.7 <i>4.2</i>
29	-73.1 <i>186.5</i>	24.4 <i>30.7</i>	30.3 <i>10.1</i>	20.1 <i>2.6</i>	-28.8 <i>142.7</i>	25.8 <i>9.1</i>
27	1.3 <i>1.3</i>	4.3 <i>1.5</i>	4.8 <i>2.6</i>	6.7 <i>3.4</i>	2.7 <i>2.0</i>	5.7 <i>3.0</i>
28	10.8 <i>5.5</i>	13.6 <i>0.3</i>	12.3 <i>2.4</i>	15.0 <i>1.6</i>	12.1 <i>4.1</i>	13.5 <i>2.4</i>
30	13.4 <i>6.9</i>	16.8 <i>2.7</i>	21.6 <i>2.7</i>	19.4 <i>1.5</i>	15.0 <i>5.5</i>	20.6 <i>2.4</i>
31	15.0 <i>9.6</i>	10.4 <i>5.4</i>	21.8 <i>4.1</i>	22.0 <i>3.2</i>	12.9 <i>8.0</i>	21.9 <i>3.5</i>
32	4.2 <i>3.0</i>	2.8 <i>0.3</i>	2.7 <i>0.6</i>	3.1 <i>0.4</i>	3.6 <i>2.3</i>	2.9 <i>0.5</i>
33	11.2 <i>5.8</i>	12.3 <i>1.3</i>	10.5 <i>2.9</i>	11.4 <i>1.8</i>	11.7 <i>4.2</i>	10.9 <i>2.4</i>
34	19.8 <i>11.3</i>	29.3 <i>3.4</i>	26.7 <i>3.4</i>	24.4 <i>1.3</i>	24.1 <i>9.6</i>	25.7 <i>2.8</i>
35+36	14.4 <i>7.9</i>	21.1 <i>3.6</i>	20.4 <i>5.4</i>	23.6 <i>0.9</i>	17.5 <i>7.0</i>	21.8 <i>4.2</i>
37	9.1 <i>5.2</i>	11.5 <i>2.0</i>	12.3 <i>4.6</i>	9.5 <i>1.9</i>	10.2 <i>4.1</i>	11.0 <i>3.8</i>
38	-2.3 <i>106.6</i>	-50.7 <i>30.7</i>	283.9 <i>846.4</i>	364.2 <i>35.5</i>	-24.3 <i>81.9</i>	319.6 <i>600.4</i>

Figures in italics show standard deviation

Source: Annual Survey of Industries and Trade and Production Data

The ratio is higher in leather, chemical, rubber products and petroleum, metal products parts and machinery and equipment industries. The import penetration is comparatively low in tobacco and textile products industries. Only food and food products industry and textile show a decline in import penetration during the post liberalisation period compared to the pre reform period. The import penetration ratio is given in Appendix XXIX. The figure given in Appendix XXXVIII also shows for majority of Indian manufacturing industries the import penetration ratio has increased during post reform period. Openness index of Indian industries is given in Appendix XXX. Openness index shows an increasing trend for most of the industries. During the post reform period it also shows an increasing trend compared to the pre reform period.

7.4 Export Performance of Indian Industries as per International Standard Industrial Classification (ISIC)

The above analysis gives the export performance of Indian industries as per the Annual Survey of India (ASI) classification. The export performance is examined by matching the ASI code and Trade and Production data code at the two digit level. The trade and production data also provide data at the disaggregate level (three and four digit level). The export at the three and four digit level from 1980-99 is examined using the ISIC data in the following section. The classification of industries at three digit and four digit level is given in the Appendix XXXI to Appendix XXXVI.

7.4.1 Export Performance of Indian Manufacturing Industries at Three Digit Level

The annual average growth rate of exports of industries as per ISIC classification at three digit level is given in Table 7.13. The average export growth rate shows the export performance of a majority of Indian industries increased during the period of 1990-99. The average per annum growth rate of miscellaneous petroleum and coal products (84.38 per cent) is highest during the

period 1991-99 and lowest average growth rate is shown by petroleum refineries (-9.20 per cent). The miscellaneous petroleum and coal industry export growth rate declined considerably during the period of 1996-99, from 177.02 in 1991-95 to -31.42 per cent in 1996-99. The average export growth rate of wood products except furniture industry, paper and product, industrial chemical, miscellaneous petroleum and coal industry, glass and products, non ferrous metal and transport equipment industries show negative average growth rate during 1996-99 compared to 1991-95 period.

Table 7.13

Annual Average Growth Rate of Exports as per ISIC Classification at Three Digit Level

Code	1980-85	1986-90	1991-95	1996-99	1980-90	1991-99
311	-2.31	7.68	20.67	1.06	2.68	11.95
313	9.96	11.23	-5.30	61.00	61.10	24.17
314	1.75	1.83	-13.40	13.06	1.79	-1.64
321	-3.14	21.11	11.13	4.94	8.98	8.38
322	13.36	22.35	10.12	5.71	17.85	8.16
323	1.44	11.15	5.73	1.56	6.30	3.88
324	20.57	18.10	3.29	2.03	19.34	2.73
331	-9.15	3.27	41.72	-7.56	-2.94	19.82
332	-20.48	-9.16	84.86	22.48	-14.82	57.13
341	2.88	26.68	54.43	-7.34	14.78	26.98
342	17.18	4.71	19.39	9.11	10.95	14.82
351	3.60	43.36	23.70	6.20	23.48	15.92
352	5.44	28.06	7.98	9.62	16.75	8.71
353	12.45	9.06	-0.20	-20.45	64.76	-9.20
354	21.65	16.40	17.02	-31.42	14.03	8.38
355	19.46	18.38	24.30	1.52	18.92	14.18
356	-8.81	48.42	45.49	-7.71	19.80	21.85
361	9.17	22.38	24.57	0.12	15.78	13.71
362	-10.51	13.96	39.72	-1.08	1.73	21.59
369	-0.56	26.08	34.35	3.46	12.76	20.62
371	-7.96	49.62	31.79	1.80	20.83	18.46
372	24.71	15.60	6.91	-1.59	87.66	3.13
381	-8.84	23.65	12.56	7.28	7.40	10.21
382	7.43	19.25	7.62	6.03	13.34	6.91
383	4.14	20.38	20.44	5.97	12.26	14.01
384	-8.18	18.94	17.64	-1.76	5.38	9.02
385	3.72	16.79	5.63	12.02	10.25	8.47
390	23.57	20.37	13.39	5.75	21.97	9.99

Source: Computed from Trade and Production data

The export intensity of majority of industries increased since 1991 as Appendix XXXI shows. The export intensity is highest in textiles, wearing apparels, leather products, footwear except rubber or plastics, wood products and fabricated metal product industry and lower in beverage, tobacco, furniture except metal, pottery china and earthen ware, other non metallic products, non ferrous metal and glass and product industry. The average export intensity, given in Table 7.14, also shows that for majority of the products the export growth rate is highest during the post reform period.

Table 7.14
Average Exports Intensity of Industries
As per ISIC Classification at Three Digit Level

Code	1980-1990	1991-2000	Code	1980-1990	1991-2000
311	0.115 <i>0.022</i>	0.145 <i>0.023</i>	354	0.000 <i>0.000</i>	0.000 <i>0.000</i>
313	0.002 <i>0.002</i>	0.007 <i>0.005</i>	355	0.007 <i>0.002</i>	0.021 <i>0.005</i>
314	0.090 <i>0.053</i>	0.029 <i>0.015</i>	356	0.002 <i>0.001</i>	0.012 <i>0.005</i>
321	0.160 <i>0.040</i>	0.326 <i>0.041</i>	361	0.001 <i>0.000</i>	0.004 <i>0.001</i>
322	0.790 <i>0.240</i>	0.983 <i>0.155</i>	362	0.006 <i>0.003</i>	0.014 <i>0.005</i>
323	0.571 <i>0.078</i>	0.433 <i>0.036</i>	369	0.010 <i>0.003</i>	0.044 <i>0.012</i>
324	0.296 <i>0.099</i>	0.354 <i>0.038</i>	371	0.009 <i>0.005</i>	0.045 <i>0.012</i>
331	0.037 <i>0.010</i>	0.063 <i>0.037</i>	372	0.006 <i>0.006</i>	0.014 <i>0.004</i>
332	0.006 <i>0.006</i>	0.012 <i>0.006</i>	381	0.122 <i>0.025</i>	0.197 <i>0.024</i>
341	0.003 <i>0.001</i>	0.014 <i>0.006</i>	382	0.028 <i>0.006</i>	0.043 <i>0.005</i>
342	0.006 <i>0.001</i>	0.009 <i>0.002</i>	383	0.018 <i>0.005</i>	0.034 <i>0.008</i>
351	0.019 <i>0.013</i>	0.072 <i>0.013</i>	384	0.051 <i>0.015</i>	0.086 <i>0.016</i>
352	0.029 <i>0.010</i>	0.049 <i>0.005</i>	385	0.069 <i>0.012</i>	0.057 <i>0.008</i>
353	0.028 <i>0.014</i>	0.028 <i>0.016</i>	390	2.225 <i>0.892</i>	2.555 <i>0.493</i>

Figures in italics shows standard deviation

Source: Computed from Trade and Production data

The import penetration ratio also increased over the period 1980-99. It ranges from 0.15 per cent to 26.00 per cent in Indian industries. The highest penetration is shown by fabricated metal products industry (26 per cent) in 1999. The import penetration in fabricated metal products, professional and scientific equipment, petroleum refineries, machinery except electrical, industrial chemicals, and paper and products are highest. The beverage, tobacco, furniture except metal, rubber, plastic, pottery and other non metallic mineral product industry shows low import penetration ratio as given in Appendix XXIX. The average import penetration ratio is given in Table 7.15. Table shows that the highest average import penetration is shown by fabricated metal product industry during 1991-99 periods.

Table 7.15
Annual Average Import Penetration Ratio of Industries as per ISIC Classification

Code	1980-1990	1991-1999	Code	1980-1990	1991-1999
311	0.071 <i>0.038</i>	0.057 <i>0.032</i>	354	0.002 <i>0.001</i>	0.017 <i>0.012</i>
313	0.002 <i>0.002</i>	0.003 <i>0.001</i>	355	0.003 <i>0.001</i>	0.009 <i>0.003</i>
314	0.000 <i>0.000</i>	0.001 <i>0.001</i>	356	0.002 <i>0.001</i>	0.005 <i>0.003</i>
321	0.015 <i>0.009</i>	0.045 <i>0.012</i>	361	0.001 <i>0.001</i>	0.001 <i>0.000</i>
322	0.001 <i>0.043</i>	0.007 <i>0.042</i>	362	0.012 <i>0.006</i>	0.014 <i>0.003</i>
323	0.032 <i>0.033</i>	0.089 <i>0.014</i>	369	0.023 <i>0.023</i>	0.012 <i>0.002</i>
324	0.008 <i>0.007</i>	0.021 <i>0.005</i>	371	0.083 <i>0.031</i>	0.060 <i>0.012</i>
331	0.026 <i>0.021</i>	0.047 <i>0.023</i>	372	0.041 <i>0.016</i>	0.052 <i>0.016</i>
332	0.001 <i>0.001</i>	0.009 <i>0.008</i>	381	0.241 <i>0.096</i>	0.257 <i>0.028</i>
341	0.101 <i>0.035</i>	0.112 <i>0.020</i>	382	0.127 <i>0.052</i>	0.152 <i>0.030</i>
342	0.024 <i>0.011</i>	0.028 <i>0.009</i>	383	0.060 <i>0.030</i>	0.083 <i>0.019</i>
351	0.128 <i>0.047</i>	0.172 <i>0.023</i>	384	0.102 <i>0.041</i>	0.110 <i>0.038</i>
352	0.024 <i>0.010</i>	0.036 <i>0.004</i>	385	0.281 <i>0.101</i>	0.234 <i>0.041</i>
353	0.123 <i>0.080</i>	0.193 <i>0.035</i>	390	0.171 <i>0.545</i>	0.677 <i>9.330</i>

Note: Figures in italics show standard deviation

Source: Computed from Trade and Production data

The lowest ratio is shown by wearing apparels. It is negative for both the period. The average import penetration ratio of majority of industries increased during the post reform period compared to the pre reform period. The import penetration ratio of the food industry (311), textiles (321), wood products except furniture(331) and other non metallic products (369) have decreased during the post reform period compared to the pre reform period.

7.4.2 Export Performance of Industries at Four Digit Level

The trend and growth rate of Indian industries at four digit levels are examined with ISIC classification. The four digit industries were classified as labour intensive, resource intensive, scale intensive, science based and differentiated as per UNESCAP classification are given in Appendix XXXII to Appendix XXXVI. Tendulkar's classification is followed in this section also. The three digit industries which have insignificant export share are not included in the selection. The export share, which is very insignificant at four digit level is also not considered for the analysis. The export performance of these industries is examined since 1980.

Export Performance of Resource Intensive Products

The export performance of resource intensive product increased since 1985. The average growth rate is positive for almost all products during 1991-95 period but shows a decline in 1996-99 as given in Table 7.16. The manufacture of cement lime and plaster showed highest average growth rate since 1986 and the growth rate of this products also declined during 1996-99 period. The manufacture of non metallic mineral products has highest growth rate during the period 1996-99. The import growth rate is also high during 1991-95 period compared to other periods.

Table 7. 16
Average Growth Rate of Exports and Imports of Resource Based Products (%)

Code	Exports				Imports			
	1980-85	1986-90	1991-95	1996-99	1980-85	1986-90	1991-95	1996-99
3111	-4.50	-3.97	-0.53	1.72	-31.78	77.55	12.64	4.29
3114	8.75	8.71	4.96	2.85	-15.04	-14.63	7.76	-16.22
3115	-0.15	3.48	-1.94	10.56	-25.81	-7.91	56.17	37.72
3231	0.37	5.09	11.09	11.73	-19.37	86.75	5.07	5.47
3233	11.77	18.43	24.22	23.00	-24.29	13.00	54.49	-8.01
3691	-6.95	-7.07	-4.19	4.47	-25.93	15.65	7.03	7.66
3692	77.36	87.36	41.80	2.76	-43.10	-49.23	29.30	49.78
3699	1.23	-0.01	6.05	7.36	-19.82	11.21	12.30	3.79
3813	-8.68	-12.63	-18.02	-11.13	18.53	-12.17	25.43	1.62
3311	-9.43	-3.04	-0.64	5.97	25.78	26.77	38.77	4.13
3319	-12.11	2.84	-4.62	-12.31	4.02	-28.53	36.66	-0.01
3113	28.77	19.63	-0.31	2.03	-32.79	3.13	20.66	70.66

Source: Computed from Trade and production database

The exponential growth rate of resource intensive industries showed that export and import growth rate of these industries increased during the reform period as given in Table 7.17. The export growth rate is highest for the non metallic mineral product (3691) and wood and cork product (3319) during the post reform period. During the pre reform period the growth rate of these industries was very low. During the pre reform period the highest export growth rate is shown by manufacture of cement lime (3692) and products of leather industry (3233). The lowest export growth rate during post reform period is shown by tannery and other leather product industry (3231) and mill and wood product industry (3311). The import growth rate is highest in the tannery and other leather product industry (3231). The cement lime industry (3692), structural metal product industry (3813) and wood and cork industry showed a decline in import growth rate during the post reform period compared to the pre reform period. Import growth rate is higher than export growth rate in both periods.

Table 7.17
Exponential Growth Rate of Exports and Imports of Resource Intensive Products

Code	Exports			Imports		
	1980-90	1991-99	1980-99	1980-90	1991-99	1980-99
3111	0.80	9.76	6.30	29.12	12.79	20.11
3114	5.82	9.75	10.70	-51.03	65.13	5.36
3115	9.12	5.37	12.91	-14.75	52.32	1.46
3231	6.58	-0.88	-0.56	59.44	6.40	31.39
3233	22.04	10.01	16.81	18.00	6.44	11.26
3691	5.74	10.11	16.69	8.45	11.25	7.20
3692	36.75	7.80	37.10	-45.62	43.28	-22.00
3699	8.61	16.79	19.85	7.32	8.80	8.32
3813	-5.53	11.29	5.64	-5.49	15.63	-1.02
3311	0.33	0.73	5.79	37.62	24.19	17.90
3319	-16.16	16.77	0.30	-9.95	9.52	-4.11
3113	4.25	11.53	5.80	36.00	7.95	13.31

Source: Computed from Trade and production database

Export Performance of Labour Intensive Products

The export growth rate of labour intensive product shows that paper and Paper board (3411) showed highest growth rate in 1991-95 period but thereafter declined sharply to -13.72 per cent in 1996-99 period. The export growth rate is highest during 1986-90 period compared to 1985-90 period, as given in Table 7.18. The import growth rate declined during 1996-99 period which is lower than the 1980-85 period. The compound growth rate of exports shows that manufacture of ship building and finishing industry (3841) has highest growth rate during the post reform period. The compound growth rate of exports of labour intensive products also showed that performance is better during the post reform period. Export growth rate some of the industries like textile apparel industry (3212), paper board industry (3412), metal furniture and fixture industry (3812) show an impressive growth rate during the post reform period. The import growth rate of labour intensive products also showed an improvement in performance during the post reform period as given in Table 7.19. Import growth rate of textile products (3212), leather product industry (3233), paper board industry (3412), manufacture of footwear (3240) and knitting mill products (3213) showed a decrease in import performance during the post reform period.

During the post reform period, the import growth rate is lower compared to export growth rate for most of the industries.

Table 7.18
Average Growth Rate of Exports and imports of Labour Intensive Products-(%)

Code	Exports				Imports			
	1980-85	1986-90	1991-95	1996-99	1980-85	1986-90	1991-95	1996-99
3212	-15.57	-2.19	20.43	9.31	-17.66	-5.19	6.26	15.20
3233	0.92	29.37	16.59	6.96	12.21	13.00	54.49	-8.01
3411	-40.65	29.36	64.82	-13.72	30.51	6.00	13.64	-0.71
3412	-71.40	25.95	43.05	-1.94	5.39	53.14	19.51	-8.33
3811	-22.49	23.14	13.97	1.32	10.06	5.14	11.62	4.20
3812	-2.54	11.95	19.30	3.15	23.64	22.14	53.61	28.80
3819	-24.35	30.67	13.45	7.70	59.64	14.57	7.90	1.40
3909	-6.47	24.56	30.51	6.58	86.18	10.03	16.90	6.44
3240	20.19	18.10	3.29	2.03	12.80	45.64	15.88	3.11
3513	6.10	77.17	37.75	-0.91	36.36	13.31	9.20	-3.66
3841	-40.18	62.47	35.79	19.19	-39.33	17.85	6.11	22.65
3909	44.06	24.02	56.02	2.76	13.00	-49.23	29.30	23.78
3211	-9.92	23.89	11.20	4.68	45.34	25.09	29.03	-0.45
3213	21.51	47.45	12.61	7.37	11.07	22.18	15.97	26.09
3214	-8.60	15.18	7.27	2.04	14.62	-40.00	22.53	74.73

Source: Computed from Trade and production database

Table 7.19
Exponential Growth Rate of Exports and Imports of Labour Intensive Products

Code	Exports			Imports		
	1980-90	1991-99	1980-99	1980-90	1991-99	1980-99
3212	-4.99	18.69	4.72	20.25	12.77	9.75
3233	22.04	10.01	16.81	18.00	6.44	11.26
3411	8.89	16.61	22.66	6.95	12.64	5.76
3412	-2.72	15.88	16.77	54.97	4.38	25.82
3811	10.09	7.51	10.97	13.04	11.34	10.37
3812	-6.46	10.55	35.68	99.36	23.71	38.53
3819	7.54	10.92	12.48	17.19	6.86	8.00
3909	12.89	20.27	19.27	18.04	15.36	13.68
3240	18.63	3.33	9.74	53.78	7.36	24.54
3513	53.29	17.75	32.78	12.26	6.17	7.03
3841	8.04	45.40	19.48	12.08	22.32	9.52
3909	36.75	7.80	37.10	-45.62	43.28	-22.00
3211	10.05	10.49	11.63	22.09	8.01	15.78
3213	23.75	10.03	19.34	76.22	23.74	22.37
3214	9.78	1.70	7.50	0.00	92.02	0.00

Source: Computed from Trade and production database

Export Performance of Scale Intensive Products

The annual average growth rates of export and import of scale intensive products have been given in Table 7.20. The export growth rate among scale intensive product is highest in manufacture of plastic products(3560) during 1991-95 period, but the growth rate decreased to -7.71 per cent in 1996-99. The export of synthetic resin, plastic materials and man made fibres (3513) which showed highest growth in 1986-90 (77.77 per cent) period declined to 37.75 per cent in 1990-95 period and to -0.91 per cent in 1996-99 period. Export of most of the scale intensive products also showed a decline in 1996-99 period. The import growth rate of a majority of products also declined during 1996-99 period compared to the 1991-95 period. The growth rate of import was highest during 1986-90 period compared to 1991-95 period.

Table 7.20
Annual Average Growth Rate of Exports and Imports of Scale Intensive Products (%)

Code	Exports				Imports			
	1980-85	1986-90	1991-95	1996-99	1980-85	1986-90	1991-95	1996-99
3419	-9.79	37.26	42.07	9.38	9.34	6.01	19.44	4.12
3420	17.18	4.71	19.39	9.11	37.85	4.18	10.24	19.98
3511	-1.55	45.33	20.40	8.34	18.83	8.84	16.85	3.07
3512	67.13	30.16	32.65	7.24	37.73	22.52	21.02	-6.34
3513	21.02	77.17	37.75	-0.91	11.41	13.31	9.20	-3.66
3529	1.82	32.75	13.53	13.79	37.05	11.79	8.76	10.95
3551	30.89	25.32	26.06	-0.82	-0.54	41.84	23.00	8.53
3559	31.41	7.85	21.77	8.56	20.25	10.71	21.54	7.65
3710	-7.96	49.62	31.79	1.80	9.93	1.34	7.68	-5.15
3901	23.44	20.51	13.19	5.80	55.55	5.95	17.78	17.73
3903	-1.84	10.47	11.99	1.97	12.98	43.70	24.98	1.97
3620	-10.51	13.96	39.72	-1.08	12.96	22.96	10.86	6.26
3560	-8.81	48.42	45.49	-7.71	21.89	26.48	46.87	-3.10
3610	9.17	22.38	24.57	0.12	69.32	-2.55	12.06	16.03

Source: Computed from Trade and production database

The exponential growth rate of scale intensive product is shown in Table 7.21. Manufacture of paper and paper product industry (3419) has the highest export performance during the post reform period. Export performance of

industries like manufacture of basic industrial chemicals (3511), fertilisers (3512), manufacture of synthetic resins and manmade fibres (3551) and manufacture of jewellery and related products (3901) has better performance in the pre reform period. But the import of jewelley related (3901) products has highest growth rate during the post reform period. During the period 1980-2000 the highest import growth rate is shown by sporting and athletic goods industry (3903). The import growth rate of majority of these industries also shows growth rate is lower compared to export growth rate.

Table 7.21
Exponential Growth Rate of Exports and Imports of Scale Intensive Industries

Code	Exports			Imports		
	1980-90	1991-99	1980-99	1980-90	1991-99	1980-99
3419	8.60	23.42	22.19	28.62	17.04	15.66
3420	5.76	15.39	9.28	17.99	16.42	8.69
3511	25.05	14.52	21.81	14.35	11.09	11.43
3512	44.35	18.79	27.29	-1.54	3.20	4.14
3513	53.29	17.75	32.78	12.26	6.17	7.03
3529	16.14	10.72	14.06	18.37	11.89	11.86
3551	26.93	7.10	19.21	15.13	18.61	15.81
3559	1.18	15.30	11.08	12.67	19.14	13.60
3710	19.51	12.70	23.35	3.95	5.57	1.06
3901	21.20	9.85	13.35	-11.20	37.76	30.31
3903	4.51	10.29	43.43	30.05	16.91	36.39
3620	4.38	18.47	14.98	21.14	11.27	9.85
3560	17.67	10.58	23.76	25.94	16.35	17.52
3610	18.01	9.13	16.31	5.33	11.91	6.48

Source: Computed from Trade and production database

Export Performance of Differentiated Product Industries

In the case of differentiated product, machinery and equipment except electrical (3829) and metal and wood working machinery (3823) show highest average export growth rate as in Table 7.22. The growth rate of exports of differentiated product also declined during 1996-99 period. The export growth rate of majority of differentiated products showed increase in growth rate in 1990s compared to 1980s. The import growth rate of most of the differentiated products showed a decrease in performance during 1996-99 period. The imports of rail road equipment (3842) has a sharp increase in 1996-99 than other periods. The

compound growth rate of export shows that machinery and electrical equipment products (3829) and manufacture of electrical equipment industry (3831) have highest export growth rate and the performance of these industries is higher in post reform period compared to the pre reform period. But the export growth rate of motor cycle industry (3844) and manufacturing of office accounting machinery (3825) shows a sharp decline during the post reform period compared to the pre reform period. The export performance of electrical appliance and house ware (3833) increased from -6.31 per cent during the pre reform period to 11.76 per cent during post reform period. Import performance also shows an increasing trend during the 1990s. The import of motor cycle industrial products (3844) also shows a sharp decline during the post reform period compared to the pre reform period. The import fell to -1.36 per cent during 1991-2000 period from 37.16 per cent during 1980-1990 periods. Manufacturing industry of office accounting machinery (3825) has the highest growth rate during the post reform period. Differentiated products shows during the pre and post reform periods import growth rate is higher compared to the export growth rate as given in Table 7.23.

Table 7.22
Annual Average Growth Rate of Exports and Imports of Differentiated Products (%)

Code	Exports				Imports			
	1980-85	1986-90	1991-95	1996-99	1980-85	1986-90	1991-95	1996-99
3823	16.29	5.69	4.42	14.22	13.98	15.70	13.40	12.03
3824	7.34	26.19	1.34	9.36	31.06	5.37	23.79	-8.80
3829	1.13	10.82	8.55	14.71	24.62	-0.45	16.23	-0.29
3831	-4.98	29.43	17.87	10.11	40.96	6.15	25.27	-6.15
3844	-15.60	27.31	24.22	-7.98	32.60	-0.47	-6.64	-0.80
3825	93.31	46.66	23.95	-9.20	33.89	27.64	16.42	23.47
3833	-2.49	-1.76	20.89	8.68	14.37	6.65	21.57	17.44
3839	13.67	12.95	0.85	11.66	76.71	14.81	14.83	4.32
3842	-12.96	12.32	21.33	-9.10	1.01	25.41	16.24	90.72
3843	-4.86	18.32	19.18	-0.79	31.57	2.51	14.16	-4.49

Source: Computed from Trade and production database

Table 7.23
Exponential Growth Rate of Exports and Imports of Differentiated Products

Code	Exports			Imports		
	1980-90	1991-99	1980-99	1980-90	1991-99	1980-99
3823	12.03	12.14	7.77	11.10	18.53	9.72
3824	15.42	9.49	9.79	6.29	10.88	6.23
3829	4.02	13.83	8.08	5.41	12.42	4.77
3831	9.09	13.61	14.81	14.15	12.62	8.34
3844	9.62	1.94	12.30	37.16	-1.36	10.39
3825	54.87	8.10	23.51	30.24	26.59	18.25
3833	-6.31	11.76	6.78	4.02	27.84	9.81
3839	8.33	11.13	5.04	23.89	13.13	10.98
3842	-5.92	-3.23	-1.68	9.22	10.80	3.23
3843	4.58	7.10	11.13	11.03	9.22	7.28

Source: Computed from Trade and production database

Export Performance of Science Based Products

The export growth rate of science based products shows that the highest growth rate is shown in 1986-90 period. Photographic and optical goods (3852) and professional and Scientific and measuring and controlling equipment (3851) show high per cent growth rate in 1996-99. The growth rate of soap and cleaning preparations, perfumes, cosmetics and others(3523) declined from 32.10 per cent in 1986-90 to -1.80 per cent in 1991-95 period compared to the average growth rate of other periods. The import growth rate also declined during 1996-99 period compared to the earlier period, 1991-95 as shown in Table 7.24. The compound growth rate show that the growth rate of export of science based products declined during the post reform period compared to the pre reform period. The manufacture of radio, television and communication equipment industry (3832) has higher export growth rate among the science based products. But the manufacture of soap and perfumes and cosmetics industry (3523) show the highest import growth rate. Science based products shows export growth rate of majority of products is higher than the import growth rate as clear from Table 7.25.

Table 7.24
Annual Average Growth Rate of Exports and Imports of Science Based Products-(%)

Code	Exports				Imports			
	1980-85	1986-90	1991-95	1996-99	1980-85	1986-90	1991-95	1996-99
3522	10.04	28.96	11.15	9.78	15.04	14.51	11.76	1.46
3523	11.84	32.10	-1.80	3.55	181.68	21.51	16.21	34.80
3832	13.58	53.32	39.01	2.43	41.08	15.86	20.37	6.44
3851	-1.64	27.43	2.97	16.54	18.31	15.59	9.38	11.08
3852	14.81	6.34	-6.28	16.88	46.61	2.24	10.97	9.79
3853	-3.92	104.77	70.36	-0.12	1.04	8.31	0.35	6.35

Source: Computed from Trade and production database

Table 7.25
Exponential Growth Rate of Exports and Imports of Science Based Products

Code	Exports			Imports		
	1980-90	1991-99	1980-99	1980-90	1991-99	1980-99
3522	16.69	12.96	14.62	12.06	5.09	9.26
3523	6.55	3.70	4.86	34.76	33.70	17.30
3832	34.00	21.95	23.59	22.19	14.77	13.28
3851	15.42	13.69	12.67	13.92	10.78	9.65
3852	7.74	7.65	0.28	10.59	15.77	7.34
3853	-0.50	19.55	26.54	1.52	9.76	-0.23

Source: Computed from Trade and production database

7.5 Impact of Trade Liberalisation on Export Intensity of Indian Manufacturing Industries

In this section, an analysis of industry wise determinants of export intensity of Indian manufacturing industries is done. The factors selected for the analysis are output, input output ratio, import penetration, trade policy and wages per unit of value added. Three multiple regression models are used for the analysis to assess the impact of trade liberalisation. The first model uses liberalisation dummy, the second model openness index and in third model both variables are used.

Multiple regression model used to analyse the impact of each industry is given as

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e \quad (1)$$

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e \quad (2)$$

Where Y – export intensity (export/output) α - intercept, X_1 - output, X_2 – input out ratio, X_3 – wage per unit of value added, X_4 – import penetration , X_5 – liberalisation dummy (model 1) and openness (model 2), e - error term. All variables are in log forms. The theoretical relationship between exports and each variable is given below:

Output- The relationship between output and export behaviour is often hypothesized as positive. The output is taken as a proxy for size. The industry with higher output has better resource base, risk perception, economies of scale and profitability and thus prone to the possibility of higher export.

Wage per unit of value added- It is expected that labour productivity affect export competitiveness positively. The share of wage in value added should not be high as it will affect the incentives of the entrepreneurs to produce and hence to export more.

Import penetration – This ratio gives the joint impact of tariff and non tariff barriers. Import penetration is defined as the ratio of imports to domestic availability i.e. production plus imports minus exports. Increased competition would force domestic producers to adopt cost reduction methods and this will result in domestic industries becoming more competitive i.e. import penetration would decrease.

Input out put ratio –It is used as measure of productivity and a positive impact is expected on exports if ratio decreases.

Liberalisation – Two alternative measures of trade liberalisation are used, one the liberalisation dummy i.e. zero before 1991 and one for liberalisation period.

Openness index- Another measure used to assess the impact is trade openness index, $[(\text{exports plus import}) / \text{GDP}]$, Openness index have been calculated for 15 manufacturing industries seperately.

7.5.1 Determinants of Export Intensity of Food Products Industry

The food industry shows that the output has positive impact in all models. Wage per unit of value added shows positive influence and import penetration has negative impact in model with openness and in model with both trade policy variables. Input output ratio shows positive influence in all three models. Both trade policy measures show positive and significant impact as given in Table 7.26.

Table 7.26
Determinants of Export Intensity of Food Products (20-21) Industry

Variables	Model 1			Model 2			Model 3		
	Coefficients	t value	P value	Coefficients	t value	P value	Coefficients	t value	P value
Intercept	0.104	0.932	0.366	0.092	1.291	0.216	0.117	1.741	0.104
Output	0.000	0.719	0.483	0.001	3.051	0.008	0.001	3.805	0.002
Input-output ratio	-0.023	-0.171	0.867	-0.150	-1.572	0.137	-0.184	-2.042	0.060
Wage per unit of value added	0.187	0.648	0.527	-0.235	-1.135	0.274	-0.374	-1.828	0.089
Import penetration	0.002	0.638	0.533	-0.002	-1.307	0.211	-0.001	-0.871	0.399
Liberalisation dummy	0.064	1.967	0.068				0.038	1.893	0.079
Openness				0.001	5.405	0.000	0.001	5.216	0.000
R Square	0.395			0.742			0.794		
Adjusted R Square	0.193			0.655			0.706		

7.5.2 Determinants of Export Intensity of Beverage and Tobacco Products

The results given in Table 7.27 shows that output has positive influence in all models. The wage per unit of value added has positive effect on export intensity in both the models. Input output ratio shows positive and significant influence in all models. Import penetration shows positive impact in model all models. Liberalisation dummy has negative impact on the beverage industry but openness shows positive and significant impact .

Table 7.27
Determinants of Export Intensity of Beverages and Tobacco (22) Industry

Variables	Model 1			Model 2			Model 3		
	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value
Intercept	0.045	0.423	0.679	0.075	1.247	0.233	-0.014	-0.187	0.855
Output	-0.007	-1.658	0.120	-0.010	-4.656	0.000	-0.006	-2.220	0.045
Input-output ratio	0.299	2.158	0.049	0.310	3.061	0.008	0.281	2.963	0.011
Wage per unit of value added	-0.140	-0.637	0.535	-0.338	-2.341	0.035	-0.207	-1.365	0.196
Import penetration	0.045	0.918	0.374	0.009	0.229	0.822	0.000	0.014	0.989
Liberalisation dummy	-0.004	-0.127	0.901				-0.039	-1.839	0.089
Openness				0.018	3.424	0.004	0.022	4.130	0.001
R Square	0.740						0.888		
Adjusted R Square	0.647						0.836		

7.5.3 Determinants of Export Intensity of Intensity of Textiles (23+24+25)

Liberalisation measured as dummy and openness shows positive and significant impact on manufacture of textile industry. Input output ratio and import penetration show the theoretically expected negative sign in all models. Output shows positive impact in all models. Wage per unit of value added shows positive impact as given in Table 7.28.

Table 7. 28
Determinants of Export Intensity of Textiles (23+24+25) Industry

Variables	Model 1			Model 2			Model 3		
	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value
Intercept	0.455	1.743	0.102	0.699	2.600	0.020	0.685	2.590	0.021
Output	0.001	0.902	0.381	0.001	1.025	0.322	0.001	0.903	0.382
Input-output ratio	-0.262	-1.010	0.328	-0.392	-1.584	0.134	-0.376	-1.547	0.144
Wage per unit of value added	-0.173	-0.887	0.389	-0.216	-1.183	0.255	-0.212	-1.182	0.257
Import penetration	-0.046	-3.710	0.002	-0.046	-3.953	0.001	-0.046	-4.051	0.001
Liberalisation dummy	0.153	2.805	0.013				0.078	1.248	0.233
Openness				0.002	3.385	0.004	0.001	2.000	0.065
R Square	0.745			0.779			0.802		
Adjusted R Square	0.660			0.706			0.716		

7.5.4 Determinants of Export Intensity of Textile Products (26) Industry

Liberalisation though shows positive impact on the export of textile products it is not significant. Openness index shows positive and significant influence. Table 7.29 shows wage per unit of value added shows negative influence. Import penetration has the expected negative influence in all models. Output shows negative impact on the export intensity of this firm.

Table 7.29
Determinants of Export Intensity of Textile Products (26) Industry

Variables	Model 1			Model 2			Model 3		
	Coefficients	t value	P value	Coefficients	t value	P value	Coefficients	t value	P value
Intercept	0.381	0.446	0.662	1.178	2.183	0.047	1.205	2.007	0.066
Output	-0.023	-3.668	0.002	-0.049	-5.304	0.000	-0.049	-4.903	0.000
Input-output ratio	1.744	1.601	0.130	0.413	0.562	0.583	0.377	0.463	0.651
Wage per unit of value added	-3.195	-3.665	0.002	-2.215	-3.797	0.002	-2.201	-3.578	0.003
Import penetration	-0.189	-0.413	0.686	-0.283	-0.696	0.498	-0.268	-0.608	0.554
Liberalisation dummy	0.511	2.806	0.013				-0.021	-0.123	0.904
Openness				0.014	4.827	0.000	0.015	3.584	0.003
R Square	0.666			0.810			0.810		
Adjusted R Square	0.555			0.741			0.722		

7.5.5 Determinants of Export Intensity of Leather and Leather Products (29) Industry

Liberalisation has negative impact on the leather industry's export intensity. Openness has positive and significant impact. Output has positive influence. The input output ratio and import penetration show negative influence on the export intensity of the leather industry as given in Table 7.30 i.e, it has favourable effects on the export intensity of leather industry. Wage per value added shows favourable influence on export intensity of leather and leather product industry.

Table 7.30
Determinants of Export Intensity of Leather and Leather Products (29)
Industry

Variables	Model 1			Model 2			Model 3		
	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value
Intercept	1.980	4.085	0.001	2.137	4.132	0.001	1.760	4.276	0.001
Output	0.024	2.763	0.015	0.042	3.099	0.008	0.044	4.235	0.001
Input-output ratio	-0.727	-1.194	0.252	-0.899	-1.375	0.191	-0.537	-1.049	0.313
Wage per unit of value added	-1.024	-1.823	0.090	-0.925	-1.517	0.151	-1.041	-2.224	0.044
Import penetration	-0.036	-2.419	0.030	-0.001	-0.059	0.954	-0.000	-0.014	0.989
Liberalisation dummy	-0.190	-1.997	0.066				-0.289	-3.306	0.006
Openness				0.008	1.086	0.296	0.017	2.682	0.019
R Square	0.618			0.547			0.754		
Adjusted R Square	0.481			0.385			0.640		

7.5.6 Determinants of Export Intensity of Wood and Wood Products (27)

In the case of wood industry, openness index and liberalisation dummy have positive and significant impact. Table 7.31 shows that labour productivity has negative influence on the export of wood industry. Import penetration has the favourable impact. Output also shows positive impact.

Table 7.31
Determinants of Export Intensity of Wood and Wood Products (27) Industry

Variables	Model 1			Model 2			Model 3		
	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value
Intercept	-0.071	-2.308	0.037	0.016	0.513	0.616	-0.015	-0.486	0.635
Output	0.000	0.241	0.813	0.002	1.146	0.271	0.003	1.954	0.073
Input-output ratio	0.034	0.914	0.376	0.006	0.199	0.845	0.038	1.305	0.214
Wage per unit of value added	0.359	5.209	0.000	0.096	1.191	0.253	0.184	2.350	0.035
Import penetration	-0.004	-1.353	0.197	-0.006	-2.136	0.051	-0.004	-1.548	0.146
Liberalisation dummy	0.070	3.779	0.002				0.042	2.429	0.030
Openness				0.042	4.444	0.001	0.029	3.090	0.009
R Square	0.829			0.796			0.882		
Adjusted R Square	0.768			0.723			0.828		

7.5.7 Determinants of Export Intensity of Paper and Paper Products (28)

The result of the analysis of the impact of the trade policy on the export intensity of paper industry is given in Table 7.32. Output, liberalisation and openness has positive impact on export intensity. Liberalisation and openness have positive impact on the export intensity of the paper industry. Wage per value added shows positive impact. Input output ratio shows the theoretically expected negative relations. Thus most of the variables have positive impact on the export intensity of paper and paper product industry. Import penetration has negative impact on the export intensity of paper products industry

Table 7.32
Determinants of Export Intensity of Paper and Paper Products (28) Industry

Variables	Model 1			Model 2			Model 3		
	Coefficients	t value	P value	Coefficients	t value	P value	Coefficients	t value	P value
Intercept	0.071	1.664	0.118	0.045	1.580	0.136	0.059	1.765	0.101
Output	0.000	1.353	0.197	0.000	1.740	0.104	0.000	1.510	0.155
Input-output ratio	-0.098	-1.625	0.127	-0.001	-0.013	0.990	-0.028	-0.530	0.605
Wage per unit of value added	-0.007	-0.373	0.714	-0.103	-4.164	0.001	-0.089	-2.948	0.011
Import penetration	0.001	1.510	0.153	0.001	0.690	0.502	0.001	0.981	0.345
Liberalisation dummy	0.011	2.733	0.016				0.003	0.824	0.425
Openness				0.001	4.660	0.000	0.001	3.123	0.008
R Square	0.845			0.907			0.911		
Adjusted R Square	0.789			0.873			0.870		

7.5.8 Determinants of Export Intensity of Chemical and Chemical Products (30) Industry

The models given in Table 7.33 show that trade policy has positive and significant impact on the export intensity of chemical and chemical products. Import penetration ratio and output also show positive impact. Wage per unit of value added shows negative influence on the intensity of exports in all models.

Table 7.33
Determinants of Export Intensity of Chemical and Chemical Products (30)

Variables	Model 1			Model 2			Model 3		
	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value
Intercept	-0.035	-0.460	0.652	0.085	1.249	0.232	0.072	0.994	0.338
Output	0.001	0.362	0.723	0.001	0.958	0.354	0.000	0.847	0.413
Input-output ratio	0.090	1.467	0.164	0.045	0.886	0.391	0.048	0.911	0.379
Wage per unit of value added	0.113	0.370	0.717	0.557	2.180	0.047	0.490	1.715	0.110
Import penetration	-0.001	-1.580	0.136	-0.000	-0.609	0.552	-0.000	-0.641	0.533
Liberalisation dummy	0.034	2.440	0.029				0.009	0.589	0.566
Openness				0.000	4.108	0.001	0.000	2.766	0.016
R Square	0.888			0.928			0.930		
Adjusted R Square	0.848			0.902			0.897		

7.5.9 Determinants of Export Intensity of Rubber, Plastic and Petroleum Products (31) Industry

Regression model given in Table 7.34 shows that impact of trade policy measured as liberalisation dummy and openness exhibits positive impact on the export of rubber and petroleum product. Import penetration and input output ratio shows the theoretically expected negative influence. Wage per unit of value added shows positive impact on the export intensity

Table 7.34
Determinants of Export Intensity of Rubber, Plastic and Petroleum Products (31) Industry

Variables	Model 1			Model 2			Model 3		
	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value
Intercept	0.188	1.622	0.126	0.327	2.918	0.011	0.179	1.542	0.145
Output	0.000	2.872	0.012	0.000	-0.925	0.369	0.000	1.764	0.100
Input-output ratio	-0.088	-0.708	0.490	-0.249	-2.126	0.050	-0.076	-0.609	0.552
Wage per unit of value added	-0.212	-1.202	0.248	-0.298	-1.370	0.191	-0.289	-1.521	0.151
Import penetration	-0.001	-1.179	0.257	-0.000	-0.619	0.545	-0.000	-0.661	0.519
Liberalisation dummy	0.047	2.551	0.022				0.045	2.394	0.031
Openness				0.000	1.219	0.242	0.000	1.060	0.307
R Square	0.542			0.402			0.576		
Adjusted R ²	0.389			0.203			0.394		

7.5.10 Determinants of Export Intensity of Non Metallic Minerals (32)

Trade policy has positive and significant impact on the export performance of non metallic mineral products. Import penetration shows the positive influence on this industry. Output has influenced positively on the export intensity of the non metallic mineral products. Wage per unit of value added also has negative impact. Most of the variables selected have positive impact on the export intensity of this industry as given in Table 7.35.

Table 7.35
Determinants of Export Intensity of Non Metallic Minerals (32) Industry

Variables	Model 1			Model 2			Model 3		
	Coefficients	t value	P value	Coefficients	t value	P value	Coefficients	t value	P value
Intercept	-0.183	-2.695	0.017	-0.056	-0.529	0.605	-0.037	-0.391	0.702
Output	0.001	2.023	0.061	0.001	0.226	0.824	0.001	0.482	0.637
Input-output ratio	0.133	2.826	0.013	0.085	1.432	0.173	0.068	1.261	0.228
Wage per unit of value added	0.266	2.290	0.037	0.064	0.387	0.704	0.062	0.421	0.680
Import penetration	-0.000	-0.074	0.942	-0.002	-1.011	0.328	-0.001	-0.738	0.473
Liberalisation dummy	0.036	2.668	0.018				0.028	2.179	0.047
Openness				0.004	2.497	0.025	0.003	1.999	0.065
R Square	0.789			0.780			0.835		
Adjusted R Square	0.718			0.706			0.765		

7.5.11 Determinants of Export Intensity of Basic Metal and Alloy (33)

Positive and significant impact of trade reform on Basic metal and alloy industry is evident from Table 7.36 Openness and liberalisation dummy show positive and significant impact. Wage per unit of value added has positive impact on the export intensity of basic metal industry. Import penetration has negative impact on the export intensity of this industry. Output has positive impact on the export intensity in the case of metal and alloy industry.

Table 7.36
Determinants of Export Intensity of Basic Metal and Alloy (33) Industry

Variables	<i>Model1</i>			<i>Model 2</i>			<i>Model 3</i>		
	<i>Coeffi- cients</i>	<i>t value</i>	<i>P value</i>	<i>Coeffi- cients</i>	<i>t value</i>	<i>P value</i>	<i>Coeffi- cients</i>	<i>t value</i>	<i>P value</i>
Intercept	0.038	0.295	0.772	0.006	0.087	0.932	0.009	0.116	0.909
Output	0.000	0.335	0.742	0.000	1.460	0.165	0.000	1.430	0.175
Input-output ratio	-0.058	-0.436	0.669	-0.081	-1.074	0.300	0.076	0.916	0.375
Wage per unit of value added	-0.059	-0.515	0.614	-0.232	-3.284	0.005	-0.223	-2.606	0.021
Import penetration	0.001	0.992	0.337	0.001	1.052	0.310	0.001	1.035	0.318
Liberalisation dummy	0.052	3.721	0.002				0.003	0.219	0.830
Openness				0.001	8.605	0.000	0.001	5.419	0.000
R Square	0.678			0.896			0.896		
Adjusted R Square	0.570			0.861			0.851		

7.5.12 Determinants of Export Intensity of Metal Products (34) Industry

Export intensity of metal product industry is positively influenced by openness index and liberalisation dummy. The analysis results given in Table 7.37 show import penetration has favourable effects on the export intensity in both models and labour productivity measured in terms of value added per wage shows positive impact in all models. Output has positive impact on this industry.

Table 7.37
Determinants of Export Intensity of Metal Products (34) Industry

Variables	<i>Model1</i>			<i>Model 2</i>			<i>Model 3</i>		
	<i>Coeffi- cients</i>	<i>t value</i>	<i>P value</i>	<i>Coeffi- cients</i>	<i>t value</i>	<i>P value</i>	<i>Coeffi- cients</i>	<i>t value</i>	<i>P value</i>
Intercept	0.138	0.956	0.355	0.075	0.591	0.564	0.168	1.164	0.265
Output	0.000	0.351	0.731	0.002	1.097	0.291	0.002	1.116	0.285
Input-output ratio	-0.090	-0.589	0.565	-0.286	-2.582	0.022	-0.143	-0.912	0.379
Wage per unit of value added	-0.164	-1.278	0.222	-0.434	-2.191	0.046	-0.353	-1.730	0.107
Import penetration	-0.001	-1.495	0.157	-0.001	-1.716	0.108	-0.001	-1.719	0.109
Liberalisation dummy	0.067	2.454	0.028				0.043	1.265	0.228
Openness				0.002	2.396	0.031	0.001	1.181	0.259
R Square	0.799			0.796			0.819		
Adjusted R Square	0.727			0.724			0.735		

7.5.13 Determinants of Export Intensity of Machinery (35+36) Industry

Liberalisation dummy and openness has positive impact on export intensity of machinery industry . Output, input output ratio and wage per unit of value added shows positive impact on the export intensity as given in Table 7.38. Import penetration has negative impact on the export intensity of machinery industry.

Table 7.38
Determinants of Export Intensity of Machinery (35+36) Industry

Variables	Model 1			Model 2			Model 3		
	Coefficients	t value	P value	Coefficients	t value	P value	Coefficients	t value	P value
Intercept	-0.047	-0.727	0.478	-0.020	-0.319	0.754	-0.020	-0.299	0.769
Output	0.000	2.020	0.062	0.000	0.676	0.509	0.000	0.657	0.522
Input-output ratio	-0.008	-0.108	0.915	-0.029	-0.386	0.705	-0.026	-0.331	0.746
Wage per unit of value added	0.191	1.838	0.086	0.068	0.527	0.606	0.073	0.531	0.604
Import penetration	0.001	2.383	0.031	0.001	1.469	0.162	0.001	1.403	0.182
Liberalisation dummy	0.011	1.094	0.291				0.002	0.150	0.883
Openness				0.000	1.725	0.105	0.000	1.250	0.232
R Square	0.718			0.746			0.746		
Adjusted R Square	0.624			0.661			0.637		

7.5.14 Determinants of Export Intensity of Transport Equipment and Parts (37)

The export intensity is positively influenced by trade liberalisation measures in the case of transport industry. Wage per unit of value added does not shows the theoretically expected influence on the exports of transport industry in most of the model. Import penetration shows negative impact in all models. Table 7.39 shows Input output ratio has negative impact in model with liberalisation dummy and it is positive in other two models.

Table 7.39
Determinants of Export Intensity of Transport Equipment and Parts (37)

Variables	Model 1			Model 2			Model 3		
	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value
Intercept	0.057	0.411	0.687	0.067	0.509	0.618	0.080	0.628	0.540
Output	0.000	1.971	0.067	0.000	2.806	0.013	0.000	2.730	0.016
Input-output ratio	-0.017	-0.086	0.933	0.070	0.393	0.700	-0.008	-0.047	0.963
Wage per unit of value added	0.027	0.338	0.740	-0.175	-2.459	0.027	-0.086	-0.937	0.364
Import penetration	0.001	1.552	0.141	0.000	0.365	0.720	0.001	0.747	0.468
Liberalisation dummy	0.063	5.099	0.000				0.030	1.463	0.166
Openness				0.001	5.515	0.000	0.001	1.970	0.069
R Square	0.718			0.745			0.779		
Adjusted R Square	0.624			0.660			0.684		

7.5.15 Determinants of Export Intensity of Other Manufacturing Industries (38) Industry

In the case of other manufacturing industries, trade policy measured as liberalisation dummy has positive impact as given in Table 7.40. The import penetration has negative impact on the other manufacturing industries. Output also has negative impact in most of the models

Table 7.40
Determinants of Export Intensity of Other Manufacturing Industries (38)

Variables	Model 1			Model 2			Model 3		
	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value	Coeffi- cients	t value	P value
Intercept	6.220	6.725	0.000	6.877	5.725	0.000	6.878	5.376	0.000
Output	-0.014	-1.068	0.304	-0.002	-0.109	0.914	-0.002	-0.102	0.920
Input-output ratio	-8.447	-2.475	0.027	-11.110	-2.419	0.030	-11.115	-2.249	0.043
Wage per unit of value added	4.967	0.798	0.438	9.217	1.188	0.255	9.226	1.091	0.295
Import penetration	0.002	1.099	0.291	0.003	1.350	0.198	0.003	1.274	0.225
Liberalisation dummy	0.334	0.629	0.540				0.003	0.004	0.997
Openness				0.003	1.015	0.327	0.003	0.757	0.463
R Square	0.630			0.646			0.646		
Adjusted R Square	0.498			0.519			0.482		

The above analysis shows that for most of the industry liberalisation and openness index has positive impact except in the case of leather and machinery and liberalisation dummy negative in the case of wood industry and openness index negative in rubber product industry's exports. Thus trade policy positively influences export intensity of most of Indian manufacturing in all models.

The results of the analysis can be summarised as follows as given in Table 5.41. The variables are explained as follows- X_1 -output, X_2 - Input output ratio, x_3 -wage per unit of value added, X_4 - import penetration, X_5 -liberalisation dummy and X_6 -openness index.

Table 7. 41
Summary Results of Determinants of Exports of Indian Manufacturing Industries

Model 1	Positive impact	Negative impact
X_1	20-21,23+24+25, 29,27,28,30, 31,32,33,34,35+36,37,38	22, 26
X_2	20-21,33,34,35+36,23+24+25,31,37,29,28	22,38,26,22,27,30,32
X_3	22,23+24+25,26,28,27,31,32,33, 34,37	20-21,32,35+36,38,37,29,30
X_4	23+24+25,27,31,32,34,26,38,30,33	20-21,22, 29,27, 31, 33,28
X_5	20-21,23+24+25,26,27,28,30,31,32, 33,34,35+36,37,38,	22,29
X_6	-	-
Model 2		
X_1	20-21,29,28,30,31,32,33,34,35+36,23+24+25,37	22,26,27
X_2	20-21,30,33,34,37,35+36,23+24+25,29,28,31,38	22,27,32,26,23+24+25
X_3	20-21,37,22,23+24+25,26,29, 28,31,33,34,37	27,32,35+36,38, 37,30,32,38
X_4	20-21, 23+24+25,26,27,29,31,32,34,	22,28,30,33,35+36,37,38
X_5	-	-
X_6	20-21,22,23+24+25,26,29,27,28,30, 31,32,33,34,35+36,37,38	-
Model 3		
X_1	20-1,23+24+25, 26, 27,29,28,30,31,32,33,3, 35+36,37,38,	22,
X_2	20-21,30,33,34,37,38,23+24+25,29,28,31,35+36	22,32,26,27,30,32
X_3	20-21,27,38,37,33,34,22,23+24+25	23+24+25,26,28,29,30,31,32,35+36
X_4	20-21,23+24+25,26,29,27,30,31,32,34,	22,28,33,35+36,37,38
X_5	20-21,23+24,27,28,30,31,32,33,34,35+36,37,38	22,26,29
X_6	20-21,22,23+24+25,26,29,27,28,30, 31,32,33,34,35+36,37,38	

Summary table shows that openness index has positive impact on all industries. But liberalisation has negative and positive impact depending upon the industry. But in the model 1 liberalisation dummy has positive impact on all industries except beverage and tobacco (22) and leather and leather product industry (29). In model 3 with two policy variables, trade policy measured as liberalisation dummy has negative impact on the beverage and tobacco industry, leather industry, textile products and textile product industry. Import penetration also has favourable impact on most of the industries.

7.6 Granger causality Test for Indian Manufacturing Industries

Granger Causality results for the variables used in the analysis is given below. Where EX is exports, OPE is openness, IP is import penetration ratio, IO is input output ratio, WV is wages per unit of value added, Y is exports and Xs are each variable under testing.

The Granger causality result given in Table 7.42 it is summarized in Table 7.43. Table 7.43 shows that the selected variables have influence on the export intensities of majority of industries and also shows feed back effect with export intensities in majority of industries. Only a few industries shows no causality between selected variables and export intensities. Exports and openness has feed back effect in most of the industries.

Table 7.42
Granger Causality Test of Export Intensities of Indian Manufacturing Industries

Null Hypothesis:	F-Statistic (Probability)														
	20-21	22	23	26	27	28	29	30	31	32	33	34	35+36	37	38
IO does not Granger Cause EX	0.025 (0.976)	1.633 (0.230)	0.217 (0.808)	0.382 (0.689)	0.592 (0.566)	5.109 (0.022)	1.012 (0.388)	0.550 (0.589)	2.975 (0.084)	10.792 (0.001)	6.167 (0.012)	0.631 (0.546)	0.226 (0.800)	0.120 (0.888)	0.504 (0.615)
EX does not Granger Cause IO	0.789 (0.474)	2.108 (0.158)	0.025 (0.975)	0.215 (0.809)	0.037 (0.964)	0.374 (0.694)	5.344 (0.019)	5.393 (0.018)	2.437 (0.124)	0.677 (0.524)	3.446 (0.061)	0.934 (0.416)	3.518 (0.058)	1.743 (0.211)	0.587 (0.569)
IP does not Granger Cause EX	2.452 (0.122)	0.765 (0.352)	0.774 (0.480)	1.249 (0.317)	0.146 (0.865)	0.594 (0.565)	1.434 (0.271)	0.482 (0.627)	0.518 (0.606)	0.633 (0.546)	0.093 (0.912)	0.216 (0.808)	0.234 (0.794)	0.246 (0.785)	1.123 (0.353)
EX does not Granger Cause IP	2.063 (0.164)	0.862 (0.002)	4.123 (0.039)	0.903 (0.428)	1.802 (0.201)	0.987 (0.397)	0.537 (0.596)	1.494 (0.258)	1.175 (0.338)	0.364 (0.701)	0.004 (0.996)	2.597 (0.110)	0.088 (0.917)	1.087 (0.364)	0.277 (0.762)
OPE does not Granger Cause EX	5.818 (0.014)	2.788 (0.096)	8.452 (0.004)	2.701 (0.102)	0.158 (0.855)	2.958 (0.087)	1.688 (0.223)	1.371 (0.288)	3.411 (0.062)	0.953 (0.409)	7.960 (0.005)	1.744 (0.213)	15.069 (0.000)	0.799 (0.469)	5.216 (0.020)
EX does not Granger Cause OPE	0.679 (0.523)	0.039 (0.962)	3.386 (0.063)	0.997 (0.394)	0.265 (0.771)	1.238 (0.322)	1.126 (0.354)	1.364 (0.290)	*0.442 (0.652)	1.080 (0.366)	4.436 (0.032)	1.322 (0.300)	0.902 (0.428)	2.433 (0.124)	1.386 (0.282)
OUT does not Granger Cause EX	3.035 (0.080)	4.075 (0.040)	8.762 (0.003)	6.205 (0.012)	0.188 (0.831)	0.719 (0.505)	4.031 (0.041)	5.732 (0.015)	2.669 (0.104)	0.129 (0.880)	6.471 (0.010)	4.190 (0.037)	1.797 (0.202)	1.907 (0.185)	1.823 (0.198)
EX does not Granger Cause OUT	0.865 (0.442)	2.692 (0.103)	6.331 (0.011)	0.983 (0.399)	1.776 (0.205)	7.535 (0.006)	3.089 (0.077)	3.447 (0.061)	0.478 (0.630)	0.241 (0.789)	0.960 (0.407)	0.970 (0.403)	4.319 (0.035)	1.508 (0.255)	0.227 (0.800)
WV does not Granger Cause EX	3.298 (0.067)	2.102 (0.159)	3.534 (0.057)	7.794 (0.005)	5.071 (0.022)	5.922 (0.014)	7.791 (0.005)	2.614 (0.109)	2.272 (0.140)	10.934 (0.001)	2.425 (0.125)	7.175 (0.007)	15.800 (0.000)	3.973 (0.043)	1.318 (0.301)
EX does not Granger Cause WV	1.539 (0.249)	0.399 (0.679)	0.894 (0.431)	0.462 (0.640)	0.201 (0.820)	1.418 (0.275)	1.865 (0.191)	3.192 (0.072)	0.012 (0.988)	1.417 (0.275)	0.941 (0.413)	0.162 (0.852)	1.537 (0.249)	0.158 (0.855)	4.367 (0.035)

Table 7.43
Summary Results of Granger Causality Test of Export Intensities of Indian Manufacturing Industries

Variables	Feedback ($Y \Leftrightarrow X_s$)	$X_s \Rightarrow Y$	$Y \Rightarrow X_s$
Input output ratio	22,29,30,31,33,34	28,32	35+36,37
Import penetration ratio	20-21,30,31,34	27	22,26,28,29,35,38
Openness	20-21,23,26,28,29,30,33,34,35+36,37	22,27,31	32,38
Output	22,23,35,37	20-21,29,30,31,33,34,38	25,28,26,27
Wage per unit of value added	20-21,28,29,30,35,38,32	22,23,25,26,27,33,34,37	

Conclusion

The industry level analysis shows that null hypotheses of no significant impact of trade liberalisation is rejected in most of the analysis. The industry level export performance shows that during the post reform period the export performance of majority of industries increased. The impact assessed using the regression model also concludes that the trade policy measures used in the present analysis is found to be favourable for majority of industries.

Impact of Trade Liberalisation on India's Exports

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Chapter VIII

***Trade Liberalisation and Determinants of Firm
Level Exports***

- 8.1 Factors Determining Firm Level Exports
- 8.5 Empirical Models and Results
- 8.3 Determinants of Firm Level Exports in the Pre and Post
Reform Period
- 8.4 Impact of Trade Liberalisation on Firm Level Exports

Introduction

Empirical studies on the determinants of international trade have mainly been carried out across industries and countries. Most of the trade theories also explain the export performance of each industry or product and little attention was given to the individual firm within the industry. The neo classical theory of international trade also rules out investigation of export performance at the firm level like the classical theory. The existing studies on the firm level concluded that the theoretical determinants of comparative advantage, which are traditionally recognised at the industry level, could also operate at the firm level. Firms within the same industry can be expected to have different access to factor markets, different rates of skill creation, different information about final markets and different entrepreneurial and organisational capabilities. There are country specific factors and industry specific advantages, which also determine the export behavior of the firms. But some advantage will be firm specific, since certain managerial, organisational, marketing and other skills will be peculiar to each enterprise and thereby the production methods, technologies and know-how will be different from firm to firm. Only recently, with the greater availability of firm level data, attempts have been made to address the issues like the determinants, better export performance of some firms than others, etc. In this chapter an analysis of the impact of trade policy on the export performance of firms is made.

In order to analyse the impact of trade reforms on export behaviour of the firms seven major industries with highest export intensity are selected. The selected industries are Food, Textiles, Chemicals, Machinery, Transport, Non Metallic Mineral products and Metal. The period of analysis is from 1989 to 2002. The firm level data is collected from the PROWESS database provided by CMIE, which provide firm level data from 1989 onwards. Thus the period of analysis is from 1989 to 2002.

The number and the export intensity of firm in each industry used for the analysis are given below.

The total number of firms in each industry for the analysis from 1989-2002 is given in Table 8.1. The number of firms are highest in chemical industry (9690) followed by machinery (7457) and lowest in transport industry (2309)

Table 8.1
Number of Firms selected in Each Industry

Industry	No. of firms
Food	5003
Textiles	5799
Chemicals	9690
Non Metallic Mineral products	2360
Metal products	4144
Machinery	7457
Transport	2309

The mean and standard deviation of export intensity is highest in non - metallic mineral products industry. The average export intensity and standard deviation of textile industry are also high compared to other industries. The mean export intensity is lowest in transport industry (5.86) as given in Table 8.2.

Table 8.2
Mean and Standard Deviation of Exports Intensity of Firms in Industries

Industry	Mean	Standard Deviation
Food	10.32	24.90
Textiles	18.34	29.04
Non metallic mineral products	18.99	35.07
Metal	7.13	16.44
Machine	6.53	16.30
Transport	5.86	12.48
Chemical	9.20	19.34

8.1 Factors Determining Firm Level Exports

Following the theoretical and empirical literature on the determinants of export activity at firm level, it is concluded that export activity of Indian manufacturing firms may depend upon three sets of factors. The first one is the firm specific factors like age, size, enterprise level, technological efforts, product

differentiation activities, raw material imports, productivity, profitability, outward investment and foreign affiliation. Policy factors are the second type and are classified as those affecting the export performance directly and indirectly. Those directly affecting firm level exports behaviour are like fiscal benefit where exporting companies can claim duty drawback or cash compensatory support or benefit under the international price reimbursement scheme. Policy factors which indirectly affecting firms export behaviour are policies relating to FDI, imports and other regulatory system. Sector specific factors are the third factor that determines the exports of the firms. The details of each factor used for the present analysis is given below.

Firm size: Theoretically the relationship between export performance and firm size is positive. The firm size is argued to be a proxy for resource base, risk perception and economies of scale. They are decisive in determining the export performance of a firm. The smaller firms are characterised by resource constraints and they may be more risk averse and scale inefficient. The larger firms on the contrary reflect success in achieving scale economies, higher profitability, have preferential access to credit and hence more ability to withstand uncertainty associated with global markets. However the existing literature has mixed findings on the relationship between firm size and export behaviour. Some studies find a positive relationship between firm size and export intensity whereas some others report an insignificant and also a non-linear relationship. The present study used total sale as a proxy for size. The non linear form (second degree) of sale is also used for analysis for testing the proposition that after a stage there is negative relationship between size and export intensity.

Technological efforts: Technology is postulated to explain inter firm variations in export behaviour as it can significantly determine both price and non price competitiveness. Technological changes can cause both higher

productivity of the firm and better quality of products. In a broader sense technical capability of a firm includes its ability to operate, absorb and create technological knowledge encompassing entrepreneurial, managerial and technical components. However, in developing countries firms have little technological capability in the sense of technology creation and are heavily depended on the import of technology from abroad. The firms own technological efforts to adapt or innovate, measured as the total R&D expenditure as a percentage of sale and technology related payments abroad as a percentage of sales as a proxy for the firm's propensity to import disembodied technology from abroad are used in the present analysis to examine the impact of technology.

Multi National Enterprise (MNE) affiliation: Affiliation with foreign MNE's may enable a firm in accessing and succeeding in the global market. Before a firm decides to enter into exporting it has to collect and analyse information on various aspects of foreign markets such as consumer preference, regulation, distribution channels and other market characteristics. For a purely domestic firm this collection of information on new market involve considerable financial and other cost as compared to firms with foreign ownership. With the liberalisation efforts the role of MNE affiliation has increased in the country. Thus the impact is measured using the foreign promoter share in a particular firm. It is expected that there is a positive relationship between foreign ownership and exports.

Product differentiation: The product differentiation strategy of a firm in the form of innovative design, brand name etc. is more likely to bring more export market than a firm which is not making product differentiation. Also firms incurring large advertising and other sales promotion costs to differentiate their product from others are theoretically better placed on the export front. In this

analysis total marketing expenses is used for measuring the product differentiation. Advertisement expenditure is used for measuring the impact of advertisement intensity on the export of the firm.

Raw material import: Importing of raw material from abroad by the firm can have positive impact on export behaviour. There are two important reasons for this. Firstly, the imported raw materials are qualitatively better or are more competitive than the local alternatives and this will enhance the productivity of the importing firms. Secondly, the foreign supplier may pass on important information regarding foreign markets, including technical information and thus can serve as a channel for market access. Raw material import by the firm is used in this analysis.

Profitability: Profitability can also be an important determinant of export behaviour at the firm level. It can serve as an indicator of overall efficiency. Moreover profitable firms are better placed as compared to unprofitable firms in terms of resources to withstand the risks attached with export activities. Thus profitability is also included as one of the variables.

Policy specific factors: There has been a radical shift in the policy regime governing trade, industry and technology with the initiation of economic reforms in India in 1991. Various direct and indirect trade promotion measures like tax benefits, simplifying export credit scheme and issue of green card for exporters, setting up of special economic zone, duty exemption scheme, phasing out of quantitative restrictions etc. are implemented. These policy measures will also have affected the export performance of the firms. Though various trade policy measures are used to assess the impact of trade reform, liberalisation dummy is used in the present analysis to capture the impact of trade reform on Indian firms. The impact of other economic reforms measures that can indirectly affect export

activities has been represented by a dummy variable taking value zero for pre-reform and unity for post reform period in this analysis.

Sector specific factors: The industries differ vastly in terms of the organisational structure, policy environment, technological characteristics and historical developments. Thus it is expected that industry specific factors are significant. To take account of these differences industry -specific effects are also taken for the analysis. This is also measured by using the dummy variable for each industry.

8.2 Empirical Models and Results

The export behaviour of a firm generally involves two important decisions whether to export or not and if the decision is to export, then how much to export. Hence depending upon these decisions there are two groups of firms in a particular industry. One group, which participates in exporting and another, which does not. In this context export intensity takes the value zero for the firms which is not exporting and takes the actual export value for the former group of firms. In such a case where the value of dependent variable is not observed for a large proportion of cases, the most appropriate choice is the Tobit model. The general form and explanation of Tobit model is given in Chapter III.. In order to examine export intensity of firm in the present analysis Tobit model is used. The firm level analysis is divided into two sections. The first section examines the determinants of export intensity during the pre and post reform period and the second section the impact of trade policy on the export behaviour of the firms. For both sections Tobit model is used. The Tobit model is specified as follows.

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \epsilon t, \text{ if } \beta x_{it} + \epsilon t > 0 \\ = 0 \quad \text{if } \beta x_{it} + \epsilon t \leq 0$$

Y - exports as a percentage of sale

X₁- Advertising expenditure as a percentage of sale

- X₂ - Import of raw material goods as percentage of sale
- X₃. Technical and professional fees remitted abroad as a percentage of sales
- X₄- marketing expenses to sale
- X₅ – Profit before tax as percentage of sale
- X₆ – Royalty know how expenses as percentage of sale
- X₇ - Total sale
- X₈. Non linear form of sale (sales²)
- X₉- Total R&D expenditure as percentage of sale

8.3 Determinants of Firm Level Exports in the Pre and Post Reform Periods

In order to examine whether the factors that determine the export behaviour has changed during the reform period analyses are made for the pre and post reform periods separately. Pre liberalisation period is from 1989-91. Post reform period analysis is done with reference to the period 1992-97, 1998-2002 and 1992-2002. The result of the analysis of firms in each industry is given below.

Table 8.3 shows that export intensity of all industries shows an increasing trend in the post reform period compared to pre reform period. The mean export intensity of food industry increased from 5 per cent in 1989-1991 to 12 per cent in 1992-97, but it declined to 10 per cent in 1998-2002. Sale, advertisement expenditure, R&D expenditure, import of raw material and foreign promoter share show an increasing trend in post reform period compared to pre reform period. But for some of the firms royalty expenditure, profitability and technical and professional fees paid abroad have decreased in 1998-2002 period compared to the earlier periods of 1989-1991 and 1992-97. The foreign promoter share increased in the post reform period and it shows an increasing trend for the period 1998-2002 for most of the firm.

Table 8.3
Mean Values of Factors Determining Firm level Exports

Year/ Industry	Export intensity	Sale	Royalty know how	Advertisement intensity	Market cost	R&D	Profit margin	Raw material import	Foreign promoter share	Professional and technical fees paid abroad
Food industry										
1989-91	0.05	64.81	0.002	0.007	0.015	0.000	0.13	0.00	0.00	0.00
1992-97	0.12	73.36	0.003	0.008	0.015	0.000	0.09	0.11	0.00	0.00
1998-02	0.10	99.92	0.007	0.006	0.017	0.001	-0.34	0.00	0.00	0.00
Textile industry										
1989-91	0.09	51.12	0.000	0.003	0.015	0.000	-0.09	0.03	0.00	0.00
1992-97	0.18	63.96	0.000	0.004	0.015	0.001	0.07	0.29	0.00	0.10
1998-02	0.21	84.56	0.001	0.005	0.0161	0.001	-0.58	0.08	0.19	0.00
Chemical industry										
1989-91	0.04	93.44	0.001	0.007	0.021	0.000	0.12	0.01	0.00	0.00
1992-97	0.08	85.82	0.001	0.007	0.020	0.003	0.14	0.36	0.00	0.01
1998-02	0.11	98.64	0.001	0.008	0.023	0.007	0.30	0.06	0.82	0.00
Non metallic mineral products										
1989-91	0.06	72.22	0.002	0.004	0.014	0.000	0.15	0.03	0.00	0.00
1992-97	0.20	77.49	0.002	0.005	0.016	0.001	0.18	0.54	0.00	0.01
1998-02	0.21	87.62	0.003	0.005	0.018	0.001	-0.26	0.01	0.68	0.00
Metal industry										
1989-91	0.03	46.06	0.001	0.002	0.008	0.000	0.10	0.01	0.00	0.00
1992-97	0.07	54.77	0.001	0.002	0.007	0.002	0.04	2.55	0.00	0.21
1998-02	0.09	89.88	0.001	0.002	0.008	0.000	-0.37	0.02	0.40	0.00
Machine industry										
1989-91	0.05	82.90	0.004	0.005	0.018	0.000	0.11	0.05	0.00	0.00
1992-97	0.06	88.18	0.004	0.010	0.016	0.006	0.05	0.18	0.00	0.05
1998-02	0.07	96.53	0.003	0.021	0.018	0.013	-0.10	0.03	1.12	0.01
Transport										
1989-91	0.03	52.07	0.004	0.004	0.012	0.000	0.04	0.01	0.00	0.00
1992-97	0.06	77.99	0.003	0.003	0.013	0.002	-0.14	0.11	0.00	0.00
1998-02	0.07	84.40	0.003	0.014	0.016	0.004	-0.34	2.73	1.03	0.01

8.3.1 Determinants of Export Performance of Firms in Food Industry

The mean export performance of food industry shows that it increased up to 1997. The export intensity is highest in 1996 i.e. it reached to 14 per cent in 1996 from 4 per cent in 1989. The lowest intensity is shown in 1999. The export performance increased after 1991 as given in Table.8.4. The inter firm variation was high during 1992 but it does not show any significant variation till 2000. The number of firms increased over the years and the number of non exporting firms

are greater than exporting firms as given in Table 8.5. Figure 8.1 also shows that the export intensity increased over the years since 1989.

Figure 8.1
Mean Exports Intensity of Firms in Food Industry

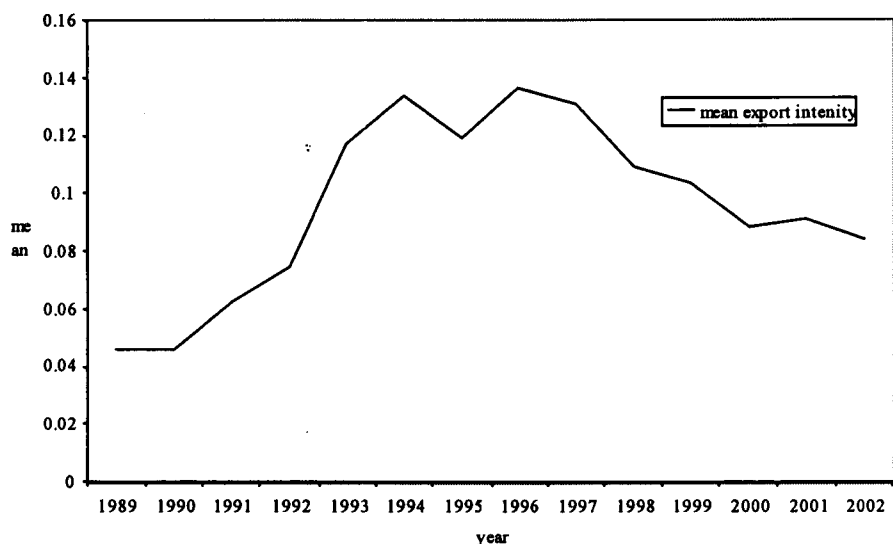


Table 8.4
Mean and Standard Deviation of Export Intensity of Firms in Food Industry

Year	Mean	Std. Dev	Year	Mean	Std. Dev
1989	0.04608	0.12286	1996	0.13652	0.27308
1990	0.04612	0.11065	1997	0.13096	0.26319
1991	0.06300	0.15503	1998	0.10913	0.23843
1992	0.07429	0.71652	1999	0.03960	0.24200
1993	0.11689	0.24587	2000	0.08840	0.22272
1994	0.13346	0.26940	2001	0.09132	0.34320
1995	0.11879	0.25766	2002	0.08379	0.20697

In the case of food industry advertisement intensity shows negative impact on exports in the three sub periods and also during whole liberalisation period. The import of raw materials have positive impact during the pre and post liberalisation periods except for the period 1992-97. Technical and professional fees paid abroad shows negative impact during the pre reform period and 1998-2002 period. Profitability has negative impact during the pre and immediate period after the introduction of liberalisation. The results are given in Table 8.5

Table 8.5
Pre and Post Reform Period Determinants of Export Intensity of Firms in Food Industry

Variables	1989-1991			1992-1997			1998-2002			1992-2002		
	Coefficient (Std. Error)	z- Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.
X ₁	-1.278129 (0.833966)	-1.533	0.125	-1.053610 (0.522162)	-2.018	0.044	-0.465545 (0.620185)	-0.751	0.453	-0.056746 (0.280132)	-0.203	0.840
X ₂	3.032185 (0.749028)	4.048	0.000	-0.007501 (0.008873)	-0.845	0.398	0.623000 (0.321994)	1.935	0.053	0.002045 (0.004935)	0.414	0.679
X ₃	-14.14039 (5.333623)	-2.651	0.008	0.894539 (0.683604)	1.309	0.191	0.194087 (0.357720)	0.543	0.587	0.030922 (0.122671)	0.252	0.801
X ₄	0.338852 0.356158	0.951	0.341	0.364180 (0.361064)	-1.009	0.313	1.023984 (0.383296)	2.672	0.008	1.182216 (0.226512)	5.219	0.000
X ₅	-0.090213 (0.070688)	-1.276	0.202	-0.012714 (0.013660)	-0.931	0.352	0.022479 (0.006810)	3.301	0.001	0.000582 (0.002162)	0.269	0.788
X ₆	-23.73539 (7.413417)	-3.202	0.001	-5.262198 (1.461231)	-3.601	0.000	-3.097270 (0.826126)	-3.749	0.000	-0.053504 (0.202342)	-0.264	0.792
X ₇	0.000128 (0.000136)	0.945	0.345	2.32E-05 (0.000103)	0.226	0.821	4.09E-05 (7.85E-05)	0.521	0.602	9.57E-05 (4.54E-05)	-2.109	0.035
X ₈	-3.79E-08 (7.61E-08)	-0.497	0.619	-5.43E-09 (2.86E-08)	0.190	0.849	-3.74E-09 (1.14E-08)	-0.327	0.744	-1.39E-08 (6.54E-09)	2.129	0.033
X ₉	14.70142 (13.35694)	1.101	0.271	-10.64421 (5.864690)	-1.815	0.070	-3.133654 (2.481075)	-1.263	0.207	0.718234 (1.481487)	0.485	0.628
Log likelihood		-137.6603			-879.3967			-935.0225			-3042.756	
Mean export intensity		0.052757			0.092099			0.098329			0.108318	
Akaike info criterion		0.643400			1.185862			1.260030			1.343643	
Schwarz criterion		0.733358			1.221284			1.295451			1.357775	
Censored observation		265			899			968			2737	
Uncensored		194			601			532			1807	
Total		459			1500			1500			4544	

Total royalty expense shows negative impact throughout the period of study. Sale and its non linear form show positive and negative impact respectively in three sub periods and liberalisation period as a whole. Total R&D expenditure shows negative impact during the two sub periods of liberalisation, but it shows positive impact during the liberalisation period as a whole. Thus in the case of firms in food industry all the variables have positive impact on the export intensity except advertisement intensity and royalty expenditure in the post reform period. Product differentiation factor and technical fees paid abroad also influenced export intensity negatively during the pre reform period in

addition to advertisement intensity and royalty expenditure. During the first period of post reform, i.e., during 1992-97, import of raw material and profit margin have negative influence but these variables show positive impact during the second period.

8.3.2 Determinants of Export Performance of Firms in Chemical Industry

The mean export intensity of chemical industry shows a continuous increase since 1989 to 2002. The performance is better during the liberalisation period as shown in Table 8.6. Figure 8.2 shows the increasing trend in export intensity. The number of exporting firms are greater than non exporting firms and it shows an increase in the number of firms since 1989 as clear from Table 8.7.

Figure 8.2
Mean Export Intensity of Firms in Chemical Industry

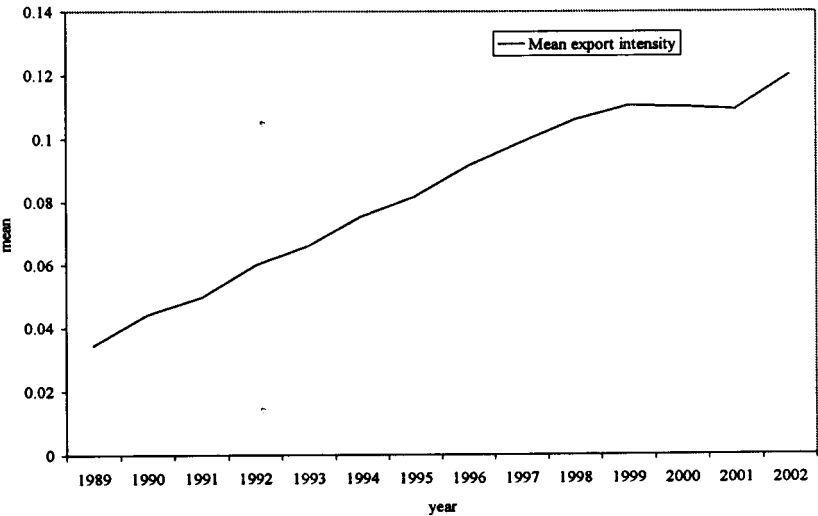


Table 8.6
Mean and Standard Deviation of Export Intensity of Firms in
Chemical Industry

Year	Mean	Std. Dev	Year	Mean	Std. Dev
1989	0.034	0.090	1996	0.092	0.188
1990	0.044	0.948	1997	0.099	0.192
1991	0.060	0.123	1998	0.106	0.200
1992	0.060	0.123	1999	0.110	0.225
1993	0.066	0.145	2000	0.110	0.259
1994	0.076	0.172	2001	0.109	0.203
1995	0.082	0.178	2002	0.120	0.220

In the case of chemical industry advertisement expenditure has positive impact in the three sub periods except the period 1992-97 as given in Table 8.7. Import of raw material goods shows negative impact during the post liberalisation period and it has positive impact during 1989-1991 periods, i.e., in pre reform period. Technical and professional fees paid abroad show negative impact on the export intensity of chemical industry in the three sub periods of study and positive impact in the post reform period as a whole. Marketing intensity shows positive and significant impact in all periods and profitability has negative impact except 1998-2002 periods. Total R&D expenditure shows positive impact during the pre and post liberalisation period. The result for the post liberalisation period as a whole gives that only import of raw material goods, profitability and sale has negative impact on export intensity of chemical industry.

Table 8.7
Pre and Post Reform Period Determinants of Export Intensity of Firms in Chemical Industry

Variables	1989-1991			1992-1997			1998-2002			1992-2002		
	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.
X ₁	0.208424 (0.289845)	0.719	0.472	-0.478495 (0.305698)	-1.565	0.118	0.197089 (0.352265)	0.559	0.576	0.377748 (0.16916)	2.234	0.026
X ₂	0.033495 (0.065079)	0.515	0.607	-0.001876 (0.003183)	-0.589	0.556	-0.266716 (0.084444)	-3.158	0.002	-0.000339 (0.00614)	-0.553	0.580
X ₃	-0.677239 (0.520169)	-0.302	0.193	-0.738862 (0.332250)	-2.224	0.026	-0.102845 (1.185652)	-0.087	0.931	0.007413 (0.02709)	0.300	0.764
X ₄	0.456710 (0.127361)	3.586	0.000	0.202458 (0.165108)	1.226	0.220	0.661285 (0.200431)	3.299	0.001	0.884623 (0.08862)	9.982	0.000
X ₅	-0.062159 (0.023728)	-2.620	0.009	-0.059069 (0.02660)	-2.497	0.013	0.026326 (0.007306)	3.603	0.000	-0.001428 0.000640	-2.232	0.026
X ₆	-0.554091 (1.225708)	-0.452	0.651	-1.710102 (1.15376)	-1.482	0.138	2.303841 (0.871773)	2.643	0.008	1.245872 (0.470827)	2.646	0.008
X ₇	1.82E-05 (1.27E-05)	1.430	0.153	-6.87E-06 (1.76E-05)	-0.391	0.696	-6.13E-06 (1.02E-05)	-0.600	0.548	-4.17E-06 (3.01E-06)	-1.384	0.166
X ₈	-1.18E-09 (7.81E-10)	-1.511	0.131	4.10E-10 (8.42E-10)	0.487	0.626	9.07E-11 (1.71E-10)	0.530	0.596	4.17E-11 (3.33E-11)	1.254	0.210
X ₉	4.467151 (2.486901)	1.796	0.073	1.676061 (0.58865)	2.847	0.004	0.059612 (0.038527)	1.547	0.122	0.083446 (0.036032)	2.316	0.021
Log likelihood	6.528399			-668.3261			-970.5183			-3771.606		
Mean export intensity	0.087348			0.169333			0.210354			0.194597		
Akaike info criterion	0.007225			0.678326			0.980518			0.866447		
Schwarz criterion	0.057880			0.706331			1.008523			0.874551		
Censored observations	420			962			919			3778		
Uncensored observation	541			1038			1081			4951		
Total observation	961			2000			2000			8729		

8.3.3 Determinants of Export Performance of Firms in Textile Industry

The mean export intensity of textile industry increased at an increasing rate during post liberalisation period. The export intensity increased from 6 per cent in 1989 to 22 per cent in 1999, though the intensity declined during the latter years of liberalisation. The inter firm variation of export intensity is highest in 1999 as standard deviation is highest in this period. The increase in export intensity is clear from Table 8.8 and Figure 8.3.

Figure 8.3
Mean Export Intensity of Firms in Textile Industry

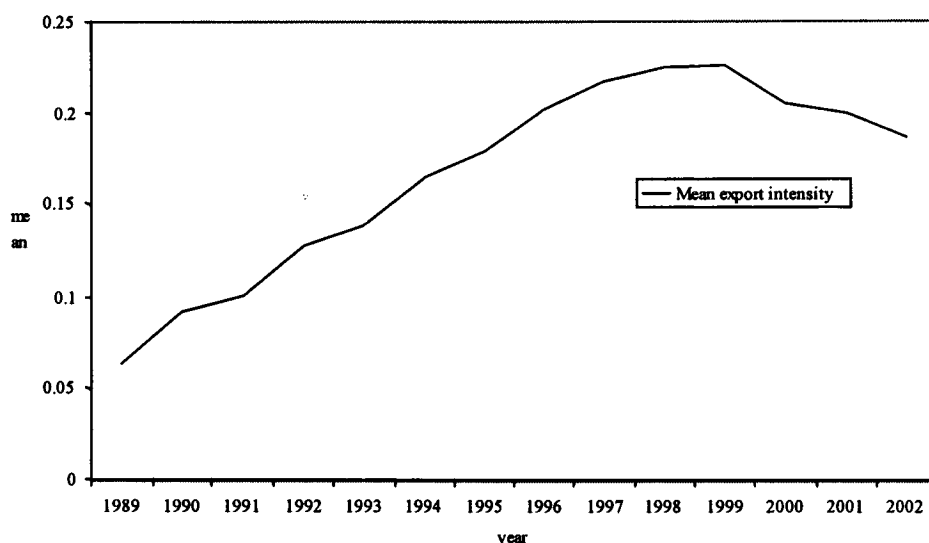


Table 8.8

Mean and Standard Deviation of Exports Intensity of Firms in Textile Industry

Year	Mean	Std. Dev	Year	Mean	Std. Dev
1989	0.063	0.173	1996	0.202	0.308
1990	0.092	0.233	1997	0.218	0.308
1991	0.101	0.207	1998	0.225	0.303
1992	0.128	0.238	1999	0.225	0.322
1993	0.138	0.265	2000	0.205	0.304
1994	0.165	0.285	2001	0.200	0.292
1995	0.180	0.291	2002	0.187	0.283

In the case of textile industry marketing cost, profitability and R&D intensity has positive impact on the export intensity in all periods and significant impact during the post reform period. Table 8.9 shows advertisement expenditure has negative impact in all periods in textile industry. The analysis for the period 1992-2002 as a whole shows that advertisement intensity and technical and professional fees paid abroad only has negative influence on the export. In the pre reform period advertisement intensity and total royalty expenditure have negative impact on the export intensity. During the first period of reform all other determining variables have positive impact except advertisement expenditure and royalty expenditure, but during the second period import of raw material goods

also influenced negatively in addition to the advertisement and technical and professional fees paid abroad. These three variables (advertisement intensity, import of raw material and professional and technical fees paid abroad) have negatively influenced the export intensity of textile industry during the post reform period. The advertisement intensity only shows negative impact for the whole period. The growth rate of this variable also shows a decreasing trend since 1989.

Table 8.9
Pre and Post Reform Period Determinants of Export Intensity of Firms in Textile Industry

Variables	1989-1991			1992-997			1998-2002			1992-2002		
	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.
X ₁	-2.244679 (1.410610)	-1.591	0.112	-1.505241 (0.813617)	-1.850	0.064	-5.559268 (0.949540)	-5.855	0.000	-3.521951 (0.500175)	-7.041	0.000
X ₂	0.096516 (0.035117)			0.008517 (0.002473)			-0.005080 (0.006735)			0.004078 (0.001882)		
X ₃	22.30937 (15.80039)	2.748	0.006	-0.056134 (0.064508)	3.444	0.001	-2.669932 (2.598868)	-0.754	0.451	-0.031217 (0.039118)	2.167	0.030
X ₄	1.803839 (0.814425)			3.623236 (0.467115)			4.358723 (0.490997)			4.262284 (0.283868)		
X ₅	0.113836 (0.044086)	1.412	0.158	0.016448 (0.010332)	-0.870	0.384	0.164213 (0.026735)	-1.027	0.304	0.053370 (0.007968)	-0.798	0.425
X ₆	-0.390318 (3.202480)			-1.663445 (2.582007)			4.148805 (3.722909)			0.173777 (1.5599760)		
X ₇	0.000919 (0.000370)	2.215	0.027	0.000293 (0.000181)	7.757	0.000	0.000456 (0.000130)	8.877	0.000	0.000407 (7.02E-05)	15.015	0.000
X ₈	-2.28E-06 (1.11E-06)			-3.50E-07 (3.54E-07)			-3.19E-07 (1.16E-07)			-2.80E-07 (6.71E-08)		
X ₉	11.72556 (40.04374)	2.582	0.010	0.345531 (1.037598)	1.592	0.111	6.172123 (2.874790)	6.142	0.000	-0.020882 (0.585714)	6.698	0.000
Sum squared residuals		25.06409			160.7346			180.0289			447.1292	
Log likelihood		-248.7828			-1152.247			-1263.429			-3132.808	
Mean export intensity		0.043539			0.070020			0.105490			0.097331	
Akaike info criterion		0.851259			1.162828			1.274066			1.210635	
Schwarz criterion		0.923795			1.190844			1.302082			1.223260	
Censored observation			273			754			819			1981
Uncensored			335			1245			1180			3211
Total			608			1999			1999			5192

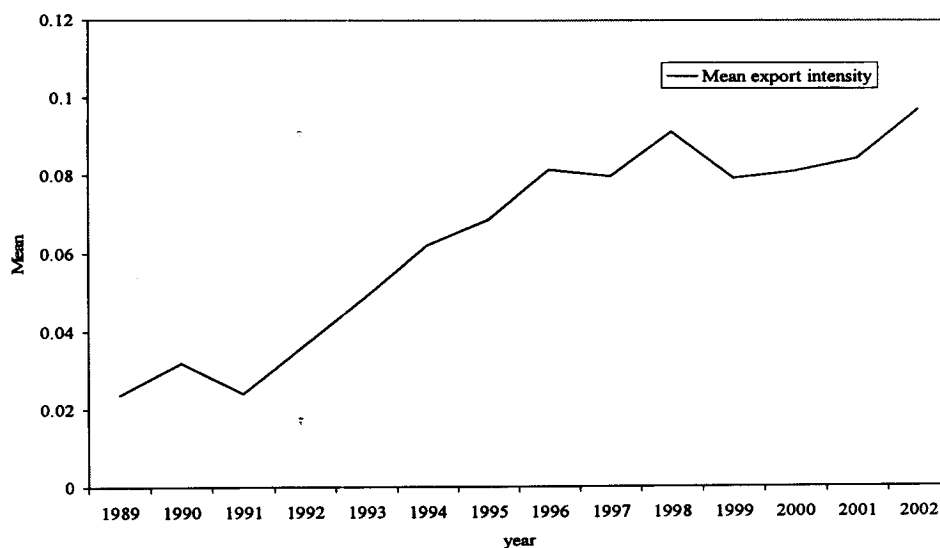
8.3.4 Determinants of Export Performance of Firms in Metal Industry

The mean export intensity of metal industry also shows an increasing trend since 1989. It increased from 2.4 per cent in 1989 to 9 per cent in 2002. Exporting firms are lesser in number than non exporting firms in metal industry. The results given in Table 8.10 show that the highest export intensity is in 2002. Export intensity shows a decline in 1999 but thereafter it increases. Figure 8.4 shows that export intensity of metal industry have increased over the years except for few years.

Table 8.10
Mean and standard Deviation of Export Intensity of Firms in Metal Industry

Year	Mean	Std. Dev	Year	Mean	Std. Dev
1989	0.024	0.066	1996	0.081	0.187
1990	0.032	0.082	1997	0.080	0.204
1991	0.024	0.068	1998	0.091	0.194
1992	0.037	0.099	1999	0.079	0.170
1993	0.049	0.122	2000	0.081	0.168
1994	0.062	0.148	2001	0.084	0.167
1995	0.069	0.162	2002	0.097	0.184

Figure 8.4
Mean Export Intensity of Firms in Metal Industry



Advertisement intensity, import of raw material goods, technical and professional fees paid abroad and profitability have negative impact on the export intensity of metal industry during post reform periods (Table 8.11). But during the pre reform period the variables positively affecting the export intensity are advertisement intensity, technical and professional fees paid abroad and total sale of the firm. Import of raw material has negative relation in the pre reform period but it shows positive impact in 1992-97 and post reform period as a whole. Import of raw materials, profitability and sale have positive and significant impact in post reform period.

Table 8.11
Pre and Post Reform Period Determinants of Export Intensity of Firms in Metal Industry

Variables	1989-1991			1992-1997			1998-2002			1992-2002		
	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.
X ₁	1.365382 (0.723682)	1.887	0.059	-0.195121 (0.674279)	-0.289	0.772	-0.831584 (1.074177)	-0.774	0.439	-0.384443 (0.607132)	-0.633	0.527
X ₂	-0.097674 (0.086770)			-0.024643 (0.022394)			0.032891 (0.018305)			-0.005260 (0.005741)		
X ₃	1.416396 (0.828521)	-1.126	0.260	-0.827956 (0.759758)	-1.100	0.271	-0.657272 (0.969633)	1.797	0.072	-0.520450 (0.484894)	-0.916	0.360
X ₄	-0.745133 (0.475684)			0.547762 (0.465166)			1.033618 (0.380499)			0.909279 (0.292512)		
X ₅	-0.002275 (0.0161140)	1.710	0.087	0.009768 (0.008998)	-1.090	0.276	0.051774 (0.012544)	-0.678	0.498	0.030843 (0.007914)	-1.073	0.283
X ₆	-0.004282 (1.273975)			-1.070980 (1.372143)			-1.056067 (1.666212)			-1.119544 (1.043037)		
X ₇	4.85E-05 (3.00E-05)	-1.566	0.117	5.31E-05 (2.12E-05)	1.178	0.239	5.20E-05 (1.62E-05)	2.716	0.007	5.40E-05 (1.26E-05)	3.109	0.002
X ₈	-5.52E-09 (3.86E-09)			-3.54E-09 (1.63E-09)			-3.18E-09 (1.11E-09)			-3.36E-09 (9.05E-10)		
X ₉	-7.713020 (8.436318)	-0.141	0.888	0.380459 (1.090438)	1.086	0.278	11.08286 (3.410022)	4.127	0.000	1.288449 (1.009939)	3.897	0.000
Log likelihood	-50.40105			-718.7224			-741.2575			-1473.563		
Mean export intensity	0.026449			0.066299			0.086387			0.076446		
Akaike info criterion	0.282248			0.792520			0.800487			0.798473		
Schwarz criterion	0.377087			0.822520			0.829989			0.815213		
Censored observation	257			969			943			1912		
Uncensored	171			870			934			1804		
Total	428			1839			1877			3716		

8.3.5 Determinants of Export Performance of Firms in Machine Industry

The mean export intensity of machinery industry also shows an increasing trend since 1989. It increased from 3.7 per cent in 1989 to 18.8 per cent in 2002 as shown in Table 8.12. The export intensity of machine industry reached highest level in 2001. The standard deviation of export intensity is highest during 1999 and lowest in 2002. Figure 8.5 also shows that the export intensity of machinery industry has increased over the years.

Figure 8.5
Mean Export Intensity of Machinery Industry

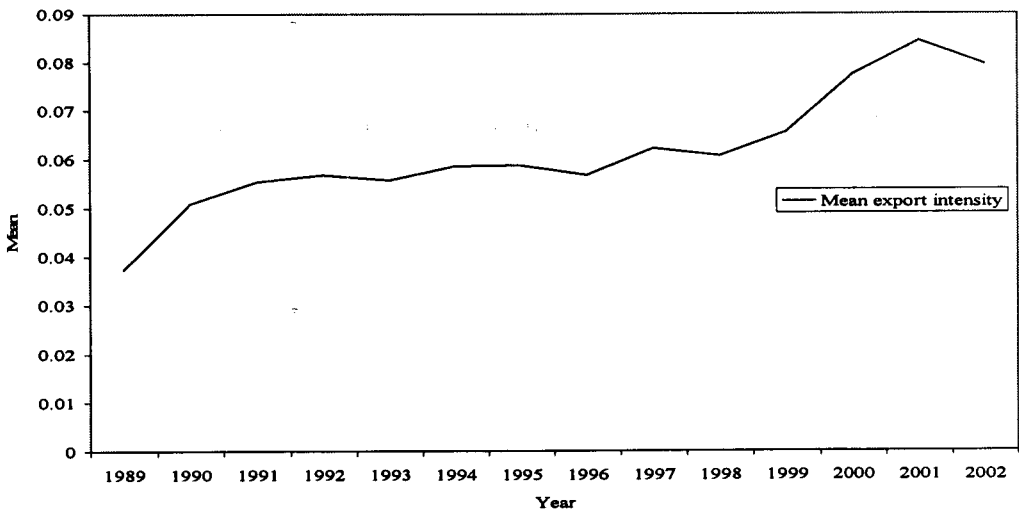


Table 8.12
Mean and Standard Deviation of Export Intensity of firms in Machinery Industry

Year	Mean	Std. Dev	Year	Mean	Std. Dev
1989	0.037	0.101	1996	0.057	0.146
1990	0.051	0.127	1997	0.062	0.163
1991	0.055	0.127	1998	0.061	0.149
1992	0.057	0.128	1999	0.066	0.639
1993	0.056	0.137	2000	0.077	0.199
1994	0.059	0.134	2001	0.084	0.200
1995	0.059	0.147	2002	0.080	0.188

In machinery industry the advertisement expenditure, import of raw material, technical and professional fees paid abroad, profitability, total royalty

expenditure and R&D expenditure have negative impact on export intensity during the post liberalisation period (Table 8.13). Marketing expenditure shows positive impact on export in three periods. Whereas R&D expenditure, professional and technical fees paid abroad have positive influence on the export of firms in machinery industry in the pre reform period.

Table 8.13
Pre and Post Reform Period Determinants of Export Intensity of Firms in Machinery Industry

Variables	1989-1991			1992-1997			1998-2002			1992-2002		
	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.
X ₁	-1.019680 (0.628775)	-1.622	0.105	0.084880 (0.163086)	0.520	0.603	-2.058823 (0.398601)	-5.165	0.000	-0.495213 (0.114836)	-4.312	0.000
X ₂	-0.021720 (0.032310)			-0.001031 (0.002288)			-0.018823 (0.021864)			-0.001627 (0.002101)		
X ₃	0.135438 (0.654834)	-0.672	0.501	-0.438913 (0.210688)	-0.451	0.652	-0.027808 0.057398	-0.861	0.389	-0.459566 (0.178070)	-0.775	0.439
X ₄	-0.013844 (0.176705)			0.127079 (0.126721)			-0.402871 (0.204850)			-0.039160 (0.091430)		
X ₅	0.042791 (0.040645)	0.207	0.836	-0.010740 (0.005245)	-2.083	0.037	0.023359 (0.009860)	-0.484	0.628	0.003131 (0.002101)	-2.581	0.010
X ₆	-1.210557 (0.883431)			0.069025 (0.205578)			-0.391204 (0.656702)			-0.046117 (0.199608)		
X ₇	0.000143 (5.75E-05)	-0.078	0.938	7.15E-05 (3.86E-05)	1.003	0.316	7.24E-05 (3.93E-05)	-1.967	0.049	3.62E-05 (1.64E-05)	-0.428	0.668
X ₈	-4.90E-08 (2.33E-08)			-1.66E-08 (1.33E-08)			-1.03E-08 (7.63E-09)			-4.16E-09 (3.52E-09)		
X ₉	2.233211 (5.976630)	1.053	0.292	-0.381871 (0.258431)	-2.048	0.041	-1.085143 (0.509598)	2.369	0.018	-0.217237 (0.175937)	1.490	0.136
Log likelihood	-34.89356			-463.9647			-847.7871			-2410.708		
Mean export intensity	0.048820			0.058496			0.067723			0.067091		
Akaike info criterion	0.123165			0.474202			0.857787			0.719592		
Schwarz criterion	0.186151			0.502218			0.885792			0.729720		
Censored observation	292			899			1095			3313		
Uncensored	437			1100			905			3415		
Total	729			1999			2000			6728		

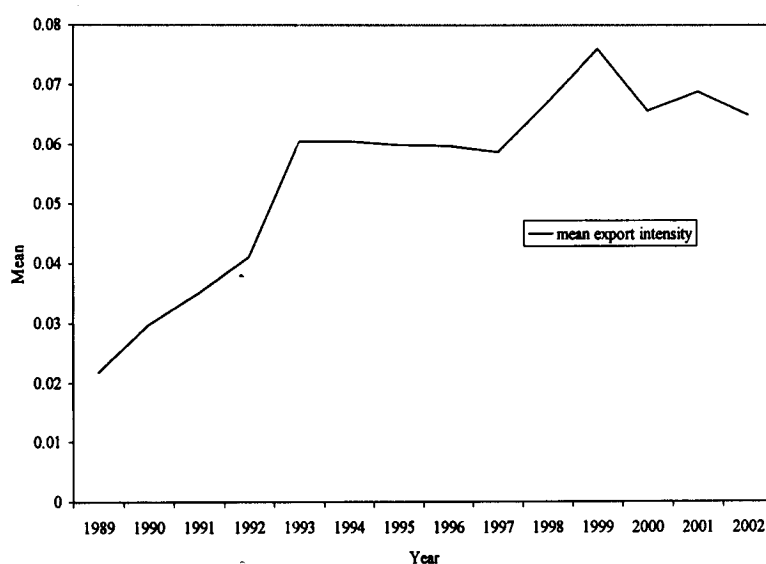
8.3.6 Determinants of Export Performance of Firms in Transport Industry

The export intensity of transport industry increased over the years since 1989 as given in Table 8.14. But it shows a fluctuating trend. The highest export intensity is shown in the year 1999. Majority of the firms in transport industry are exporting firms. The performance of firms in this industry is also clear from Figure 8.6 which shows an increasing trend.

Table 8.14
Mean and Standard Deviation of Export Intensity of Firms in Transport Industries

Year	Mean	Std. Dev	Year	Mean	Std. Dev
1989	0.022	0.041	1996	0.060	0.131
1990	0.030	0.051	1997	0.059	0.128
1991	0.035	0.070	1998	0.067	0.129
1992	0.041	0.075	1999	0.076	0.152
1993	0.061	0.143	2000	0.066	0.144
1994	0.061	0.133	2001	0.069	0.134
1995	0.060	0.121	2002	0.065	0.131

Figure 8.6
Mean Export Intensity of Firms in Transport Industry



Analysis of determinants of firm level export in the pre and post reform period in transport industry gives that advertisement intensity, technical and professional fees paid abroad, marketing cost, profitability and R&D expenditure

have positive impact (Table 8.15). The analysis for the post reform period 1992-2002 shows that only total royalty expenditure has negative impact on export intensity and all other variables have positive impact. In the pre reform period import of capital goods also influenced export negatively. In the first reform period import of royalty know how and total royalty expenditure have negative impact but in the second period professional and technical fees paid abroad and sale also have negative relationship.

Table 8.15
Pre and Post Reform Period Determinants of Export Intensity of Firms in Transport Industry

Variables	1989-1991			1992-1997			1998-2002			1992-2002		
	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.
X ₁	0.431189 (0.517015)	0.834	0.404	1.952085 (0.767804)	2.542	0.011	1.606917 (0.660411)	2.433	0.015	0.028710 (0.378704)	0.076	0.940
X ₂	-0.012025 (0.039891)			0.031419 (0.004028)			-0.004090 (0.002507)			0.000765 (0.001446)		
X ₃	1.262338 (1.221153)	-0.301	0.763	-0.038840 (0.195063)	7.800	0.000	-1.059418 (0.791690)	-1.631	0.103	0.178095 (0.085700)	0.529	0.597
X ₄	1.315925 (0.194866)			1.101887 (0.178738)			1.129484 0.233418			1.283202 (0.149208)		
X ₅	0.031826 (0.017018)	1.034	0.301	0.047849 (0.019793)	-0.199	0.842	0.148210 (0.030868)	-1.338	0.181	0.048343 (0.013683)	2.078	0.038
X ₆	-3.069431 (0.912811)			-3.840595 (0.78559)			-1.803116 (0.939674)			-2.744858 (0.568216)		
X ₇	1.76E-05 (3.30E-05)	6.753	0.000	2.80E-05 (1.64E-50)	6.165	0.000	8.52E-06 (1.65E-05)	4.839	0.000	2.34E-05 (1.19E-05)	8.600	0.000
X ₈	-1.06E-09 (1.90E-08)			-2.66E-09 (2.37E-09)			-1.30E-09 (2.17E-09)			-2.21E-09 (1.63E-09)		
X ₉	2.386543 (3.385928)	1.870	0.062	1.475611 (0.798410)	2.417	0.016	0.323389 (0.487035)	4.801	0.000	0.275820 (0.393880)	3.533	0.000
Sum squared residuals		0.887852			12.84853			18.42745			33.97814	
Log likelihood		191.8976			85.97250			-36.26197			-24.35967	
Mean export intensity		0.030755			0.057304			0.068333			0.062929	
Akaike info criterion		-1.177331			-0.155046			0.090710			0.034360	
Schwarz criterion		-1.056511			-0.105173			0.139019			0.062364	
Censored observation		103			341			361			702	
Uncensored observation		206			639			659			1298	
Total observation		309			980			1020			2000	

8.3.7 Determinants of Export performance of Firms in Non Metallic Mineral Products

The export intensity of Non Metallic Mineral products shows a sharp increase since 1989. The intensity increased from 3.1 per cent to 21.6 per cent in 2002. The export intensity reached 24 per cent in 1996, which is the highest since 1989. After 1996 it shows a decline in the performance. The fluctuating trend is clear from Figure 8.7. More than 50 per cent of the firms in the Non metallic mineral products industry are exporting firms as shown in Table 8.16.

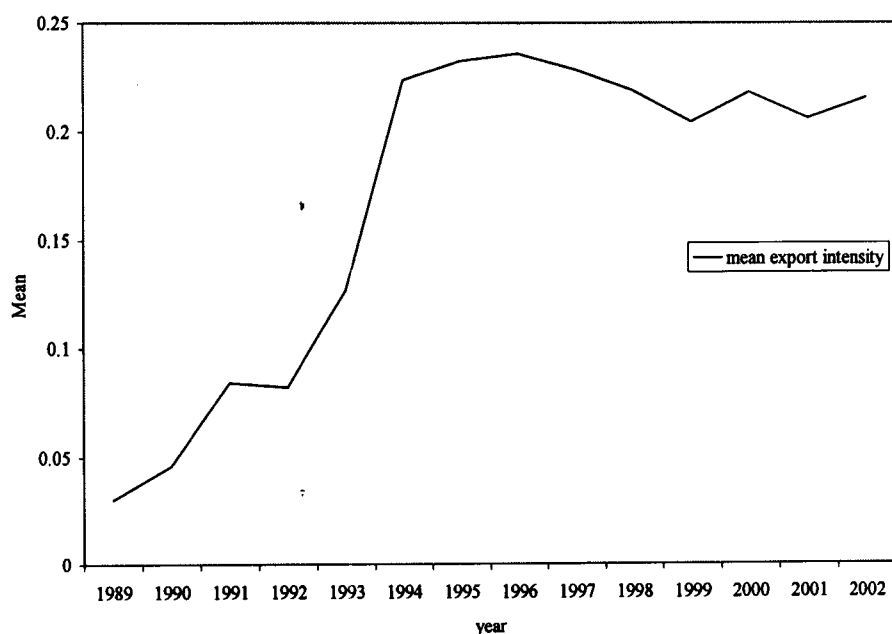
Table 8.16

Mean Export Intensity of Firms in Non Metallic Mineral Product Industry

Year	Mean	Std. Dev	Year	Mean	Std. Dev
1989	0.031	0.150	1996	0.236	0.377
1990	0.046	0.180	1997	0.228	0.369
1991	0.085	0.254	1998	0.219	0.359
1992	0.082	0.244	1999	0.204	0.358
1993	0.127	0.291	2000	0.218	0.402
1994	0.224	0.377	2001	0.206	0.355
1995	0.233	0.372	2002	0.216	0.365

Figure 8.7

Mean Export Intensity of Firms in Non Metallic Mineral Product Industry



In non metallic mineral products the major factors, which contributed the export intensity positively during the liberalisation period are professional and technical fees paid abroad, marketing expenditure, profitability and R&D expenditure as given in Table 8.17.

Table 8.17
Pre and Post Reform Period Determinants of Export Intensity of Firms in Non Metallic Mineral Product Industry

Variables	1989-1991			1992-997			1998-2002			1992-2002		
	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.	Coefficient (Std. Error)	Z-Statistic	Prob.
X ₁	-7.391164 (3.812949)	-1.938	0.053	-0.974622 (1.352583)	-0.721	0.471	-2.569922 (1.676812)	-1.533	0.125	-1.322494 (1.043478)	-1.267	0.205
X ₂	0.287054 (0.081667)			-0.011954 (0.007060)			0.662319 (0.430491)			0.015774 (0.005481)		
X ₃	0.831853 (4.829365)	3.515	0.000	0.037607 (0.049345)	-1.693	0.090	3.828823 (4.550167)	1.539	0.124	0.043225 (0.049639)	2.878	0.004
X ₄	-2.417747 (1.231381)			1.070471 (0.640141)			-0.715516 (0.631223)			0.163994 (0.445028)		
X ₅	-0.172654 (0.188278)	0.172	0.863	0.040181 (0.027010)	0.762	0.446	0.064305 (0.026966)	0.841	0.400	0.055778 (0.019760)	0.871	0.384
X ₆	-14.30973 (7.082401)			-3.917151 (2.161554)			-5.622501 (2.036479)			-4.513870 (1.430968)		
X ₇	3.10E-05 (0.000396)	-1.963	0.050	9.12E-05 (0.000164)	1.672	0.095	0.000429 (0.000123)	-1.134	0.257	0.000285 (9.52E-05)	0.369	0.713
X ₈	1.90E-07 (4.35E-07)			-3.33E-08 (1.00E-07)			-1.43E-07 (5.63E-08)			-9.94E-08 (4.79E-08)		
X ₉	-297.4525 (1.29E+08)	-0.917	0.359	1.247989 (1.818215)	1.488	0.137	0.269701 (3.574190)	2.385	0.017	1.085158 (1.629373)	2.823	0.005
Sum squared residual		10.56390			135.7132			136.6784			273.9021	
Log likelihood		-116.4921			-799.4793			-759.6791			-1564.232	
Mean export intensity		0.056755			0.201931			0.212554			0.207110	
Akaike info criterion		0.936979			1.511633			1.510656			1.506442	
Schwarz criterion		1.070254			1.558097			1.559003			1.533451	
Censored observation		152			448			396			844	
Uncensored		118			623			623			1246	
Total		270						1019			2090	

In the period 1992-97 the factors that contributed positively to the export intensity are marketing cost, profitability and R&D expenditure but import of raw materials and total royalty expenditure exhibit negative impact on the export intensity. During the post liberalisation period as a whole advertisement

intensity, import of raw materials and royalty expenditure have negative impact. In the case of firms in non metallic mineral products royalty expenditure intensity shows negative impact in all sub periods.

The summary results of the determinants of firms in the pre and post reform periods are given in Table 8.18. It is clear from table that the number of industries with positive impact of the variable increased in the post reform periods compared to the pre reform period 1989-91. Thus it is clear that most of the selected variables has positive impact on the export intensity of firms in the post reform period.

Table 8. 18
Summary Table of Pre and Post Reform Period Determinants of Export Intensity of Firms (Industries with positive impact of Variables)

Variables	1989-1991	1992-1997	1998-2002	1992-2002
Advertising expenditure	Chemical, Metals, Transport	Machine, Textiles,	Chemicals, Textiles	Chemicals, Textiles
Import of raw material	Chemicals, Textiles, Food, Non metallic mineral products	Textiles, Transport	Metals, foods, Non metallic mineral products	Metals, Textiles, foods, Transport, Non metallic mineral products
Technical and professional fees paid abroad	Metal, Textiles, machine, Transport, Non metallic mineral products	Food, Non metallic mineral products	Food, Non metallic mineral products	Chemicals, foods, transport, Non metallic mineral products
Marketing expenses	Chemicals, Textiles, Food, Transport	Chemicals, Metal, food, Textile, machines, Non metallic mineral	Chemicals, Metal, food, Textiles, Machine, Transport	Chemicals, Metal, food, textiles, machine, transport, Non metallic mineral products
Profitability	Textiles, Machine, Transport	Machine, Textiles, Transport, Non metallic mineral products	Machine, Textiles, Machine, food, Transport, Non metallic mineral products	Metals, Textiles, Transport, Machine, food, Non metallic mineral products
Royalty expenses	-	Metals	Chemicals, Textiles	Chemicals, Textiles
Sale	Metal, Machine, Textiles, Transport, Non metallic mineral products	Metals, Textiles, Transport, Machine, Food, Non metallic mineral products	Metal, Textiles, Transport, Machine, foods, Non metallic mineral products	Mineral, Textiles, Transport, Machine, Food, Non metallic mineral products
Total R&D	Chemicals, Textiles, Transport, Machine, food, Non metallic mineral products	Chemicals, Metal, Textiles, Transport, Non metallic mineral products	Chemicals, Metal, Textiles, Transport, Non metallic mineral products	Chemicals, Metal, Textiles, Transport, Non metallic mineral products, food

8.4 Impact of Trade Liberalisation on Firm Level Exports

In this section analysis of the impact of trade liberalisation at the firm level is made. The impact of trade liberalisation is measured by using the trade liberalisation dummy with the other factors that determine the export performance of firms. The period of study is from 1989 to 2002.

8.4.1 Empirical Models and Results

The Tobit model is used for the analysis of impact of trade liberalisation on the export performance of firm. The variables used are also same and to analyse the impact of trade liberalisation the trade liberalisation dummy is used. For the whole sample two more variables were added, the sectoral dummy to examine the influence of firm specific characteristics and foreign promoter share. Foreign promoter share gained importance in post reform period and thus it is included in this section as one of the variable. Sectoral dummy is included in the analysis to examine the influence of sector specific factors. The Tobit model used for the present analysis is given below,

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \sum \beta_j X_{12} + U_t, \quad \text{if } \beta x_{it} + \epsilon t > 0 \\ = 0 \quad \text{if } \beta x_{it} + \epsilon t \leq 0$$

Y - export as a percentage of sale

X₁- Advertising expenditure as a percentage of sale

X₂ - Import of raw material goods as percentage of sale

X₃. Technical and other professional fees remitted abroad as a percentage of sales

X₄- marketing expenses to total cost

X₅ – Profit before tax as percentage of sale

X₆ – Royalty know how expenses as percentage of sale

X₇ - Total sale

X₈. Total sale (non linear form-sales²)

X₉- Total R&D expenditure as percentage of total sale

X₁₀-Liberalisation dummy

X₁₁ – foreign promoter share

X₁₂ – sectoral dummy

8.4.2 Impact of Trade Liberalisation on Food Industry

Tobit model results given in Table 8.19 show that the impact of liberalisation is positive and significant on export intensity of firms in food industry. Size, import of raw material goods, professional and technical fees paid abroad, marketing expenses and profit margin have positive impact on export intensity of food industry. The share of foreign promoter share is very low hence it is omitted in the food industry. R&D intensity has negative impact on the firms export. Trade reform also has positive and significant impact on the export intensity of food industry, which shows that majority of the selected variables have favourable impact on exports of food industry.

Table 8.19

Determinants of Export Intensity of Firms in Food Industry

Determinants of Export Intensity of Firms in Food Industry				
Variables	Coefficient	Std. Error	Z-Statistic	Prob.
X ₁	-0.372937	0.280011	-1.331863	0.1829
X ₂	0.000660	0.004900	0.134665	0.8929
X ₃	0.011730	0.121715	0.096369	0.9232
X ₄	0.076265	0.233477	0.326647	0.7439
X ₅	0.001299	0.002152	0.603737	0.5460
X ₆	-0.230909	0.214016	-1.078936	0.2806
X ₇	0.000201	4.77E-05	4.213006	0.0000
X ₈	-2.51E-08	6.73E-09	-3.736093	0.0002
X ₉	-0.465205	1.502920	-0.309534	0.7569
X ₁₀	0.109412	0.011191	9.776692	0.0000
S.E. of regression	0.283171			
Sum of squared residuals	400.2879			
Log likelihood	-3574.011			
Akaike info criterion	1.433145			
Schwarz criterion	1.447475			
Censored observations	3002			
Uncensored observations	2001			
Total observations	5003			

8.4.3 Impact of Trade Liberalisation on Textile Industry

The analysis of the impact of trade liberalisation on the export intensity of textile industry shows that trade reform has positive impact but it is not significant. Import of raw material goods, marketing intensity, profit margin, size, foreign share and R&D intensity have positive impact during the period 1989-2002 (Table 8.20). Profit margin and marketing intensity have significant impact on the export intensity. Advertisement intensity and royalty fees paid abroad show negative impact.

Table 8.20
Determinants of Export Intensity of Firms in Textile Industry

Variables	Coefficient	Std. Error	Z-Statistic	Prob.
X ₁	-3.421247	0.475568	-7.194019	0.0000
X ₂	0.004321	0.001843	2.344300	0.0191
X ₃	-0.030391	0.038356	-0.792319	0.4282
X ₄	4.049984	0.301468	13.43419	0.0000
X ₅	0.052972	0.007764	6.822892	0.0000
X ₆	0.275812	1.447160	0.190588	0.8488
X ₇	0.000373	7.58E-05	4.917658	0.0000
X ₈	-2.47E-07	6.91E-08	-3.577876	0.0003
X ₉	0.045558	0.568956	0.080073	0.9362
X ₁₀	0.003246	0.008911	0.364323	0.7156
X ₁₁	0.0022715	0.002679	0.80015	0.3957
S.E. of regression				0.287824
Sum of squared residual				479.5773
Log likelihood				-3437.522
Akaike info criterion				1.189146
Schwarz criterion				1.201787
Censored observations				2254
Uncensored observations				3546
Total observations				5800

8.4.4 Impact of Trade Liberalisation on Metal Industry

Trade liberalisation has positive impact on the export intensity of metal industry. Import of raw materials, royalty expenses abroad and total royalty cost also have negative impact. Advertisement expenditure, marketing cost, profit margin, R&D intensity and sale of the firm determine the export intensity of the metal industry significantly as is clear from the Table 8.21.

Table 8.21
Determinants of Export Intensity of Firms in Metal Industry

Variables	Coefficient	Std. Error	Z-Statistic	Prob.
X ₁	0.665264	0.388846	1.710870	0.0871
X ₂	-0.005159	0.004323	-1.193492	0.2327
X ₃	-0.276131	0.250938	-1.100391	0.2712
X ₄	2.511230	0.313045	8.021952	0.0000
X ₅	0.032079	0.008387	3.825011	0.0001
X ₆	-0.148823	0.959064	-0.155175	0.8767
X ₇	9.53E-05	1.26E-05	7.567116	0.0000
X ₈	-5.88E-09	9.13E-10	-6.444430	0.0000
X ₉	2.260850	1.011060	2.236117	0.0253
X ₁₀	0.083799	0.006561	2.77295	0.0000
X ₁₁	0.000769	0.001619	0.128550	0.6019
S.E. of regression	0.165985			
Sum of squared residuals	113.8681			
Log likelihood	-1505.694			
Akaike info criterion	0.731995			
Schwarz criterion	0.748796			
Censored observation	2169			
Uncensored observation	1975			
Total observation	4144			

8.4.5 Impact of Trade Liberalisation on Non metallic mineral product industry

Trade reform has positive and significant impact on the firms in the non metallic industry. R&D intensity, profit margin, size and import of royalty from abroad have positive impact. But advertisement intensity, import of raw material goods and marketing cost have negative impact on the export intensity of firms in this industry. Foreign promoter share also shows positive impact on the export intensity of non metallic mineral product industry. The results are given in Table 8.22. Most of the variables show significant impact except sale, technical and royalty payments abroad and foreign promoter share.

Table 8.22
Determinants of Export Intensity of Firms in Non Metallic Mineral Products

Variables	Coefficient	Std. Error	Z-Statistic	Prob.
X ₁	-2.627949	1.000892	-2.625607	0.0086
X ₂	-0.013185	0.004644	-2.838940	0.0045
X ₃	0.041561	0.046984	0.884592	0.3764
X ₄	-0.918097	0.450965	-2.035848	0.0418
X ₅	0.045171	0.016415	2.751864	0.0059
X ₆	-5.624523	1.364157	-4.123076	0.0000
X ₇	9.72E-05	9.38E-05	1.036792	0.2998
X ₈	-2.67E-08	4.63E-08	-0.575882	0.5647
X ₉	1.011567	1.542706	0.655710	0.5120
X ₁₀	0.073671	0.016719	4.406516	0.0000
X ₁₁	0.007342	0.008202	0.21456	0.7915
S.E. of regression	0.349419			
Sum of squared residuals	286.7984			
Log likelihood	-1716.138			
Akaike info criterion	1.463676			
Schwarz criterion	1.490553			
Censored observations	996			
Uncensored observations	1364			
Total observations	2360			

8.4.6 Impact of Trade Liberalisation on Machine Industry

In the case of machine industry, R&D expenditure, import of raw material goods and liberalisation exhibit insignificant influence. Though the impact of trade reform is insignificant it has a positive impact on export. Foreign promoter share shows positive and significant impact on the export intensity of Machine industry. In the case of firms in machine industry also advertisement expenditure, R& D intensity, import of royalty know how and import of capital goods show negative impact as given in Table 8.23.

Table 8.23
Determinants of Export Intensity of Firms in Machine Industry

Variables	Coefficient	Std. Error	Z-Statistic	Prob.
X ₁	-0.243055	0.104021	-2.336586	0.0195
X ₂	-0.001423	0.002096	-0.678867	0.4972
X ₃	-0.241976	0.153039	-1.581137	0.1138
X ₄	0.390364	0.090034	4.335753	0.0000
X ₅	0.004809	0.003037	1.583316	0.1133
X ₆	0.255105	0.190038	1.342387	0.1795
X ₇	0.000118	1.70E-05	6.946480	0.0000
X ₈	-1.69E-08	3.60E-09	-4.692503	0.0000
X ₉	-0.016120	0.027747	-0.580970	0.5613
X ₁₀	0.056478	0.004589	1.30848	0.5800
X ₁₁	0.019696	0.000525	3.51436	0.0000
S.E. of regression	0.165105			
Sum of squared residuals	202.9743			
Log likelihood	-2420.927			
Akaike info criterion	0.652253			
Schwarz criterion	0.662457			
Censored observations	3605			
Uncensored observations	3852			
Total observations	7457			

8.4.7 Impact of Trade Liberalisation on Transport industry

In transport industry trade reform shows positive impact but it is not significant. The advertisement expenditure, import of raw materials, marketing cost, profitability, sales and R&D intensity show positive influence on the firms in this industry. Among these, the market intensity and profitability has significant impact. Royalty expenditure payments abroad only have negative impact in Transport industry. In the case of this industry advertisements intensity also has positive impact. In the case of transport industry most of the variables selected have positive impact.

Table 8.24
Determinants of Export Intensity of Firms in Transport Industry

Variables	Coefficient	Std. Error	Z-Statistic	Prob.
X ₁	0.041389	0.343751	0.120404	0.9042
X ₂	0.000733	0.001311	0.559416	0.5759
X ₃	0.182659	0.079959	2.284407	0.0223
X ₄	1.334469	0.147416	9.052404	0.0000
X ₅	0.049645	0.012825	3.870863	0.0001
X ₆	-2.840675	0.524337	-5.417656	0.0000
X ₇	2.54E-05	1.11E-05	2.283972	0.0224
X ₈	-2.43E-09	1.52E-09	-1.602828	0.1090
X ₉	0.355714	0.372195	0.955720	0.3392
X ₁₀	0.003133	0.005311	6.589933	0.05122
X ₁₁	0.006919	0.001761	2.92981	0.0000
S.E. of regression				0.123713
Sum of squared residuals				35.17093
Log likelihood				71.45706
Akaike info criterion				-0.052366
Schwarz criterion				-0.025000
Censored observations				805
Uncensored observations				1504
Total observations				2309

8.4.8 Impact of Trade Liberalisation on Chemical industry

Tobit model of the determinants of export intensity of chemical industry is given in Table 8.25. The results show that trade reform has positive and significant impact on the export intensity. Profitability, royalty expenditure of the firm, R&D expenditure and foreign share also influence the export intensity favourably. Advertisement intensity, import of raw materials, import of royalty and sale have negative impact on the firms in chemical industry.

Table 8.25
Determinants of Export Intensity of Firms in Chemical Industry

Variables	Coefficient	Std. Error	Z-Statistic	Prob.
X ₁	-0.382774	0.170927	-2.239404	0.0251
X ₂	-0.000571	0.000644	-0.886272	0.3755
X ₃	-0.008681	0.025777	-0.336779	0.7363
X ₄	-0.009863	0.093269	-0.105745	0.9158
X ₅	0.001257	0.000655	1.920083	0.0548
X ₆	0.026070	0.477725	0.054572	0.9565
X ₇	8.95E-06	2.91E-06	3.074415	0.0021
X ₈	-8.06E-11	3.24E-11	-2.489565	0.0128
X ₉	0.073213	0.035877	2.040675	0.0413
X ₁₀	0.097039	0.004698	20.65346	0.0000
X ₁₁	0.002313	0.009414	2.42376	0.0104
S.E. of regression	0.212866			
Sum of squared residuals	438.5731			
Log likelihood	-4385.042			
Akaike info criterion	0.907336			
Schwarz criterion	0.915485			
Censored observations	4198			
Uncensored observations	5492			
Total observations	9690			

8.4.9 Impact of Trade Liberalisation on Whole Firms

The impact of trade policy on all firms with the help of pooled sample is analysed and the result is shown in Table 8.26. From the result given in table it is clear that liberalisation has positive and significant impact on the export intensity. Industry specific variable, total royalty know how expenditure and import of royalty know how expenditure shows negative impact. Foreign promoter share shows positive and significant impact. In this model one more variable is added namely sectoral dummy to capture the influence of various firms and it shows negative influence.

Table 8.26
Determinants of Export Intensity of Whole Firms

Variables	Coefficient	Std. Error	Z-Statistic	Prob.
X ₁	-0.006397	0.016040	-0.398831	0.6900
X ₂	0.000102	0.000153	0.667018	0.5048
X ₃	-0.001872	0.001979	-0.945830	0.3442
X ₄	0.228197	0.085844	2.658271	0.0079
X ₅	0.000156	0.000243	0.641525	0.5212
X ₆	-0.253403	0.172995	-1.464802	0.1430
X ₇	1.91E-05	3.55E-06	-5.370041	0.0000
X ₈	-1.82E-10	4.10E-11	4.440727	0.0000
X ₉	0.000841	0.016833	0.049960	0.9602
X ₁₀	0.137673	0.005987	22.99446	0.0000
X ₁₁	0.000474	0.000654	0.723962	0.4691
X ₁₂	-0.009945	0.001301	-7.643832	0.0000
S.E. of regression	0.262775			
Sum of squared residuals	2537.548			
Log likelihood	-21973.68			
Akaike info criterion	1.196163			
Schwarz criterion	1.199173			
Censored observations	17029			
Uncensored observations	19733			
Total observations	36762			

The results of the analysis of the impact of trade liberalisation on firm level exports are summarized in Table 8.27. It is clear from the table that firms in most of the industries have positive impact for most of the variables selected for the analysis. Trade liberalisation measured using liberalisation dummy has positive impact on firms in all industry.

The result shows that for most of the firms the size proxied by sale and its quadratic form have positive and negative sign respectively. This means that increase in firm size increase export intensity as well as export probability but after a threshold, size has negative impact, i.e., non linear relationship between export and size. Trade liberalisation has positive and significant impact on all firms except transport, metal and machine industry. Profitability and export intensity is positively and significantly related to all firms. Advertisement expenditure shows negative impact for most of the firms but it is positive and significant in the case of transport industry.

Table 8.27
Summary Results of The Impact of Trade Liberalisation on the Export Intensity of Firms

Variables	Positive	Negative
Advertising expenditure	Metal, Transport	Food, Textiles, Non metallic mineral products, Machine, Chemical,
Import of raw material	Food, Textiles, Transport	Metal, Non metallic mineral products, Machine, Chemicals
Technical and professional fees paid abroad	Food, Non metallic mineral products, Transport,	Textiles, Metals, Machine, Chemicals
Marketing expenses	Food, Textiles, Metals, Machine, Transport	Non metallic, Chemicals
Profitability	Food, Textiles, Metal, Non metallic, Machine, Transport, Chemicals	-
Royalty expenses	Textiles, Machine, Chemicals	Food, Metals, Nonmetallic, Transport
Sale	Food, Textiles, Metal, Non metallic, Machine, Transport, Chemicals	-
Non linear form of sale	-	Food, Textiles, Metal, Non Metallic, Machine, Transport, Chemicals
Total R&D	Textiles, Metal, Non metallic, Transport, Chemicals	Food, Machine
Liberalisation dummy	Food, Textiles, Metal, Non metallic, Machine, Transport, Chemicals	-
Foreign promoter share	Textiles, Metal, Non metallic, Machine, Transport, Chemicals	-

R& D intensity also has positive impact on all firms except firms in food and machine industry. Professional fees paid abroad exhibits negative impact on majority of the firms, it is positive for food and non metallic mineral products. Advertisement expenditure, technical fees paid abroad and royalty expenditure have negative impact in majority of firms. From the negative influence of advertisement intensity it is clear that the product differentiation strategy of

Indian firms for export participation is very low. The available literature also validates that Indian firms often act as sub contractors or sell their products under the brand name of developed countries and product differentiation strategy of Indian industries not developed well . The literature on transfer of technology to developing countries suggests that foreign technology has several other costs like export prohibition clauses besides the financial cost of importing it. The existing technology gap of the country also can be a reason for the slow transfer.

Conclusion

The firm level analysis shows better export performance of the firms in various industries during the post liberalisation period. The impact assessed using the Tobit models also show that the selected trade policy dummy has positive impact on the exports of most of the industries. Thus in the firm level analysis also the alternative hypotheses of significant impact of trade liberalisation is accepted.

Impact of Trade Liberalisation on India's Exports

Thesis

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Chapter IX
Summary and Conclusions

Introduction

Foreign trade occupies an important place in the economic development of any country. Thus, countries have tried to achieve fastest economic growth by increasing their share of trade in world trade by adopting different trade policy measures. Experience of some of the countries showed that the import substitution policies that prevailed till 1970s were much less successful than the export oriented policies used in some other high growth economies. As a result export promotion policies gained importance. With the introduction of trade liberalisation export promotion measures gained more importance. Trade liberalisation measures, introduced as part of globalisation and liberalisation strategy, aim at reducing barriers of trade and thus to improve export performance.

In developing countries, trade liberalisation occurred much more slowly than the industrialised countries. The infant industry argument was the main hindering factor for the slow adoption of trade openness. But in the early 1980s many developing economies began to dramatically increase manufactured exports and thereby to support export promotion measures but the source and objective of reform were different for various countries. India also adopted liberalisation and globalisation strategies since 1991 and trade liberalisation is one of the important component of these reform measures.

Trade policies in India have undergone significant changes since independence. Till 1970s mainly import substitution policies were prevailed and then export promotion measures gained importance. During 1990s structural adjustment policies were introduced followed by reforms leading to the removal of high tariff and non tariff barriers. The trade policy measures introduced in the country in the post reform period are expected to have significant impact on the exports. The present study thus selected trade liberalisation and its impact on

exports as it is one of the most important components of reform measures introduced in India since 1991.

The study is mainly with respect to manufactured goods exports which contributes more than 75 per cent of India's exports. There were studies, which examined the impact of trade reform measures on the exports and imports sectors but most of the studies concentrated at the aggregate level. More clear assessment can be made only when disaggregate level analysis is made. The studies which deal with the various determining factors of exports at the industry and firm level during the reform period is also very few. The significance of the present study is that it examines the impact of the reform as well as the determining factors of exports during the reform period both at the aggregate and disaggregate levels. In the present study, thus, the analysis is done at the aggregate level, industry level (for 15 industries as per ASI) and at the firm level (firms at 7 industries) so as to examine the impact of trade reform.

The main objectives of the study are to examine, the trends in India's exports, its composition and direction, to analyse the impact of trade reform on aggregate exports, to assess the impact of trade liberalisation on exports of manufacturing industries in India and to analyse the factors that determine the exports of firms under trade liberalisation.

In order to assess the impact of trade reform on the exports of India both at the aggregate and disaggregate level the null hypotheses tested is that trade liberalisation and export performance are unrelated. To test the above hypotheses study has specifically used the following null hypotheses. (a) Trade liberalisation has no impact on aggregate exports (b) Industry level exports and trade liberalisation are unrelated (c) Trade liberalisation has no impact at the firm level.

The period of study is from 1980-2002. For the analysis secondary data have been used and the main data sources used for the study are Director General of Commercial Intelligence and Statistics (DGCI&S), Reserve Bank of India Bulletin, COMTRADE database, database of Annual Survey of Industries, Trade and production Database and PROWESS database of Center for Monitoring Indian Economy (CMIE).

The following methods have been used to assess the impact of trade liberalisation. The study used averages, percentages, intensity, penetration ratios, Cointegration and Error correction models, Granger causality test, multiple regression models and Tobit model.

The Cointegration and Vector Error Correction Model are used for examining the impact of trade reform at the aggregate level. Both demand and supply factors determining export performance are selected for the analysis. The factors considered for the analysis are (a) demand factors – REER and world demand and (b) supply factors- Relative price, capability to export, domestic demand, and foreign direct investment. Three alternative measures of trade policy are used in the analysis, i.e., openness, tariff and trade liberalisation dummy.

The impact of trade policy on the export performance of fifteen manufacturing industries is examined using multiple regression models. Fifteen manufacturing industries in India according to Annual Survey of Industries (ASI) classification are selected for the analysis. The period of study is from 1980 to 2000. Though ASI does not provide data on trade performance, it is matched using the Trade and Production database using the concordance table to match the ASI and Trade and Production database. The variables selected for industry level analysis are output, wage per unit of value added, input output ratio, import

penetration and trade policy variables like openness and dummy for liberalization.

The disaggregate level analysis of impact of trade liberalisation is done at firm level for seven industries. The industries, which have highest export intensity, are selected for the analysis. They are food, textiles, machine, metal, non metallic mineral products, transport and chemical industry. Firm level data are collected from PROWESS database provided by CMIE for the period 1989 to 2002.

The number of firms selected in each industry for the whole period are food industry (5003), textiles (5799), chemicals (9690), non metallic mineral products (2360), metal products (4144), machinery (7457) and transport (2309). The highest number of firms is in chemical industry followed by Machinery.

The firm level analysis examines the impact of trade reform on the export intensity as well as the factors determining exports at the firm level during the pre and post liberalisation periods.

The variables selected for the analysis of firm level exports are sale, (proxy for size), R&D expenditure, total royalty expenditure, foreign promoter share, product differentiation, raw material import, technological payment abroad, profitability and liberalisation dummy. Each of these factors is taken as a percentage to sale, i.e., intensity of each factor is taken as the determining factors of exports at firm level. The exports is also measured as export intensity, ie, exports as a percentage of sale. In order to examine the impact of changes in the size of firm after a threshold non linear form of size is also considered. The method used to examine the impact of liberalisation at firm level is Tobit model.

The trade policy measures introduced in India are documented in chapter four. This chapter examines the major policy changes that occurred in tariff, foreign direct investment and exchange rate. India's foreign trade policy during

the last five decades may be classified as import substitution policy and export promotion policies. The import substitution policy was followed in the first two decades, export drive policy in third and fourth decades and export acceleration policy in 1990s. Prior to economic reform in 1991 India operated a system of Quantitative Restrictions (QRs) through an import licensing regime. Other export promotion measures like deemed export, duty entitlement passbook scheme, duty free replenishment certificate etc were simplified and rationalised during the reform period.

The most important characteristics of trade policy reform introduced since 1991 were removal of Quantitative Restrictions (QRs) and tariff rationalisation. The average tariff was 150 per cent in 1991-92 and reduced to 50 per cent in 1998-99. The average unweighted tariff was reduced from 100 per cent in 1986 to 33 per cent in 2002, but it is still higher than other countries. The process of removal of QRs has been completed with the removal of restriction of 1429 items in 2001.

Until the reform of 1991, inflow of foreign capital to India was very low. During the post liberalisation period limits on Foreign Direct Investment (FDI) in certain specified sectors were raised. But even now inflow of FDI in India is very low and constitutes a very small share in GDP (about 0.70 per cent in 2002). Outflow of FDI is also very low. The inward FDI performance index is less than one for India, which shows that India receives less FDI relative to economic size. Foreign Portfolio Investment in India was negligible till 1993, since then it increased. In order to boost export, Export Processing Zone (EPZ), Free Trade Zone (FTZ), Special Economic Zone (SEZ) and Agri Export Zone (AEZ) were established in different policy regime periods. Exchange rate reform was also introduced and rupee was devalued.

Major findings

The analysis of export performance and impact of trade reform at aggregate, industry, and firm level are examined in chapter 5 to chapter 8. The main conclusions emerged from the analyses are summarised in this section.

The export share of India in world exports increased from 0.54 per cent during 1990 to 0.61 per cent in 1998 and 0.8 per cent in 2002. The annual average growth rate of exports of India, in Dollar terms shows an increase in the post liberalisation period, 9.21 per cent, compared to the pre reform period growth rate of 7.26 per cent. The annual average growth rate of imports of India also increased from 4.25 per cent in 1980-90 period to 10.00 per cent in 1991-2002 period.

The share of manufactured exports increased from 53 per cent in 1970 to 76 per cent in 2001-02. The average share during 1970s was 55.69 per cent and in 1980s the average share increased to 60.69 per cent. During 1990s, the average share was about 75 per cent. Thus, exports share of manufactured goods increased during post liberalisation period compared to the pre liberalisation period. Gems and jewellery, handicrafts, engineering goods and readymade goods are the important contributors to manufactured exports in India. The share of primary product declined from 26.4 per cent in 1987-88 to 16.12 in 2001-02. Thus there occurred a structural change in favour of manufactured goods exports.

The total export contributed only 0.52 per cent of GDP in 1970 and it increased to 1.09 per cent in 1981. The share increased to 16 per cent in 2000-01 period. The manufactured export contributes about 12 per cent of GDP in 2001 and it was 3.37 per cent in 1990. Share of both total exports and manufactured exports in GDP shows an increasing trend during post liberalisation period.

The import growth rate also shows an improvement during 1990s than in 1980s. During 1970s and 1980s import growth rate was higher compared to the

export growth rate. Petroleum and petroleum products constitutes the major share of import to India. Non bulk group constitutes 60 per cent of total import and among non bulk group capital goods has highest share. The bulk imports, which mainly include petroleum and consumption goods, contributes about 40 per cent of imports.

India's export performance by chapters and sections shows textile and textile articles contributes major share in exports. The export share of India in various countries shows that USA has the highest share of exports. Japan, Germany and UK also serve as the good markets for India's exports.

Manufactured export performance at disaggregate level on the basis of Standard Industrial Trade Classification (SITC) at three digit level is also examined. The analysis for the extended manufactured product covering SITC code 4 to 8 for six broad categories, resource intensive, labour intensive, scale intensive, differentiated, science based and miscellaneous products as per UN ESCAP classification and reclassified by Tendulkar (1999) is used for the analysis.

Among the resource intensive products, the highest export share is shown by leather product (611) followed by lime cement and construction material (661). The growth rate shows a better performance for most of the products in 1990s. Differentiated product uses sophisticated technology than labour and resource intensive products. The important sector which contributes the major share is telecommunication equipment (724). Most of the products in this sector also show better performance during post reform period. Science based industry uses more sophisticated technology. The sector includes arms and ammunitions, pigment paints, medicines, perfumery, soap, cleaners, polish, etc. Perfumery and cosmetics (553), pigments and paints (533) contribute the major share of exports in this group.

Following conclusions are derived from the analysis of the impact of trade liberalisation at aggregate level exports:

The multiple regression analysis for determinants of exports for total exports with demand factors shows that openness has positive relationship in all models and it has significant impact. World demand shows positive relation in all three models for both post reform and pre reform periods. But it has more significant impact during post liberalisation period. REER shows the theoretically expected negative relation in almost all models. The multiple regression analysis with supply factor shows that relative price and FDI have significant impact during post liberalisation period than pre reform period in most of the models. Capability to exports shows positive impact during both periods. Tariff rate also shows favourable impacts on total exports from India.

The multiple regression model for the determinants of manufactured exports for pre and post reform periods shows world demand, exchange rate and openness have the theoretically expected sign among the demand side factors. World demand shows significant impact during post liberalisation period in manufactured exports. Relative price, capability to export and domestic demand show the theoretically expected sign among supply factors in three models. FDI shows positive and significant impact in almost all the models for the post reform period. Capability to export shows significant impact on India's manufactured exports in the post reform period. Openness shows positive and significant impact during the post reform period. Tariff rate also has favourable influence on the manufactured exports from India.

The Johansen and Juselius cointegration analyses also show that the variables are cointegrated. Vector Error Correction model shows that for total exports openness index and tariff have significant impact among the demand side factors. Thus among the three alternative trade policy measures used tariff and

openness has significant impact. Error term of liberalisation dummy is not significant in most of the models in total and manufactured exports. Error correction models shows world demand, REER, FDI, capability to exports and relative price have significant impact on total and manufactured exports from India in the long run. Among the trade policy variables openness and tariff have significant impact .

Conclusions derived from the analysis of impact of trade liberalisation on export performance at the industry level have been as follows:

The analysis of industrial characteristics like number of factories, output, value added output, number of employees and wages to the workers shows that most of these variables showed an increase in growth rate in majority of industries during post liberalisation.

The export performance of Indian manufacturing industries shows that the wood, paper and non metallic mineral industries have highest export growth rate during post reform period. The export growth rate of beverage and tobacco, leather and rubber product industries declined during the period of post liberalisation.

The import growth rate of tobacco, leather and metal and alloy industries hiked up during the 1990s than other industries compared to 1980s. The food and food products industry shows the highest growth rate in imports during post liberalisation period.

The export intensity (ratio of export to output) of almost all industries increased during the post liberalisation period. The export intensity is highest in textile industry followed by leather industry.

Import intensity of Indian manufacturing industries also increased in majority of industries since 1980 and shows better performance during 1990s. Import intensity is highest in paper, chemical and rubber product industries.

The import penetration ratio (ratio of import to domestic availability) of most of the industries show an increasing trend in 1990s. The ratio is highest in leather and chemical industries. Import penetration ratio of food and food product and textile industry show a decline during the first half of 1990s.

The analysis shows that for most of the industries trade liberalisation has positive impact. Openness index shows positive impact on all industries. liberalisation dummy has a negative impact on beverage and tobacco, leather and textile products industry only among fifteen industries. Thus it is concluded that trade liberalisation has positive impact on most of the industries as two alternative trade policy measures used (trade liberalisation dummy and openness) show positive impact for most of the industries.

In most of the industries, output and import penetration ratio show favourable impact. Wage per unit of value added shows positive impact for most of the industries.

The export performance of Indian industries as per the International Standard Industrial Classification (ISIC) is examined at the three and four digit levels in the same chapter. Four digit level industries as per (ISIC) are divided into five categories like labour intensive, resource intensive, scale intensive, science based and differentiated products exports.

The three digit level export performance analysis on the basis of ISIC classification shows that most of the industries have higher export performance during the post reform period . The export intensity of majority of industries has also increased during the post reform period. The highest export intensity is shown by textile, wearing apparels and leather products industry.

The import penetration of Indian industries at the three digit level also shows an increase in growth rate during post liberalisation. The highest penetration is shown by fabricated metal product industry.

The trend and growth rates at four digit level are also examined. The result shows that the growth rate of export and import of majority of resource intensive products increased during 1990s. The export growth rate of labour intensive product also shows that for majority of the products exports increased during the post reform period. The exports of majority of scale intensive and science based products show highest annual average growth rate during pre reform period. Differentiated product also shows an increase in exports performance during the post reform period. But the import performance is not impressive during 1990s for this group.

Following conclusions are derived from the analysis of firm level exports performance

The mean export intensity among firms in selected industries shows that the highest intensity is in non metallic mineral products (18.99) and textiles (18.34) industries. The lowest export intensity is shown by transport (5.86) and machine (6.53) industries.

The factors determining the export intensity of firms during pre and post reform period in various industries show that most of the selected variables have positive and significant impact during the post reform period. Advertisement expenditure, technical and professional fees paid abroad and royalty expenditure have negative impact for most of the firms.

Impact of trade liberalisation on firm level exports is analysed with the Tobit model for firms in seven industries selected . Tobit result for food industry gives that trade reform has positive and significant impact on the export intensity of this industry. Import of raw material goods, professional and technical fees

paid abroad, marketing expenses and profit margin show positive impact on export intensity of food industry. R&D intensity has negative impact on the firm's exports.

The analysis of the impact of trade liberalisation on the export intensity of textile industry shows that trade reform has positive and significant impact. Import of raw material goods, marketing intensity, profit margin, size and R&D intensity have positive impact.

Trade liberalisation has positive and significant impact on the export intensity of metal industry. Import of raw material goods, technical fees paid abroad and total royalty cost also have negative impact. All other variables have positive impact.

Trade reform has positive and significant impact on the firms in the non metallic industry. R&D intensity, profit margin, size and import of royalty from abroad have positive impact on the firms in this industry, whereas advertisement intensity, import of raw materials goods and marketing cost have negative impact.

Trade reform has positive and significant impact on transport industry. The advertisement expenditure, import of raw materials, royalty expenses abroad, marketing cost, profitability, sales and R&D intensity show positive influence on the firms in this industry. Among these the market intensity and profitability have significant impact.

Trade reform shows positive impact on exports intensity of machine industry. In the case of firms in machine industry also the advertisement expenditure, R& D intensity, import of royalty know how and import of raw materials show negative impact.

Tobit model of the export intensity of chemical industry shows that trade reform has positive and significant impact on the export intensity. Profitability, royalty expenditure of the firm and R&D expenditure also influenced the export favourably since 1989. Advertisement intensity, import of raw materials, import of royalty and sale have negative impact on the firms in chemical industry.

The impact of trade policy for whole sample firms shows that liberalisation has positive and significant impact on the export intensity. Industry specific variable, total royalty know how expenditure and professional and technical fees paid abroad show negative impact. Foreign promoter share also shows positive impact on most of the firms. Firm level analysis show that trade reform has positive impact on firms in all industries. It also shows significant impact for all selected industries except machine industry.

Conclusions

The analysis of impact of trade reform on India's exports shows that for most of the commodity groups exports show an increasing trend during the post reform period. Disaggregate level analysis at the industry and firm level also shows an improvement in export performance for majority of the commodity groups and industries. Main objective of the present study is to examine the impact of the trade reform on the export performance of India. The three trade policy measures, liberalisation, openness and tariff rates, used to assess the impact of trade reform show that it has favourable impact in most of the cases. At the aggregate level trade reform have positive impact on total exports and manufactured exports. The industry level analysis concludes that trade policy measures have positive impact for most of the industries. The firm level analysis also shows that liberalisation has positively affected all firms. Hence, in most cases the test statistics accepted the alternative hypotheses of significant impact. The analysis done on the basis of three alternative trade policy variables to

capture impact of trade liberalisation show favourable impact on export performance at aggregate and disaggregates levels. Thus, the study concludes trade reform measures introduced in India have favourable impact on exports.

Suggestions and Policy Implications

The analysis shows that trade liberalisation measures introduced have positive impact on exports from India. The growth rate of manufactured goods exports increased during post reform period and the major share of India's exports is contributed by this sector. Though the share and growth rate of major manufactured commodities show an improvement, their contribution in world exports share is very low. The share of exports to India's GDP is also very low. Country can achieve more export performance by increasing the share of items in world exports, especially the items in which India is more competitive. The following suggestions can be made to improve the export performance of India in the liberalisation era.

With the opening up of the economy country can achieve higher exports by more diversification as the barriers for trade is reduced between countries with the introduction of liberalisation measures. Finding of new suitable markets for India's manufactured products and at the same time more exports to the traditional markets can increase the share of India's exports in world exports. Various marketing strategies such as advertisement, quality improvements, product diversification, etc can be used.

Improvement in production methods can also increase the share of exports. Better production technology, improvement in quality of products, infrastructural development, increase in Research and Development expenditure etc can improve the production base of the economy and hence more exports.

Advertisement intensity of Indian industry is very low. Product differentiation strategy has an important role in an open economy and Indian

industries can achieve the benefits of openness by increasing its share of advertisement expenditure. Brand building of products and attractive advertisement can be used for improving the marketing strategy and thereby to increase the world demand.

Adoption of modern technology is desirable for increasing the export performance of the country as Indian industries are still lagging behind in modern technology adoption.

Increase in share of foreign direct investment is also desirable as it shows a positive influence on India's exports. Foreign promoter share has positive impact on most of the firms and favourable policy towards this factor is desirable as it has an important place in the era of globalisation and liberalisation.

The role and importance of various trade blocks and regional trade agreement have also gained world wide importance with the introduction of trade liberalisation measures. India can also make use of these trade agreements to improve the trade performance.

Export -import policies can be framed so as to improve the export base of the country. Sector specific policies may be included in Exim policies. Special emphasis should be given to export intensive industries in EXIM policies.

India can achieve the goal of one per cent share in world exports by increasing diversification, productivity, product differentiation strategy and adoption of modern technology. Thus utilizing the favourable factors of trade liberalisation measures, like reduction of barriers of trade, export promotion measures etc. competitiveness of India's exports can be increased. As the exports shows better performance during the post reform period, India can adopt more liberalisation strategies to achieve higher share in world exports as globalisation and liberalisation have become a fact than a reality.

Impact of Trade Liberalisation on India's Exports

Thesis

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Impact of Trade Liberalisation on India's Exports

Thesis

*Submitted to the University of Calicut
for the award of the degree of*

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by

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Appendices

APPENDIX. I

India's Total Exports, Imports and Trade Balance

(Rs.Crores)

Year	Exports			Imports			Trade Balance		
	Oil	Non-oil	Total	Oil	Non-oil	Total	Oil	Non-oil	Total
1970-71	8.56	1526.69	1535.25	135.89	1498.31	1634.20	-127.33	28.38	-98.95
1971-72	10.51	1597.64	1608.15	194.14	1630.40	1824.54	-183.63	-32.76	-216.39
1972-73	28.97	1942.49	1971.46	204.04	1663.40	1867.44	-175.07	279.09	104.02
1973-74	12.25	2511.17	2523.42	560.28	2395.09	2955.37	-548.03	116.08	-431.95
1974-75	13.63	3315.20	3328.83	1156.95	3361.83	4518.78	-1143.32	-46.63	-1189.95
1975-76	18.88	4017.38	4036.26	1225.70	4039.08	5264.78	-1206.82	-21.70	-1228.52
1976-77	18.65	5124.06	5142.71	1413.35	3660.44	5073.79	-1394.70	1463.62	68.92
1977-78	15.72	5392.15	5407.87	1550.98	4469.25	6020.23	-1535.26	922.90	-612.36
1978-79	14.19	5711.87	5726.06	1676.77	5133.87	6810.64	-1662.58	578.00	-1084.58
1979-80	18.86	6399.57	6418.43	3267.08	5875.50	9142.58	-3248.22	524.07	-2724.15
1980-81	24.91	6685.80	6710.71	5263.47	7285.68	12549.15	-5238.56	-599.88	-5838.44
1981-82	220.93	7584.97	7805.90	5189.26	8418.29	13607.55	-4968.33	-833.32	-5801.65
1982-83	1235.28	7568.08	8803.36	5621.93	8670.82	14292.74	-4386.65	-1102.74	-5489.38
1983-84	1588.06	8182.65	9770.71	4831.98	10999.48	15831.46	-3243.92	-2816.83	-6060.75
1984-85	1818.19	9925.49	11743.68	5409.05	11725.15	17134.20	-3590.86	-1799.66	-5390.52
1985-86	644.72	10249.87	10894.59	4989.39	14668.30	19657.69	-4344.67	-4418.43	-8763.10
1986-87	411.23	12040.72	12451.95	2810.59	17285.17	20095.76	-2399.36	-5244.45	-7643.81
1987-88	648.75	15024.91	15673.66	4042.92	18200.82	22243.74	-3394.17	-3175.91	-6570.08
1988-89	504.96	19726.54	20231.50	4357.61	23877.61	28235.22	-3852.65	-4151.07	-8003.72
1989-90	696.67	26961.75	27658.42	6272.52	29055.83	35328.35	-5575.85	-2094.08	-7669.93
1990-91	937.80	31619.83	32557.63	10816.11	32376.75	43192.86	-9878.31	-756.92	-10635.23
1991-92	1022.27	43019.54	44041.81	13126.72	34724.12	47850.84	-12104.45	8295.42	-3809.03
1992-93	1379.25	52309.00	53688.25	17141.70	46232.82	63374.52	-15762.45	6076.18	-9686.27
1993-94	1247.79	68503.60	69751.39	18046.19	55054.82	73101.01	-16798.40	13448.78	-3349.62
1994-95	1308.98	81365.13	82674.11	18612.55	71358.11	89970.66	-17303.57	10007.02	-7296.55
1995-96	1517.75	104835.59	106353.34	25173.60	97504.54	122678.14	-23655.85	7331.05	-16324.80
1996-97	1710.35	117106.73	118817.08	35628.52	103291.16	138919.68	-33918.17	13815.57	-20102.60
1997-98	1310.99	128789.65	130100.64	30341.19	123835.11	154176.30	-29030.20	4954.54	-24075.66
1998-99	376.22	139376.92	139753.14	26919.28	151412.57	178331.85	-26543.06	-12035.65	-38578.71
1999-00	168.45	159392.94	159561.39	54648.60	160587.87	215236.47	-54480.15	-1194.93	-55675.08
2000-01	8541.67	195029.34	203571.01	71496.52	159376.24	230872.76	-62954.85	35653.10	-27301.75
2001-02	10106.58	198911.39	209017.97	66769.86	178429.86	245199.72	-56663.28	20481.53	-36181.75
2002-03	12469.22	242668.06	255137.28	85367.00	211838.87	297205.87	-72897.78	30829.19	-42068.59

APPENDIX. II
Export Import Ratio of India

Year	Oil	Non-oil	Total
1970-71	0.06	1.02	0.94
1971-72	0.05	0.98	0.88
1972-73	0.14	1.17	1.06
1973-74	0.02	1.05	0.85
1974-75	0.01	0.99	0.74
1975-76	0.02	0.99	0.77
1976-77	0.01	1.40	1.01
1977-78	0.01	1.21	0.90
1978-79	0.01	1.11	0.84
1979-80	0.01	1.09	0.70
1980-81	0.00	0.92	0.53
1981-82	0.04	0.90	0.57
1982-83	0.22	0.87	0.62
1983-84	0.33	0.74	0.62
1984-85	0.34	0.85	0.69
1985-86	0.13	0.70	0.55
1986-87	0.15	0.70	0.62
1987-88	0.16	0.83	0.70
1988-89	0.12	0.83	0.72
1989-90	0.11	0.93	0.78
1990-91	0.09	0.98	0.75
1991-92	0.08	1.24	0.92
1992-93	0.08	1.13	0.85
1993-94	0.07	1.24	0.95
1994-95	0.07	1.14	0.92
1995-96	0.06	1.08	0.87
1996-97	0.05	1.13	0.86
1997-98	0.04	1.04	0.84
1998-99	0.01	0.92	0.78
1999-00	0.00	0.99	0.74
2000-01	0.12	1.22	0.88
2001-02	0.15	1.11	0.85
2002-03	0.15	1.15	0.86

APPENDIX. III

India's Export by Chapters And sections

No.	Chapters and Sections
	Section I - Live Animals: Animal Products
1	Live Animals
2	Meat and edible oil
3	Fish and crustaceans, molluscs and other aquatic invertebrates
3	Dairy Products; birds egg; natural honey; edible products of animal origin;
3	Products of animal origin
	Section II - Vegetable products
6	Live trees & other plants; bulbs, roots & the like; cut flowers & ornamental foliage
7	Edible vegetables and certain roots and tubers
8	Edible fruit & nuts; peel of citrus fruit or melons
9	Coffee, tea, mate & spices
10	Cereals
11	Products of the milling industry, malt, starches, insulin; wheat gluten
12	Oil seeds & oleaginous fruits, misc. grains, seeds & fruits; industrial or medicinal plants; straw & fodder
13	Lac: gums, resins & other vegetable saps & extracts
14	Vegetable plaiting materials, vegetable products not elsewhere specified or included
	Section III - Animal or vegetable Fats & Oils & their Cleavage Products: Animal or Vegetable Waxes
15	Animal or vegetable fats & oils & their cleavage products; animal or vegetable waxes
	Section IV - Prepared Foodstuffs: Beverages and Tobacco
16	Preparations of meat of fish or of crustaceans, molluscs or aquatic invertebrates
17	Sugars and sugar confectionery
18	Cocoa and Cocoa preparations
19	Preparations of cereals, flour, starch and milk, pastry cooks products
20	Preparations of vegetables, fruits, nuts or other parts of plants
21	Miscellaneous edible preparations
22	Beverages, spirits and vinegar
23	Residues and waste from the food industries: prepared animal fodder
24	Tobacco and manufactured tobacco substitutes
	Section V - Mineral Products
25	Salt; sulphur; earths and stone, plastering materials, lime and cement
26	Ores, slag and ash
27	Mineral fuel, mineral oils & products, bituminous substances; mineral waxes
	Section VI - Products of the Chemical or Allied Industries
28	Inorganic chemicals; compounds of precious metals, of rare-earth metals, of radio-active elements or of isotopes
29	Organic Chemicals
30	Pharmaceutical products
31	Fertilizers
32	Dyeing, tanning and colouring matter
33	Essential oils and resinoids, cosmetic and other similar preparations
34	Soap & other similar preparations, polishes & creams, candles and the like dental waxes & preparations
35	Albuminoidal substances: modified starches, glues, enzymes
36	Explosive: matches, certain combustible preparations
37	Photographic or cinematographic goods

No.	Chapters and Sections
38	Miscellaneous chemical products
	Section VII - Plastics & Rubber
39	Plastics and articles thereof
40	Rubber and articles thereof
	Section VIII - Hides & Skins: Leather Products: Fur skins and Articles Thereof
41	Raw hides and skins (other than furskins) and leather
42	Articles of leather: saddlery harness and animal gut
43	Furskins and articles fur, manufactures thereof
	Section IX - Wood, Cork and Articles Thereof Manufacture of Plaiting Materials, Basket ware & Wickerwork
44	Wood & articles of wood, wood charcoal
45	Cork & articles of cork
46	Manufactures of plaiting materials, basketware & wickerwork
	Section X - Paper and Paper-Board and Articles Thereof
47	Pulp of wood or of other material: waste and scrap of paper or paperboard
48	Paper and paperboard: articles of paper pulp of paper and paperboard
49	Printed books & other products of printing industry
	Section XI - Textile and Textile Articles
50	Silk
51	Wool, fine or coarse animal hair
52	Cotton
53	Other vegetable textile fibers: paper yarn and fabrics
54	Man-made filaments
55	Man-made staple fibers
56	Wadding, felt and nonwovens: special yarns; twine, cordage, ropes and cables and articles thereof
57	Carpets and other textile floor coverings
58	Special woven fabrics, tufted textile fabrics, lace tapestries, trimmings, embroidery
59	impregnated, coated & laminated textile fabrics, textile articles for industrial use
60	knitted or crocheted textiles
61	Articles of apparel and clothing accessories knitted or crocheted
62	Articles of apparel and clothing accessories, not knitted or crocheted
63	Other made up textile articles: sets, worn textile articles, rags
	Section XII - Footwear, Hand gear, Umbrellas, Prepared Feathers & Articles Thereof
64	Foot ware, galters and the like, parts of such articles
65	Headgear and parts thereof
66	Umbrella, walking & seat sticks, whips, riding crops & parts thereof
67	Prepared feathers & down with articles, artificial flowers: articles of human hair
	Section XIII - Stone, Cement and Similar Materials: Ceramic Products, Glass & Glassware
68	Articles of stone, plaster, cement, asbestos, mica or similar materials
69	Ceramic products
70	Glass & glassware
	Section XIV - Pearls Precious or Semi-Precious Stones/Metals and Articles Thereof: Imitation Jewellery & Coin
71	Pearls, precious or semi-precious stones/metals and articles thereof: imitation jewellery & coin
	Section XV - Base Metals & Articles of Base Metal
72	Iron & steel
73	Articles of iron & steel
74	Copper and articles
75	Nickel & articles
76	Aluminum & articles
78	Lead & articles

No.	Chapters and Sections
79	Zinc & articles
80	Tin and articles
81	Other base metals: cermets & articles
82	Tools and their parts of base metal
83	Miscellaneous articles of base metal
	Section XVI - Machinery & Their Parts, Electrical & Electronic Equipment, Parts Thereof
84	Nuclear reactors, boilers, machinery and mechanical appliances
85	Electrical machinery & equipment & parts thereof; sound & TV recorders & reproducers & parts
	Section XVII - Transport Equipment's
86	Railway/Tramway locomotives, truck etc.: equipment's and parts
87	Road vehicles and parts
88	Aircraft, spacecraft and parts
89	Ship, boat and floating structure
	Section XVIII - Instruments & Apparatus: Clocks & Watches; Parts & Accessories Thereof
90	Optical, measuring, medical & similar instruments & parts thereof
91	Clocks and watches and their parts
92	Musical instruments: parts and accessories
	Section XIX - Arms and Ammunition: Parts and Accessories Thereof
93	Arms and ammunition: parts and accessories thereof
	Section XX - Miscellaneous Manufactured Articles
94	Furniture, bedding and allied articles, lighting, fittings, illuminated articles, prefabricated buildings
95	Toys, games & sports requisites: parts and accessories thereof
96	Miscellaneous manufactured articles
	Section XXI - Works of Art, Collectors' Pieces and Antiques
97	Works of art, collectors' pieces and antiques
98	Project goods: some special uses
99	Miscellaneous goods

APPENDIX. IV

Annual Average Growth Rate of Exports of Live animal, animal products and Vegetable Products

Section	No.	1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section1	1	-6.97	4.37	11.03	6.75	8.14	12.25
	2	15.01	32.72	34.96	8.11	22.26	20.92
	3	9.05	37.05	26.92	9.31	11.18	16.78
	4	-1.17	42.26	37.25	37.14	57.48	37.11
	5	19.74	16.24	9.62	6.34	6.62	8.69
	Total	10.31	35.31	26.62	9.20	13.32	17.34
Section2	6	68.28	32.37	61.69	21.46	6.63	30.70
	7	16.90	24.42	33.29	8.88	21.06	20.14
	8	7.61	27.36	18.72	9.48	9.80	14.37
	9	10.19	2.28	24.51	17.43	-11.11	10.68
	10	25.93	35.97	10.75	17.13	-1.94	21.19
	11	63.08	78.79	31.34	-22.57	19.28	52.47
	12	51.23	1.21	42.04	6.52	19.57	18.89
	13	11.56	25.33	31.95	32.33	-5.18	22.68
	14	26.36	-0.82	19.23	7.52	9.32	9.34
	Total	13.86	14.24	43.09	11.22	-3.27	16.17

Source: DGCI&S

APPENDIX. V**Annual Average Growth Rate of Export of Animal or vegetable fats, food stuff
Beverage and Tobacco**

Sections	No.	1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section3	15	13.88	35.09	77.40	-6.57	9.99	22.75
	Total	13.88	35.09	77.40	-6.57	9.99	22.75
Section4	16	-22.60	17.34	66.70	26.24	94.90	28.34
	17	23.37	15.98	18.25	-16.51	24.91	15.07
	18	65.51	-15.56	11.63	1.94	14.82	20.02
	19	20.59	42.42	25.27	2.70	26.34	19.18
	20	7.73	20.00	36.25	6.51	26.09	20.93
	21	35.19	51.32	47.75	16.99	9.83	28.91
	22	15.07	63.41	3.15	91.09	37.50	13.74
	23	45.26	39.45	19.66	1.94	7.59	9.01
	24	1.72	39.78	9.31	27.32	3.84	12.03
	total	28.17	43.05	19.35	4.26	21.00	13.08

Source :DGCI&S

APPENDIX. VI**Annual Average Growth Rate of Exports of Mineral products**

Sections	No.	1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section5	25	37.35	24.29	24.58	-3.45	34.71	15.63
	26	22.25	8.01	17.88	-1.61	13.79	5.25
	27	26.34	27.99	5.07	-25.15	7.28	11.48
	total	23.62	16.76	13.22	-10.12	99.19	12.12

Source :DGCI&S

APPENDIX. VII**Annual Average Growth Rate of Exports of Products of Chemicals, Plastics
and Rubber and Leather**

Sections	No.	1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section6	28	10.92	-1.89	26.19	-0.32	43.66	21.55
	29	90.41	38.36	44.26	20.36	17.95	29.40
	30	64.57	16.76	26.87	14.93	17.95	18.39
	31	13.53	17.48	18.04	-23.02	11.06	33.83
	32	43.40	30.61	16.53	11.42	14.73	15.60
	33	37.21	13.16	25.34	15.48	17.01	13.73
	34	15.65	-7.33	66.39	-9.17	37.18	1.50
	35	7.20	96.37	49.21	43.98	46.50	46.93
	36	34.21	64.15	33.42	4.59	20.39	21.37
	37	48.24	24.26	7.08	53.76	-9.33	22.50
	38	64.19	35.79	42.06	25.52	15.43	29.56
	Total	68.27	18.58	30.90	15.71	17.57	20.90
Section7	39	75.41	42.99	78.93	-3.99	41.41	30.61
	40	39.34	54.36	17.77	5.81	13.58	17.14
	Total	46.09	49.20	40.57	0.21	29.28	23.75
Section 8	41	17.14	3.22	16.65	-2.78	28.62	7.84
	42	55.45	40.80	16.01	9.58	5.71	13.66
	43	75.11	17.43	0.00	0.00	24.99	18.54
	Total	29.69	-18.24	16.30	6.13	11.43	23.84

Source :DGCI&S

APPENDIX. VIII

Annual Average Growth Rate of Exports of Wood and Paper products

Section	No.	1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section9	44	19.32	12.32	95.87	-6.21	17.65	13.51
	45	-1.90	40.12	14.76	2.09	19.23	27.46
	46	-35.15	80.33	14.21	65.58	8.80	56.08
	total	18.09	12.49	94.66	-4.95	17.26	14.45
Section10	47	16.55	17.86	15.10	75.46	76.69	35.52
	48	42.40	67.81	73.21	-3.83	42.80	34.92
	49	28.43	14.13	29.07	17.43	12.28	20.71
	Total	30.82	35.06	56.06	2.35	33.04	29.27

Source :DGCI&S

APPENDIX. IX

Annual Average Growth Rate of Exports of Textiles

Section	No.	1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section11	50	35.29	24.21	5.65	20.72	20.62	16.42
	51	58.12	18.72	23.57	29.02	28.99	32.73
	52	23.40	38.24	29.47	11.59	4.71	15.52
	53	9.57	8.32	18.08	8.11	6.16	8.78
	54	80.12	43.27	29.26	-1.83	27.31	17.39
	55	10.45	42.33	41.81	11.48	15.24	26.53
	56	38.15	57.37	37.97	26.72	9.90	32.08
	57	28.29	31.92	8.78	7.54	2.48	9.98
	58	47.54	52.96	3.81	85.42	23.13	32.73
	59	35.31	44.58	30.57	12.53	2.56	17.55
	60	11.46	27.42	14.68	-12.05	-2.37	-0.47
	61	64.62	32.64	19.99	18.58	19.16	20.82
	62	30.17	28.01	21.83	13.29	5.89	16.23
	63	27.02	32.17	27.36	14.99	17.73	21.64
	total	31.92	30.78	22.52	11.84	9.92	16.99

Source :DGCI&S

APPENDIX. X

Annual Average Growth Rate of Exports of Foot wear, Ceramic and Glass products and precious stones

Section	No.	1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section12	64	29.54	22.80	17.70	7.83	8.39	10.97
	65	44.60	17.22	-2.42	29.30	11.78	15.00
	66	-11.78	29.96	39.86	22.24	38.03	5.90
	67	10.32	33.40	67.72	48.82	30.03	43.79
	Total	29.69	23.22	17.94	8.83	9.36	11.64
Section 13	68	45.02	65.94	43.45	10.26	16.40	26.69
	69	54.98	70.17	24.43	7.75	35.66	24.72
	70	34.48	33.67	52.66	-7.25	46.93	27.11
	Total	41.34	55.52	42.32	5.43	24.97	26.58
Section14	71	38.02	19.93	26.11	12.85	12.76	18.62
	Total	38.02	19.93	26.11	12.85	12.76	18.62

Source :DGCI&S

APPENDIX. XI
Annual Average Growth Rate of Exports of Base metals, Machinery and Transport Equipment

Sections	No.	1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section15	72	13.38	64.11	41.51	1.55	19.77	22.56
	73	64.77	29.62	16.27	20.81	22.15	22.39
	74	62.93	15.55	27.90	14.83	48.17	25.65
	75	13.21	22.90	9.55	31.10	38.98	19.83
	76	86.16	61.86	1.26	11.13	42.59	17.73
	78	6.70	83.18	17.86	-25.13	32.90	7.85
	79	75.84	22.93	50.84	13.95	20.39	37.64
	80	13.59	45.24	43.99	69.48	16.56	27.91
	81	22.27	56.25	60.30	33.53	-4.77	39.46
	82	37.70	25.42	23.94	6.80	19.23	17.82
	83	36.31	48.33	24.90	8.95	22.97	21.00
	Total	67.19	42.95	23.76	8.88	23.44	21.43
Section16	84	32.65	18.35	24.40	12.67	24.83	18.43
	85	42.51	15.17	46.36	12.11	23.13	24.58
	Total	35.82	16.01	32.73	12.34	24.00	20.87
Section17	86	32.21	31.98	-22.58	2.95	96.18	-3.24
	87	44.56	47.73	28.61	-1.58	13.64	16.09
	88	4.73	62.68	-0.70	15.08	13.11	30.59
	89	21.24	17.26	15.04	16.25	-3.40	38.93
	Total	39.73	44.23	26.02	1.43	16.08	16.23

Source :DGCI&S

APPENDIX. XII
Annual Average Growth Rate of Exports of Other Products

Sections		1987-89	1990-92	1993-95	1996-99	2000-02	1991-02
Section18	90	37.24	-5.94	27.02	27.20	39.39	26.09
	91	22.33	85.80	63.11	4.43	37.33	45.22
	92	62.15	-1.00	31.22	5.60	-6.09	10.40
	Total	40.12	-1.61	33.28	20.56	35.80	25.83
Section19	93	26.33	17.81	-25.80	14.43	14.61	33.62
	Total	26.33	17.81	-25.80	14.43	14.61	33.62
Section20	94	34.43	64.38	21.48	20.15	43.30	30.87
	95	22.86	23.36	35.90	7.45	5.29	15.90
	96	50.59	42.64	64.55	5.96	15.75	25.38
	Total	28.29	34.18	44.60	8.01	16.51	22.47
Section21	97	20.51	22.73	24.88	16.00	25.44	22.55
	98	23.25	18.98	26.24	44.54	-46.75	5.15
	99	23.54	28.05	21.11	24.88	27.22	24.13
	Total	23.07	30.57	20.91	25.86	23.55	22.79
	Total Export	30.63	25.01	25.63	9.49	14.94	17.77

Source :DGCI&S

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**Export of Manufactured Goods From India as per Standard Industrial Trade
Classification (SITC) –Description of Items**

APPENDIX. XIII

Description of Resources Intensive Products

Code	Name
411	Animal oils and fats
421	Fixed vegetable .fat, oils
422	Fixed vegetable .fat, oils, other
431	Animal, vegetable fats, oils,
611	Leather
612	Manufacture of leather etc.
641	Paper and paperboard
661	Lime, cement, construction materials
662	Clay, construction .material
663	Mineral manufactures
681	Silver, platinum, etc.
682	Copper
683	Nickel
684	Aluminium
685	Lead
686	Zinc
687	Tin
689	Miscellaneous non-ferrous base metal

APPENDIX. XIV

Description of Labour Intensive Product

Code	Name
651	Textile yarn
652	Cotton fabrics, woven
653	Fabrics, man-made fibres
654	Cloth -textile, fabric, woven
855	Knit. Crochet .fabric
656	Tulle ,lace, embroidery. etc
657	Special yarn, textiles. fabric
691	Metallic structures
692	Containers, storage ,transshipments
695	Tools
697	Household equipment,
821	Furniture ,cushions, etc.
831	Trunk, suit-cases ,bag ,etc
841	Men's, boys clothing
842	Women, girl clothing
851	Footwear
899	Miscellaneous manufactured goods

APPENDIX. XV
Description of Differentiated Product

Code	Name
711	Steam generators. boilers, etc.
712	Steam turbines
714	Engines, motors non-elect
716	Rotating electric plant
718	Other power Generating machinery
722	Tractors
723	Civil engineering equipment
724	Textile, leather machines
725	Paper, pulp mill machines
728	Other machine ,parts, special industries
731	Metal removal work tools
733	Machine tools, metal-working
735	Parts for mach-tools
812	Plumbing, sanitary ,equipment etc

APPENDIX. XVI
Description of Scale Intensive Products

Code	Name
512	Alcohol, phenol, etc. derivatives
513	Carboxylic acids, derivatives
514	Nitrogen-function compounds
515	Organic-inorganic compounds
531	Synthetic colours, lace, etc.
532	Dyeing, tanning materials
581	Plastic tube, pipe ,hose
629	Articles of rubber,
642	Paper, paperboard, cut etc
664	Glass
665	Glassware
667	Pearls, precious stones
671	Pig iron ,spiegeleisn, etc
672	Ingots etc. iron or steel
673	Flat-rolled iron etc.
674	Flat-rolled plated iron
675	flat-rolled, alloy steel
676	Iron, steel bar, shapes etc.
677	Railway track iron, steel
679	Tubes, pipes, etc. iron, steel
693	Wire products exclusive .electrical
694	Nails, screws, nuts, etc.
892	Printed matter
893	Articles of plastics
894	Baby carriage, toys, games
897	Gold, silverware, jewel

APPENDIX. XVII
Description of Science Based Products

Code	Name
533	Pigments, paints, etc.
541	Medicines, etc.
551	Essential. oil, perfume ,flavor
553	Perfumery, cosmetics, etc.
554	Soap, cleaners ,polish, etc
891	Arms and ammunition

APPENDIX. XVIII
Description of Miscellaneous Products

Code	Name
571	Polymers of ethylene
895	Office, stationery supply
896	Works of art, antique etc

APPENDIX. XIX
Annual Average Growth Rate of Import of
labour Intensive Commodities

Code	1990-95	1996-02	1991-02
652	-3.12	32.50	17.66
653	29.13	15.72	21.31
654	18.75	39.60	30.91
655	16.57	35.90	27.84
656	38.73	16.85	25.97
657	30.28	9.33	18.06
691	18.95	14.64	58.10
692	32.23	14.19	21.71
695	11.61	9.06	10.13
697	59.19	40.74	48.43
821	15.86	34.99	68.68
831	5.62	0.76	2.52
841	3.18	3.11	3.71
842	6.18	4.93	5.31
851	15.86	0.69	7.01
899	4.83	9.78	7.71

Source: World Bank COM-TRADE Data base

APPENDIX. XX

Annual Average Growth Rate of Imports of Resource Based Products

Code	1991-95	1996-02	1991-02
411	21.52	15.36	18.20
421	64.90	59.84	62.17
422	91.76	17.36	51.70
431	40.07	18.79	28.61
611	17.70	8.87	12.95
612	26.91	1.95	13.47
641	18.69	-1.55	7.79
661	22.17	50.47	37.41
662	20.36	10.59	15.10
663	10.81	4.96	7.66
681	18.54	7.57	17.78
682	10.66	-13.79	-2.50
683	14.53	12.40	13.38
684	31.64	-0.05	14.58
685	2.82	19.40	11.75
686	-1.69	6.16	2.54
687	7.16	2.91	4.87
689	16.54	-3.83	5.57
851	19.37	0.69	9.32

Source: World Bank COM-TRADE Data base

APPENDIX. XXI

Annual Average Growth Rate of Imports of Differentiated Products

Code	1991-95	1996-02	1991-02
711	47.73	19.48	32.52
712	25.54	8.71	16.48
714	72.38	31.25	50.23
716	41.08	-6.31	15.57
718	18.25	1.45	9.20
722	16.67	-9.56	8.08
723	-4.90	18.26	7.57
724	34.49	-4.31	13.60
725	84.55	5.11	41.77
728	22.48	-2.07	9.26
731	22.57	-0.09	10.36
733	59.81	-7.89	23.36
735	-2.28	2.75	0.43
812	23.96	14.79	19.03

Source: World Bank COM-TRADE Data base

APPENDIX. XXII
Annual Average Growth Rate of Imports of
Scale Intensive Commodities

Code	1991-95	1996-02	1991-02
512	8.46	10.42	9.51
513	32.73	-1.33	14.39
514	14.19	7.06	10.35
515	3.19	6.25	4.84
531	26.18	7.35	16.04
532	12.41	6.21	9.07
581	47.53	36.18	41.42
629	12.35	8.61	10.34
642	24.10	5.20	13.92
664	8.57	3.69	5.94
665	0.07	22.92	12.37
667	0.13	17.79	9.64
671	3.52	-1.25	0.95
672	65.07	-11.17	24.02
673	10.15	-5.93	1.49
674	12.84	3.66	7.90
675	5.52	-5.96	-0.67
676	10.42	-0.18	4.71
677	22.71	33.80	28.68
679	-2.40	2.90	0.45
693	20.52	17.36	18.82
694	21.74	14.19	17.68
892	14.42	16.02	15.28
893	42.08	7.79	23.62
894	42.26	22.72	31.74
897	13.98	48.81	15.81

Source: World Bank COM-TRADE Data base

APPENDIX. XXIII
Annual Average Growth Rate of Imports of
Science Based Products

Code	1991-95	1996-02	1991-02
533	9.13	12.33	10.85
541	25.23	4.53	14.09
551	7.09	14.19	10.92
553	55.01	48.42	51.46
554	15.67	3.52	9.13
891	60.07	76.91	69.14

Source: World Bank COM-TRADE Data base

APPENDIX. XXIV
Annual Average Growth Rate of Import of
Miscellaneous Products

Code	1991-95	1996-02	1991-02
571	4.46	-5.52	-0.91
895	27.59	6.48	16.22
896	16.73	61.10	19.85

Source: World Bank COM-TRADE Data base

APPENDIX. XXV
Manufacturing Industries in India

Code	Name
20-21	Manufacture of food products
22	Manufacture of beverages and tobacco
23+24+25	Manufacture of Textiles
26	Manufacture of textile products
27	Manufacture of wood and wood products
28	Manufacture of paper and paper products.
29	Manufacture of leather and leather products
30	Manufacture of chemicals and chemical products
31	Manufacture of rubber, plastic, petroleum and coal products
32	Manufacture of non-metallic mineral products
33	Basic metal and alloy industries
34	Manufacture of metal products and parts
35+36	Manufacture of machinery and equipment
37	Manufacture of transport equipment
38	Other manufacturing industries
All	All Manufacturing

APPENDIX. XXVI
Concordance Table

ISIC Classification	ASI Code	ASI Code
ISIC 3 digit description	NIC 87	NIC 98
311 Food products	20-21	151+152+153+154
313 Beverages + 314 Tobacco	22	155+16
321 Textiles	23+24+25	171
322 Wearing apparel except footwear	26	172+173+181
323 Leather products + 324 Footwear except rubber or plastic	29	182+19
331 Wood products except furniture + 332 Furniture except metal	27	20+361
341 Paper and products + 342 Printing and Publishing	28	21+22
351 Industrial chemicals + 352 Other Chemicals	30	24
353 Petroleum refineries + 354 Miscellaneous Petroleum and coal products + 355 Rubber products + 356 Plastic Products	31	23+25
361 Pottery china earthenware + 362 Glass and products + 369 other non-metallic mineral products	32	26
371 Iron and steel + 372 Non-Ferrous metals	33	27+371
381 Fabricated metal products	34	2811+2812+289
382 Machinery except electrical + 383 Machinery electric	35+36	2813+29+30+31+32
384 Transport equipment	37	34+35
385 Professional and scientific equipment + 390 Other Manufactures products	38	33+369

APPENDIX. XXVII

Export Intensity of Indian Manufacturing Industries

Year	20-21	22	23+24+ 25	26	29	27	28	30	31	32	33	34	35+36	37	38
1980	14.2	11.4	15.1	53.7	58.9	7.3	0.9	3.5	1.3	2.7	1.3	14.2	3.9	8.3	124.5
1981	15.5	19.4	13.9	60.3	74.2	6.3	1.1	3.8	1.1	2.4	1.0	15.0	4.0	7.0	130.1
1982	13.7	16.9	12.7	43.5	70.1	6.3	0.8	3.5	2.5	1.7	0.9	13.5	3.7	5.4	126.8
1983	11.6	11.5	12.3	58.0	77.0	3.8	0.9	3.2	4.0	1.7	0.7	12.4	3.4	3.8	229.5
1984	11.9	8.0	13.9	80.5	101.9	4.0	1.0	4.0	3.4	1.4	0.9	11.4	3.9	4.4	188.6
1985	10.6	8.0	12.2	77.0	88.2	3.6	0.8	3.2	5.5	1.2	0.8	8.3	4.0	3.9	213.4
1986	9.9	7.6	13.3	82.3	87.9	4.4	0.8	3.3	3.4	1.1	0.6	7.7	4.3	3.6	216.9
1987	9.8	4.4	19.1	101.6	115.3	3.4	0.9	4.7	4.9	1.1	0.9	10.8	5.3	3.7	278.7
1988	8.9	3.8	17.9	87.4	93.1	3.0	0.8	6.2	3.6	1.6	2.8	11.8	5.6	4.4	343.0
1989	11.1	4.3	22.1	123.0	97.6	3.1	1.1	9.4	4.8	2.0	3.7	14.3	6.7	5.3	404.5
1990	9.0	5.6	23.2	102.0	89.5	2.9	0.9	8.4	5.5	2.2	2.8	14.4	5.7	5.6	267.8
1991	11.0	5.1	25.3	112.1	76.6	3.9	1.1	10.8	4.5	2.9	3.4	15.0	5.7	7.4	290.9
1992	12.7	6.5	31.0	124.8	87.1	5.4	1.6	10.0	9.4	4.1	5.6	21.6	6.0	10.2	336.6
1993	14.0	4.7	32.1	114.6	88.8	14.8	1.8	10.1	8.3	6.1	6.5	22.7	6.5	9.2	322.0
1994	12.9	2.6	33.7	101.1	83.9	10.5	2.8	13.1	7.7	8.3	6.6	19.0	8.0	10.8	270.7
1995	18.7	2.0	31.9	90.1	79.0	8.8	3.4	13.4	7.4	7.7	6.8	20.9	8.4	9.7	271.7
1996	17.0	4.3	35.8	80.3	71.9	9.7	2.7	12.7	6.0	6.8	6.1	18.8	8.4	7.3	204.3
1997	15.1	2.8	35.6	86.5	71.0	6.6	2.2	14.6	5.1	7.0	8.1	18.6	9.2	6.8	220.3
1998	14.8	2.4	29.1	89.1	72.3	6.8	2.7	11.8	3.5	6.3	4.6	18.8	8.2	6.6	233.2
1999	14.0	2.2	39.4	86.2	77.7	1.2	3.0	12.0	3.7	6.7	5.2	21.9	8.6	9.3	201.1

APPENDIX. XXVIII

Import Intensity of Indian Manufacturing Industries(%)

Year	20-21	22	23+24 +25	26	29	27	28	30	31	32	33	34	35+36	37	38
1980	11.1	0.1	0.5	0.1	0.2	1.4	12.6	17.9	38.5	9.0	17.6	14.2	13.5	17.6	137.4
1981	10.1	0.1	0.5	0.0	0.1	0.7	15.4	16.9	27.2	5.2	18.7	22.7	15.6	9.1	126.1
1982	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1
1983	8.3	0.2	1.3	0.1	1.0	0.9	12.8	15.0	12.8	6.7	13.2	34.2	23.7	11.2	53.1
1984	10.4	0.1	1.1	0.2	1.5	0.9	15.8	20.3	19.9	2.6	12.2	28.7	21.8	8.7	39.7
1985	9.7	0.6	1.3	0.2	1.3	3.7	17.5	23.0	12.5	2.8	15.7	41.4	27.1	11.6	60.8
1986	6.5	0.5	1.2	0.3	2.3	6.8	16.2	18.0	5.3	2.9	14.6	49.9	35.5	14.1	59.3
1987	8.6	0.2	1.6	0.2	2.4	3.8	15.7	14.3	7.2	2.5	12.7	35.1	25.8	10.7	58.4
1988	5.8	0.3	2.5	0.2	1.9	4.8	15.1	19.2	9.6	3.2	14.9	31.1	22.7	9.2	51.9
1989	3.4	0.4	2.3	0.2	4.6	2.5	15.3	23.1	12.7	3.0	15.1	33.4	23.5	15.0	68.0
1990	2.0	0.3	1.9	0.1	6.5	4.0	15.5	20.4	22.1	2.7	11.3	34.9	20.1	13.4	53.1
1991	1.7	0.1	1.8	0.1	5.5	2.1	10.6	22.2	18.0	2.3	7.9	23.6	15.2	6.3	42.5
1992	2.1	0.2	3.4	0.2	6.9	4.0	12.3	24.5	29.7	2.3	9.8	34.3	20.7	9.6	304.7
1993	1.9	0.2	2.9	0.1	9.2	3.0	13.4	20.0	24.6	2.2	8.5	26.5	21.1	19.8	236.1
1994	7.1	0.5	4.4	0.1	6.5	5.7	13.9	26.2	24.6	3.3	14.3	29.3	29.8	16.3	121.9
1995	5.1	0.6	3.8	0.1	6.6	8.7	18.7	29.1	33.6	3.2	15.2	32.6	34.2	12.7	139.3
1996	5.1	0.5	2.5	0.2	6.1	8.0	14.3	21.6	32.7	2.4	13.0	26.5	26.5	12.0	143.1
1997	5.0	0.6	2.9	0.2	7.0	7.6	17.5	23.1	29.2	2.8	14.4	25.5	29.8	8.1	168.4
1998	10.2	0.5	2.9	0.3	6.7	9.8	18.0	19.8	22.9	3.2	10.1	24.3	28.2	7.9	176.0
1999	9.4	0.4	3.8	0.3	7.0	11.7	19.2	19.5	23.7	3.3	11.1	27.4	28.6	10.8	145.7

APPENDIX.XXIX

Import Penetration Ratio of Indian Manufacturing Industries

Year	20-21	22	23+24 +25	26	29	27	28	30	31	32	33	34	35+36	37	38
1980	11.5	0.1	0.6	0.2	0.5	1.5	11.3	15.6	28.1	8.4	15.1	14.2	12.3	16.1	121.7
1981	10.6	0.1	0.6	0.1	0.5	0.8	13.5	15.0	21.6	5.0	15.9	21.1	14.0	8.9	131.4
1982	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	-0.3
1983	8.6	0.2	1.4	0.3	4.1	1.0	11.5	13.4	11.8	6.3	11.8	28.0	19.7	10.4	-69.6
1984	10.6	0.1	1.2	0.8	4.7	0.9	13.8	17.5	17.1	2.5	11.0	24.5	18.5	8.3	-81.3
1985	9.8	0.6	1.4	0.9	9.8	3.7	15.0	19.2	11.7	2.8	13.6	31.1	22.0	10.8	-115.5
1986	6.8	0.6	1.4	1.7	15.8	6.6	14.1	15.7	5.2	2.9	12.8	35.1	27.1	12.8	-102.9
1987	8.7	0.2	1.9	13.3	18.4	3.8	13.6	13.1	7.0	2.5	11.4	28.3	21.4	10.0	-48.5
1988	6.0	0.3	2.9	1.5	21.2	4.7	13.2	17.0	9.1	3.2	13.3	26.1	19.4	8.8	-27.2
1989	3.7	0.4	2.9	-0.8	65.1	2.5	13.4	20.3	11.8	3.0	13.6	28.0	20.1	13.6	-28.8
1990	2.2	0.3	2.5	3.4	38.1	4.0	13.5	18.2	18.9	2.7	10.5	29.0	17.6	12.4	-46.3
1991	1.9	0.1	2.4	0.6	19.0	2.1	9.7	20.0	15.8	2.3	7.6	21.7	13.9	6.3	-28.6
1992	2.4	0.2	4.6	0.7	34.9	4.1	11.1	21.4	24.7	2.3	9.4	30.4	18.1	9.6	447.7
1993	2.2	0.3	4.0	0.9	45.0	3.4	12.0	18.2	21.1	2.3	8.4	25.5	18.4	17.9	1679.6
1994	7.5	0.5	6.2	11.5	28.9	6.0	12.5	23.2	21.0	3.4	13.3	26.6	24.5	15.5	-249.4
1995	5.9	0.6	5.2	1.3	23.9	8.7	16.2	25.2	26.6	3.4	14.0	29.2	27.2	12.3	-429.6
1996	5.8	0.5	3.8	0.9	17.8	8.2	12.8	19.8	25.8	2.5	12.1	24.6	22.5	11.5	368.8
1997	5.6	0.6	4.3	1.3	19.5	7.5	15.2	21.3	23.5	2.9	13.5	23.8	24.7	8.0	350.5
1998	10.7	0.5	4.0	2.4	19.5	9.5	15.6	18.3	19.1	3.3	9.6	23.0	23.5	7.8	410.8
1999	9.8	0.4	5.9	1.8	23.8	11.7	16.5	18.1	19.7	3.5	10.5	26.0	23.9	10.6	326.7

APPENDIX.XXX

Openness Index of Indian Manufacturing Industries

Year	20-21	22	23+24 +25	26	29	27	28	30	31	32	33	34	35+36	37	38
1980	47.18	2.97	29.02	9.31	9.19	0.60	4.86	36.59	45.80	4.11	27.91	9.29	25.71	17.92	26.12
1981	47.83	5.08	27.53	12.07	9.23	0.54	6.60	39.38	40.78	2.98	33.26	12.36	33.23	12.81	29.24
1982	51.24	5.31	28.06	9.79	9.65	0.56	6.34	43.06	32.10	4.69	31.96	17.92	55.41	16.63	20.17
1983	54.79	3.49	27.40	13.42	10.43	0.38	7.79	55.53	45.16	2.49	26.39	14.64	48.27	12.08	33.13
1984	56.32	3.41	33.06	16.99	14.06	0.65	10.55	70.27	32.66	2.92	39.39	21.01	65.97	17.05	33.86
1985	47.35	3.33	31.92	19.45	15.19	0.93	10.40	63.54	26.95	3.39	41.96	25.85	98.56	21.49	42.40
1986	54.16	3.17	36.30	23.07	16.75	0.75	11.16	56.89	29.36	3.04	38.23	18.22	76.77	19.03	50.06
1987	49.95	2.14	51.57	29.99	21.85	0.83	11.51	81.48	40.92	3.85	46.94	20.93	80.20	18.27	59.69
1988	41.36	1.94	47.66	30.29	23.00	0.58	10.81	97.55	45.70	4.08	57.75	24.88	85.78	29.22	83.32
1989	50.68	2.46	62.91	46.95	27.91	0.85	14.47	117.99	85.03	4.97	58.83	33.11	98.38	34.10	98.78
1990	49.76	3.54	81.12	54.17	30.90	0.55	9.68	118.86	77.93	4.79	42.01	25.90	76.35	22.06	87.37
1991	68.55	4.04	106.36	68.54	34.28	0.94	14.10	169.65	106.06	7.26	59.45	40.27	115.44	35.47	193.84
1992	95.18	6.24	146.39	100.10	45.60	1.13	18.78	187.98	134.98	11.16	80.71	45.85	145.88	76.23	257.62
1993	133.53	4.72	155.34	90.96	41.76	2.86	21.22	238.46	147.99	15.27	118.19	53.50	189.50	68.55	236.41
1994	121.67	3.13	178.23	111.37	50.15	3.07	33.07	304.87	205.35	19.24	133.63	59.82	259.71	73.13	272.70
1995	186.45	2.72	198.53	123.30	53.64	2.86	33.77	301.31	241.52	20.00	146.54	66.33	261.02	93.51	331.74
1996	186.53	5.13	232.46	122.40	47.39	3.23	37.51	325.21	218.34	21.29	146.58	67.09	288.21	76.19	329.87
1997	244.19	4.14	251.46	135.89	52.45	3.29	35.45	357.40	178.06	24.37	146.93	71.64	293.53	72.60	387.52
1998	241.72	3.86	225.17	144.45	54.02	3.10	37.00	350.98	172.21	22.26	130.26	74.63	291.16	66.97	420.81
1999	161.27	3.47	214.13	157.34	53.75	1.34	5.08	137.94	465.76	23.93	42.86	34.45	155.61	38.11	256.59

APPENDIX. XXXI

India's Manufactured Export ISIC 3 Digit Description

Code	Name
311	Food products
313	Beverages
314	Tobacco
321	Textiles
322	Wearing apparel except footwear
323	Leather products
324	Footwear except rubber or plastic
331	Wood products except furniture
332	Furniture except metal
341	Paper and products
342	Printing and Publishing
351	Industrial chemicals
352	Other Chemicals
353	Petroleum refineries
354	Miscellaneous Petroleum and coal products
355	Rubber products
356	Plastic Products
361	Pottery china earthenware
362	Glass and products
369	Other non-metallic mineral products
371	Iron and steel
372	Non-Ferrous metals
381	Fabricated metal products
382	Machinery except electrical
383	Machinery electric
384	Transport equipment
385	Professional and scientific equipment
390	Other. Manufacturing products

APPENDIX. XXXII
Export Performance of Resource Intensive Products-ISIC Four Digit Classification

Code	Name
3111	Slaughtering, preparing and preserving meat
3113	Canning and preserving of fruits and vegetables
3114	Canning, preserving and processing of fish crustacean and similar food
3115	Manufacture of vegetable and animal oils and fat
3231	Tanneries and leather finishing
3233	Manufacture of product of leather and leather substitute except footwear
3311	Saw mills planning and other wood mills
3319	Manufacture of wood and cork product not elsewhere classified
3691	Manufacture of structural clay product
3692	Manufacture of cement lime and plaster
3699	Manufacture of non-metallic mineral product not else where classified
3813	Manufacture of structural metal products

APPENDIX. XXXIII
Description of Scale Intensive Products-ISIC Four Digit Classification

Code	Name
3419	Manufacture of pulp paper and paperboard articles not elsewhere classified
3420	Printing, publishing and allied industries
3511	Manufacture of basic industrial chemicals except fertilizers
3512	Manufacture of fertilizers and pesticides
3513	Manufacture of synthetic resins, plastic materials and man-made fibers except
3529	Manufacture of chemical product not else where classified
3551	Tyre and tube industries
3559	Manufacture of rubber product not else where classified
3560	Manufacture of plastic product not elsewhere classified
3610	Manufacture of pottery china and earthenware
3620	Manufacture of glass and glass product
3710	Iron and steel basic industries
3901	Manufacture of jewellery and related articles
3903	Manufacture of sporting and athletic goods

APPENDIX. XXXIV

Description of labour Intensive Products-ISIC Four Digit Classification

Code	Name
3211	Spinning, weaving and finishing textiles
3212	Manufactures of made up textile goods except wearing apparel
3213	Knitting mills
3214	Manufacture of carpets and rugs
3233	Manufacture of product of leather and leather substitute except footwear
3240	Manufacture of footwear except vulcanized or moulded rubber or plastic foot wears
3411	Manufacture of pulp paper and paperboard
3412	Manufacture of containers and boxes of papers and paperboard
3419	Manufacture of pulp paper and paperboard articles not elsewhere classified
3513	Manufacture of synthetic resins, plastic materials and man-made fibers except
3811	Manufacture of cutlery hand tools and general hardware
3812	Manufacture of furniture and fixtures primarily of metals
3819	Manufacture of fabricated metal product except machinery and equipment not else
3841	Ship building and repairing
3909	Manufacturing industries not else where classified

APPENDIX. XXXV

Description of Science Based Products-ISIC Four Digit Classification

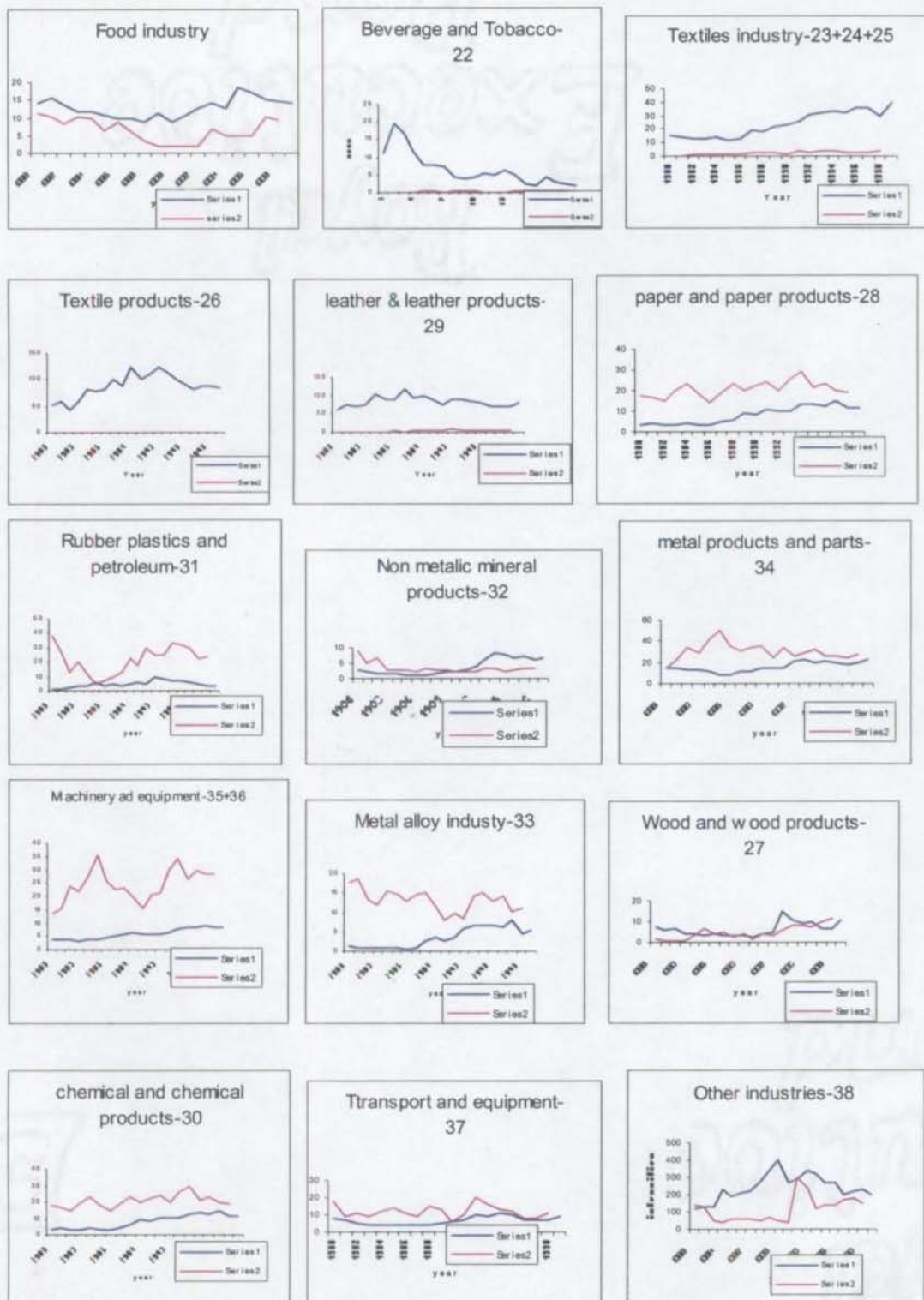
Code	Name
3522	Manufacture of drugs and medicines
3523	Manufacture of soap and cleaning preparations, perfumes cosmetics and other
3832	Manufacture if radio television and communication equipment and apparatus
3851	Manufacture of professional and scientific and measuring and controlling equipment
3852	Manufacture of photographic and optical goods
3853	Manufacture of watches and clocks

APPENDIX. XXXVI

Export Performance of Differentiated Products-ISIC Four Digit Classification

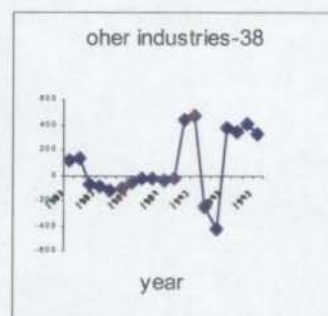
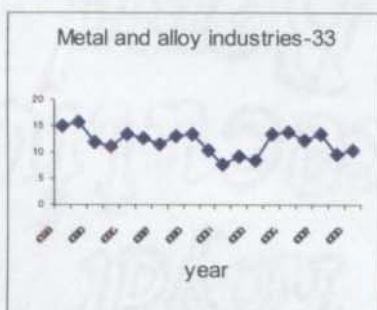
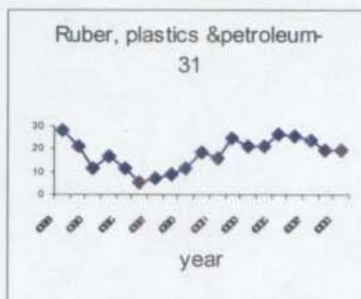
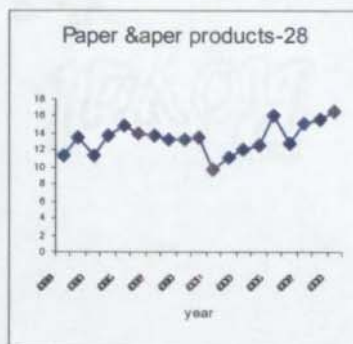
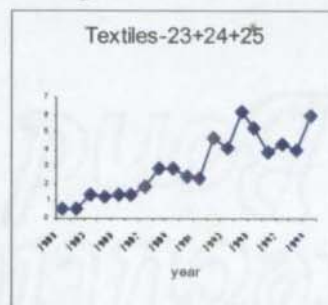
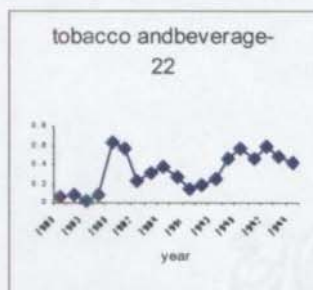
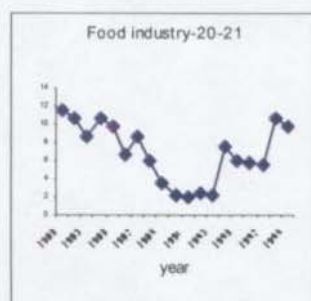
Code	Name
3823	Manufacture of metal and wood working machinery
3824	Manufacture of special industrial machinery and equipment except metal and wood
3825	Manufacture of office computing and accounting machinery
3829	Machinery and equipment except electrical not else where classified
3831	Manufacture of electrical industrial machinery and apparatus
3832	Manufacture if radio television and communication equipment and apparatus
3833	Manufacture of electrical appliance and house ware
3839	Manufacture of electrical apparatus and supplies not else where classified
3842	Manufacture of railroad equipment
3843	manufacture of motor vehicles
3844	Manufacture of motorcycles and bicycles

Appendix XXXVII Export and Import Intensities of Indian Manufacturing Industries Series 1-export intensity, Series2-import intensities



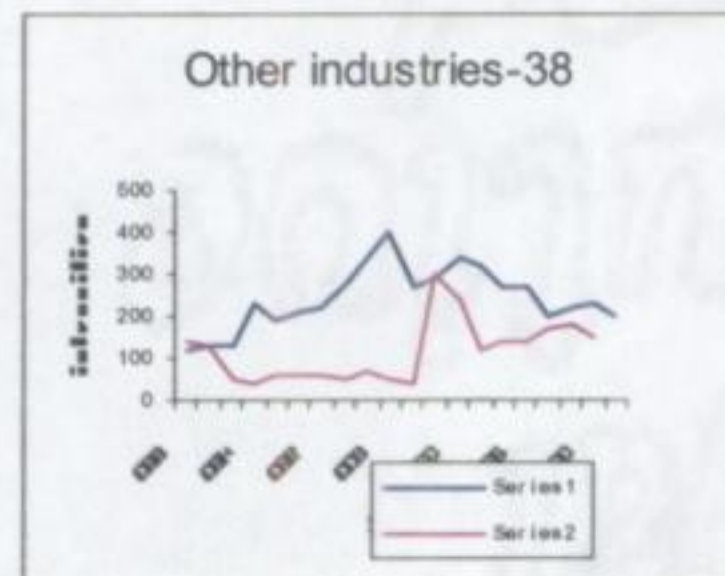
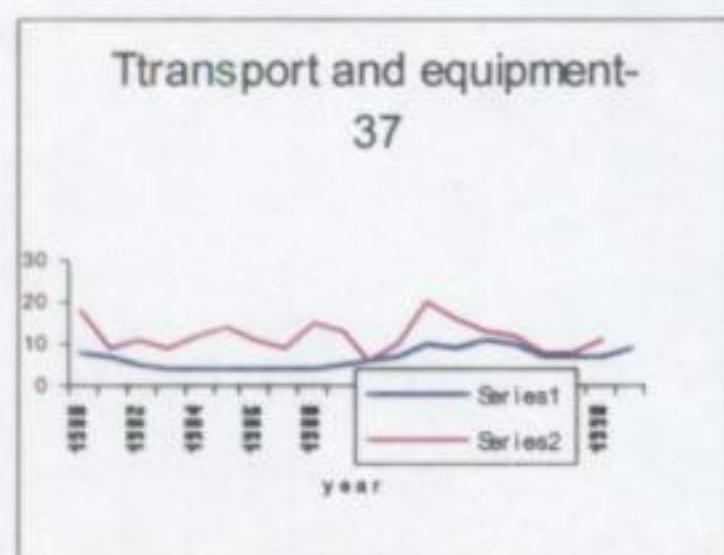
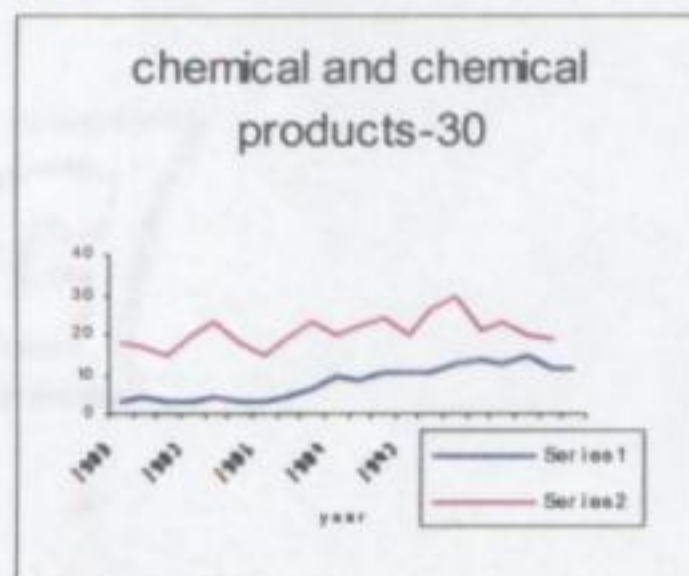
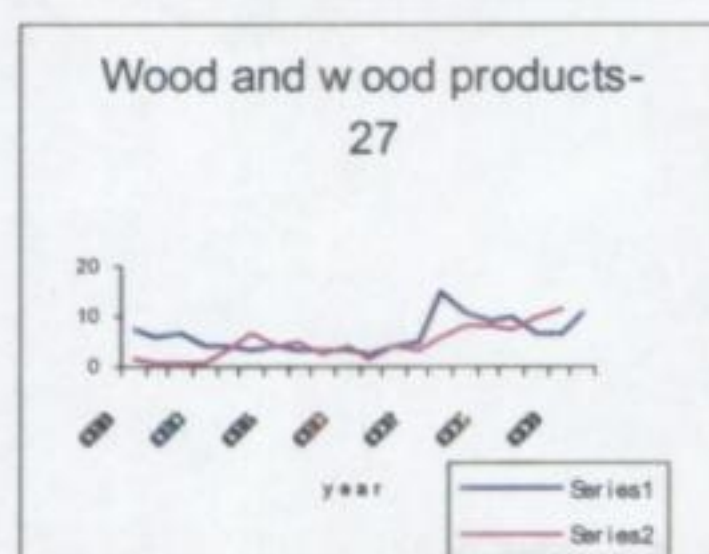
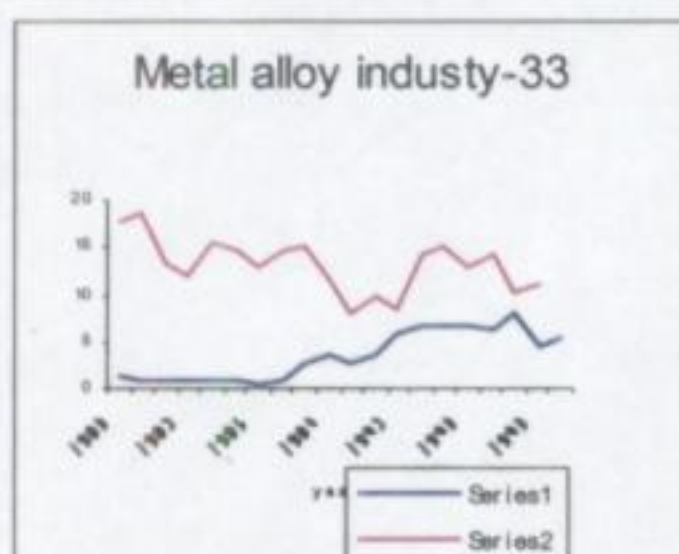
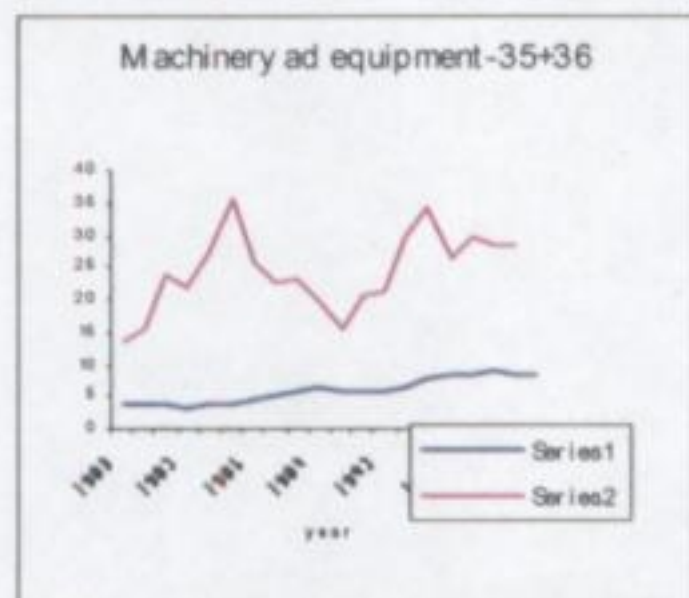
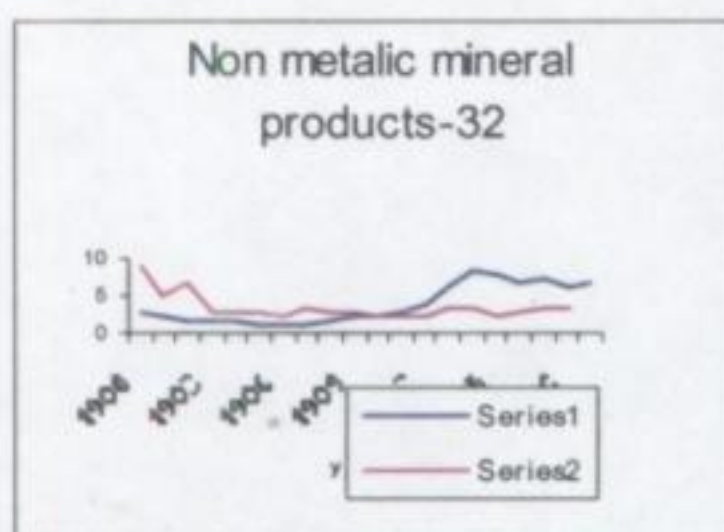
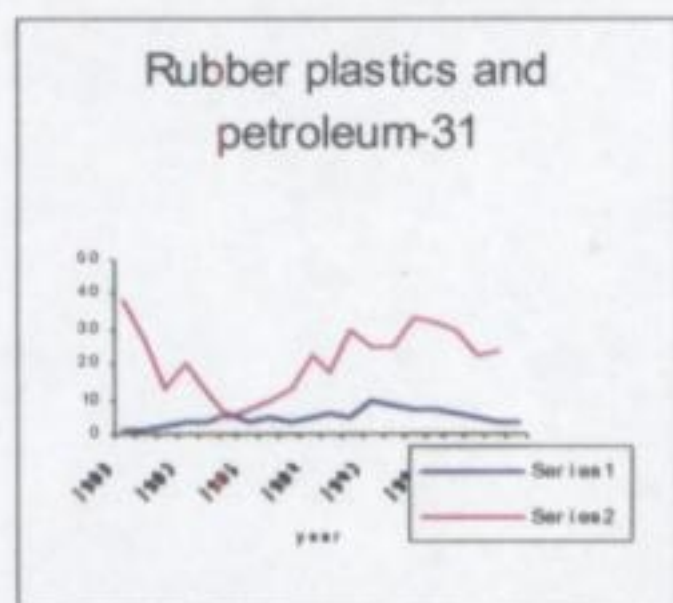
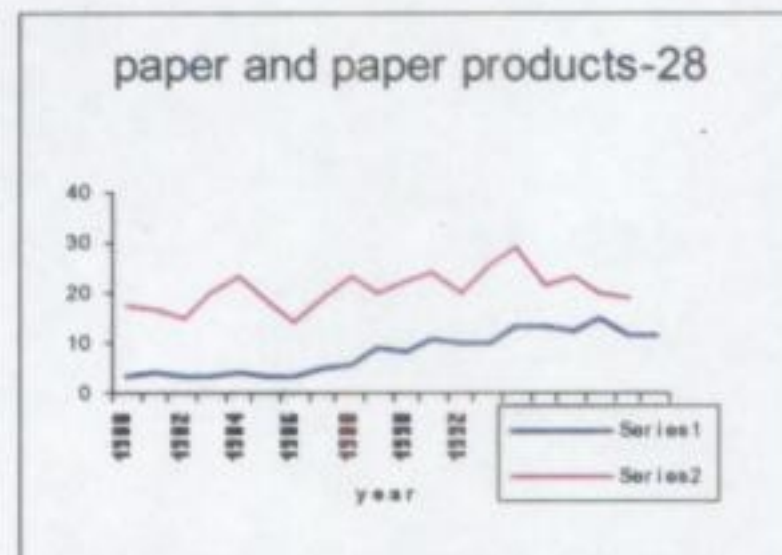
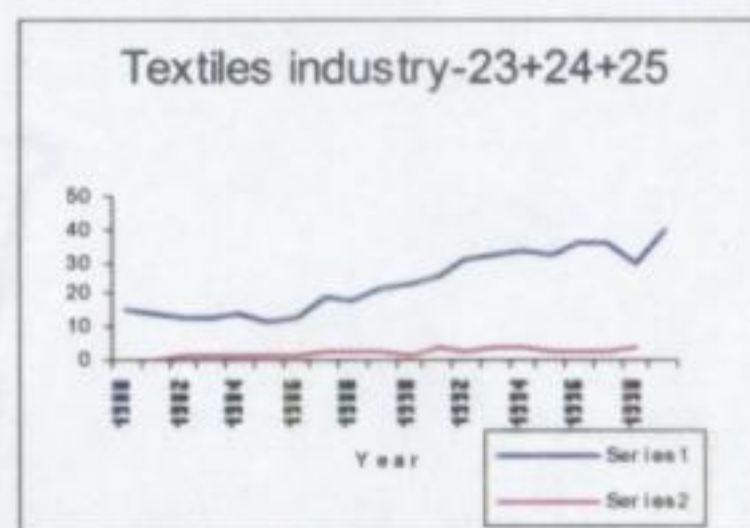
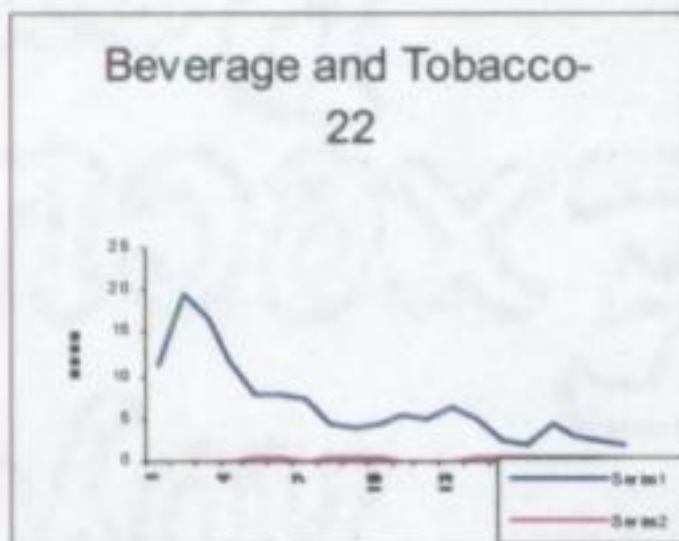
Appendix XXXVIII

Import Penetration Ratio of Indian Manufacturing Industries



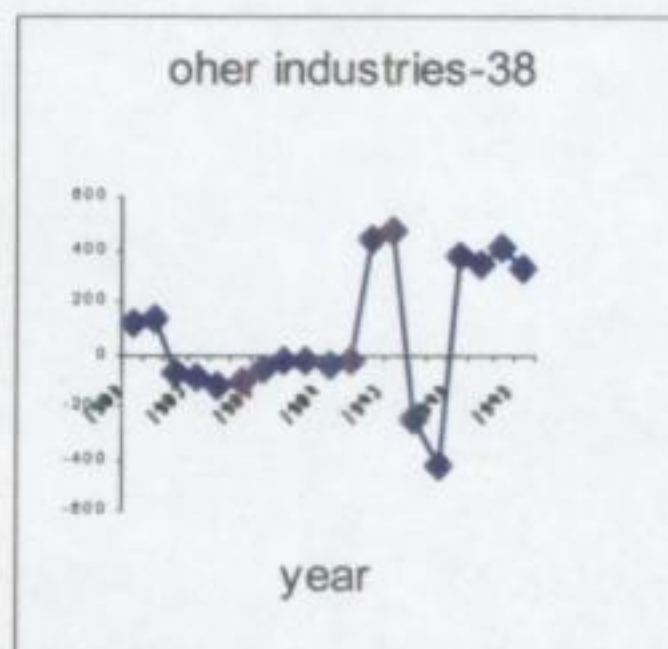
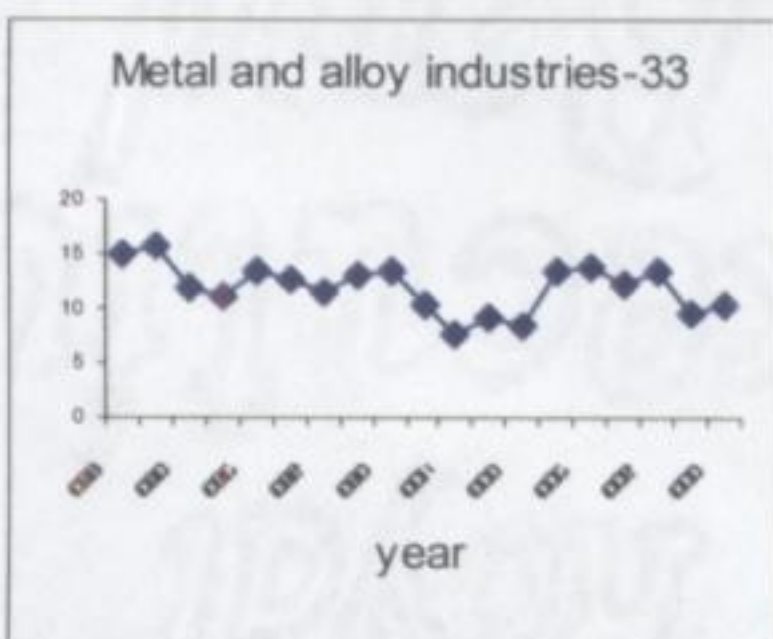
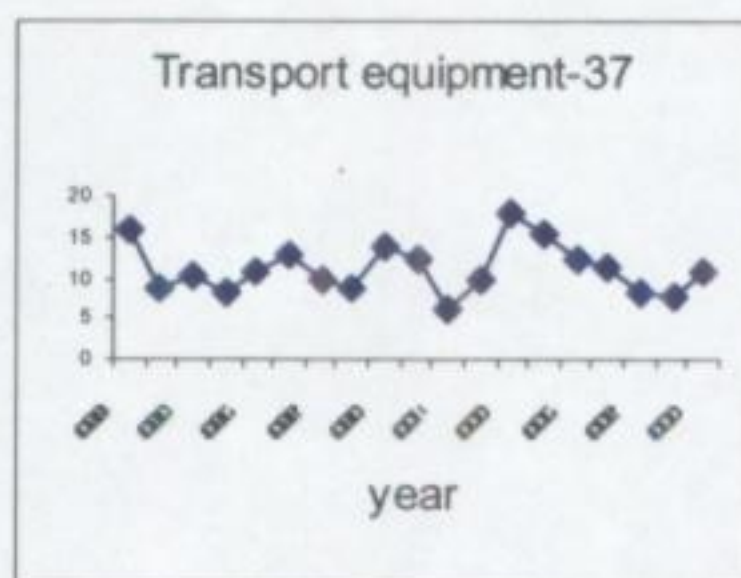
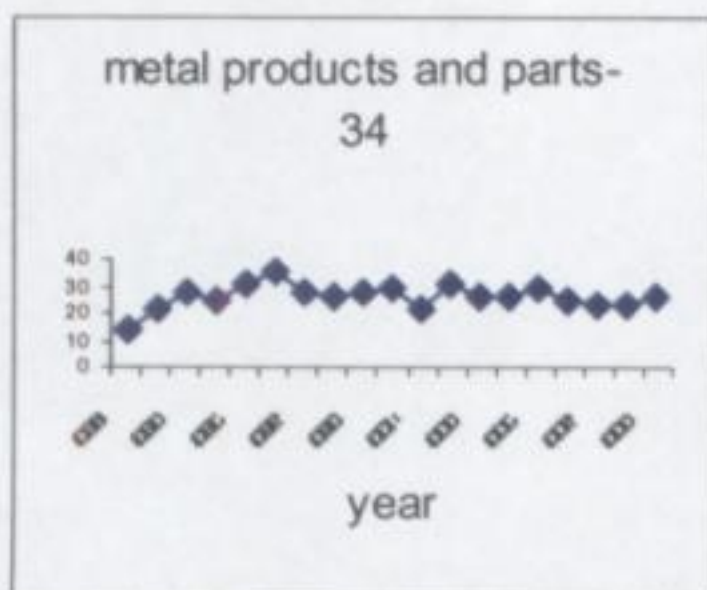
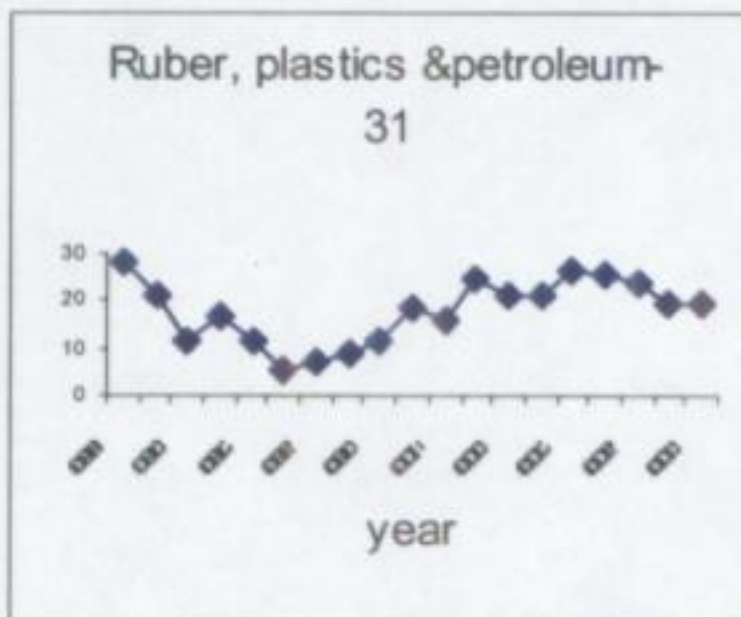
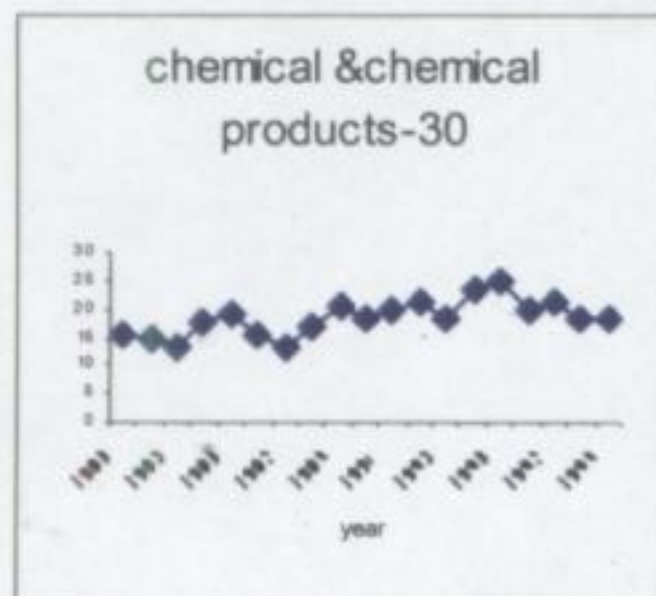
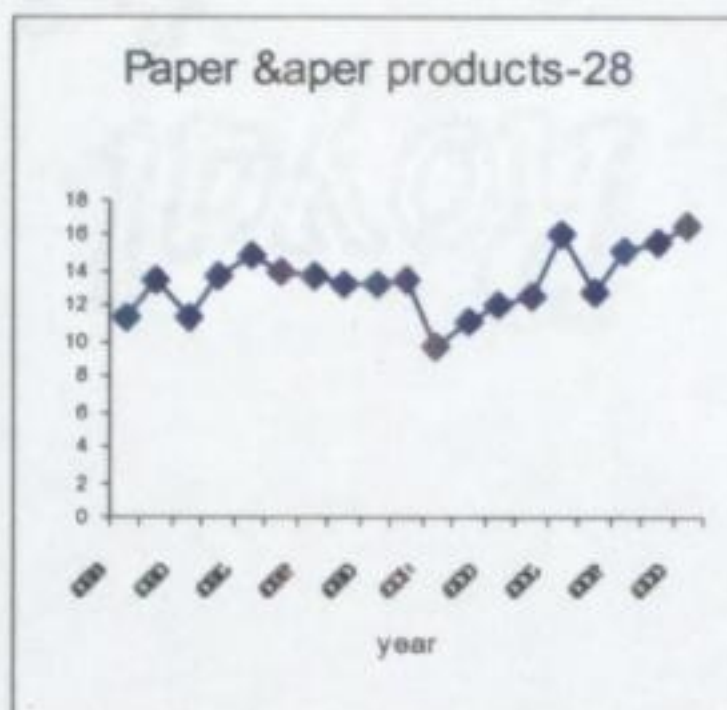
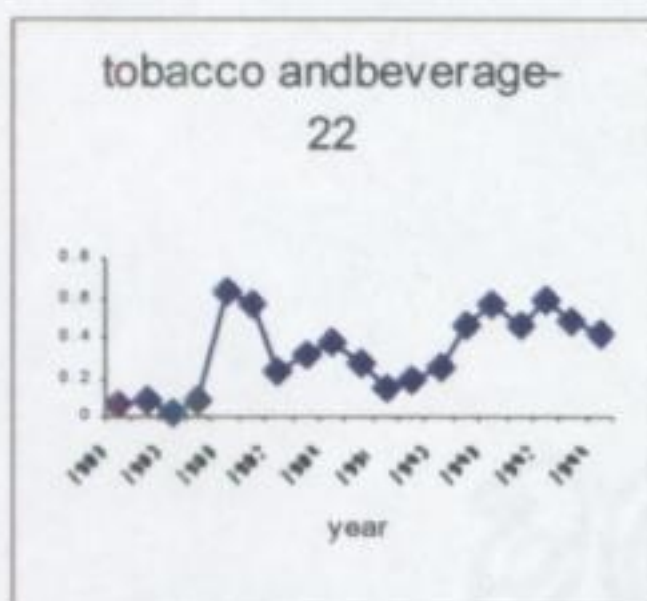
NB 5605

Appendix XXXVII Export and Import Intensities of Indian Manufacturing Industries Series 1-export intensity, Series2-import intensities



Appendix XXXVIII

Import Penetration Ratio of Indian Manufacturing Industries



NB 5605