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IMPORT INTENSITY AND ITS IMPACT ON EXPORTS, OUTPUT AND EMPLOYMENT

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IMPORT INTENSITY AND ITS IMPACT ON EXPORTS, OUTPUT AND EMPLOYMENT

Mahua Paul*

[***Abstract****: Based on input-output tables, the present paper examines the trends and patterns of import intensity in the whole economy and manufacturing sector in India during 1990s and beyond. The paper also reviews past studies on import intensity based on different data bases and alternatives methodologies. The paper finds that Import intensity of India's exports increased steadily from 10.54 per cent in 1993-94 to 15.9 per cent a decade later in 2003-04. It further increased to 18.72 per cent in 2007-08. The steep rise in import intensity between 2003-04 and 2007-08 in fact mirrored in import intensity of manufacturing exports which fell to 29.63 per cent in 2007-08. The fall in the industrial production led to decline in demand for intermediate inputs. This in fact reduced the import intensity effectively. The changing levels of import intensity have important implications for the growth of output, employment and exports. Therefore, the import liberalization measures need to be implemented and sequenced with much caution to get the desired results.]*

1. Introduction

The Indian economy has witnessed a gradual and wide ranging process of economic reforms for the last one and a half decade. A major component of this process is the opening up of the external sector. Both the commodity market and the financial sector have been opened to a large extent. Policies of import liberalisation, export promotion, and attracting foreign investment are the major ingredients of the opening up of external sector. These reform processes are now being tuned with the present multilateral trade and investment regime, which are institutionalised through World Trade Organisation (WTO). Two major characteristics of this multilateral trade and investment regime are: 1) all the member countries of WTO are treated as most favoured nation by each member country; 2) reduction in trade barriers for each member country so that greater market accessibility is available to each member country. The underlying theoretical argument behind these

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policy developments in the external sector is that import liberalization along with foreign direct investment inflows will make available better quality raw materials, technology at lowest cost and in adequate quantity. Also, domestic producers will improve their products to face competition from external producers. These two together will make the domestically produced products competitive at the international level. The multilateral trade agreements at WTO will ensure the availability of stable and less restricted international market. As a result, export will grow at a faster rate and it will become the engine of growth for the whole economy.

UNCTAD took a critical view of this export-led growth strategy. In its Report on 'Trade and Development', 2002, it observes that between 1970 and 1999, there is an increase in trade by the developing countries. The merchandise exports of developing countries grew at an average annual rate of 12 per cent, compared to 10 per cent for the world as a whole. However, for all developing countries, imports expanded faster than exports, resulting in deterioration of trade balance. And this trade expansion is not accompanied by faster growth in their gross domestic product (GDP). The share of developing countries in world income (in current dollars) declined from 27 per cent in 1980 to 23 per cent in 1999. The reasons UNCTAD has provided are manifold. First, with the exception of the first-tier newly industrializing economies already closely integrated with the global trading system with a significant industrial base, the exporting companies of developing countries still concentrate on the exploitation of natural resources or unskilled labour; these products generally lack dynamism in the world market. Second, the statistics showing a considerable expansion of technology and skill-intensive exports from developing countries' are misleading. Much of the skills in exports are embodied in components procured from technologically more advanced countries, while developing countries are engaged mainly in the low-skill, low value-added assembly stages of global production chains generally organised by TNCs. Much of the value-added contained in these products still accrues to foreign owners of capital, know-how and management. This led to low backward linkages between the TNCs production system and the developing countries market; and it creates a danger for the developing countries to remain locked into natural resource based and semi-skilled labour based production system. Also, the footloose character of these investments and increase in competition among the developing countries to attract foreign direct investment reduces the policy autonomy of developing countries to formulate development strategy that emphasises national capabilities and goal.

There are many other criticisms of this export-led growth strategy. We shall limit ourselves to only import liberalisation aspect of export-led growth strategy. The objective of the present study is to test empirically the validity of a part of this development strategy, i.e. through import liberalisation, for the Indian economy. We shall measure the impact of import liberalisation on the economy. This includes, *first*, the impact of import liberalisation policy on import intensity of exports and *second*, the impact of changes in import intensity on exports, output and employment.

The reason behind import liberalisation policy is to internationalise the production process. Import intensity of exports indicates the internationalization of production processes. Relying on import of raw materials for production and export of finished goods is an integral feature of international economic integration and globalization of production. This indicator measures the internationalization of production processes and takes into account the relative dependence on foreign inputs by individual sectors.

In India, there are apprehensions expressed by policy formulators, academia and business that liberalized trade policies would lead to an increase in demand for imports without commensurate increase in exports. The debate centres on its likely impact on growth of GDP and also employment. The growth of exports depends on numerous factors, such as capacity of domestic production, world demand, global trade environment, policy regime, along with its competitiveness *vis-à-vis* other countries. Availability and accessibility of imported raw materials and technology may have a significant influence on quality and cost of product and so on. Access to imported raw material is expected to meet two objectives, first, as a basic input to industry where domestic raw material is not available. In such cases, imported raw materials are complementary to the domestic raw materials. And it is not necessarily a part of only liberalised import-led growth strategy, it can be part of import substituting development strategy also. Second, when the raw materials, which are allowed to be imported, are also domestically supplied but imports are expected to be of better quality and also cheaper. It is this import of raw materials that is linked with import liberalisation policy for growth. The imported raw materials should improve the international competitiveness of exports and create competition for the domestic suppliers. The import of plant and machinery is supposed to allow access to advanced technology and larger scale of operation. Import liberalization in India was initiated with two specific purposes: 1) to increase export competitiveness through cost reduction and improve the quality of products; and 2) to expose domestic producers of intermediate components to external competition. So, increase in import intensity of export may lead to higher export growth, given the favourable world demand. It has been claimed that one of the prime reasons for slow growth of exports in the Indian economy was lack of access to imported raw material and plant and machinery to the industry. The restrictive trade policy regime thus constrained the improvement in quality and thereby exports competitiveness. It has been further claimed by some studies[1], even under the restrictive policy regime in some selected cases, where imported raw materials have been allowed, that in those cases, export performance has been noteworthy, for instance, diamond industry, where exports have increased substantially with greater accessibility to imported raw materials. However, raw diamonds, the raw material required for this industry is not available in India. So it may not be a proper example to justify the policy of import liberalisation under structural adjustment programme. Also, since the import requirement of this industry is high, it is

[1] Sathe, Dhanmanjiri (1997)

imperative to examine the net gain in foreign exchange after adjustment for import demands are made.

The impact of import liberalisation on GDP growth can be positive as well as negative. Increase in import liberalisation will create a greater leakage in the national economy through increase in imports of products used in final consumption and in production as inputs. It may force many import-competing domestic producers to cut down their production and GDP will decrease. On the other side, due to import liberalization exports tend to rise faster than imports. The imports of cheaper and better quality inputs in comparison to domestic inputs would increase exports and may reduce the prices of products consumed in the economy. Such a situation would accelerate demand in the national economy and GDP will increase.

Import liberalization may have adverse impact on import-competing domestic producers. It will have adverse impact on employment of these domestic producers. But the employment effect of import liberalization is rather a complex issue as it may increase exports. While increase in exports may increase employment in the domestic economy, but it depends on many other factors, i.e. production organisation, nature of technology in use, skill requirement, and so on. The impact will be industry specific. Through trade liberalisation, the exporting sectors are probably going to benefit while import-competing sectors could lose out. The impact on employment will depend upon the relative employment elasticity of these sectors.

If the import liberalisation causes a reasonably large trade deficit, it may create an expectation of devaluation in exchange rate of the currency. And the actions taken by the economic agents, who are involved in international currency market, in the backdrop of this expectation about declining currency value may lead to financial crisis. And it will have substantive declining effects on GDP and employment.

2. Objectives of the Study

The specific objectives of the present study are:-

1. To estimate import intensity of manufacturing sector with an emphasis on different industries/sectors that are in export activities.
2. To analyse the impact of the import liberalization measures on import intensity.
3. To assess the impact of import intensity on exports, output and employment.
4. To suggest policies towards making India's trade more competitive and viable.

3. Methodology, Data Sources and Treatment

The present study is based on secondary data. We draw secondary data from following sources:

1. For organised manufacturing, Annual Survey of Industries (ASI), Central Statistical Organisation (CSO), Government of India.
2. For unorganised manufacturing, National Sample Survey Organisation (NSSO) for two time points: 51st round (July 1994–June 1995) 56th round (July 2000–June 2001), 61st and 62nd rounds (2004–05 and 2005–06); data for these years has been extracted from the unit level data on CD-ROM.
3. Input-Output tables for the year 1993-94 and 1998-99, 2003–04 and 2007-08, CSO.
4. Economic Survey, Ministry of Finance, Government of India, various years.
5. Plan Documents (for various plans), Planning Commission.
6. Foreign Trade Statistics, DGFT (various issues).

The dataset used in this study has been collected from multiple sources. This is done to obtain the complete picture of the import intensity. This study traces the impact of change in import intensity of exports on output, employment and exports for the manufacturing sector over the period 1993–94 to 2007–08. Each sector has been defined on the basis of NIC Classification at three digit level.

Trade data are available according to Indian Trade Classification (ITC) based on Harmonised Commodity Description and Coding System (HCDCS). Earlier the data was based on United Nations Standard International Trade Classification (UNSITC). For the present study, trade data was available for the years 1993–94, 1998–99, 2003–04 and 2007-08 according to ITC (HS) Classification. Trade, industry and input-output sectors are made comparable using appropriate concordance tables as these two classifications relate to production activities. As trade data is available according to ITC (HS) Classification, and is different from that of NIC Classification, a concordance between trade and industry has been prepared to match with NIC categories.

The manufacturing sector in India comprises both organised and unorganised segments; data for the manufacturing sector has been obtained from ASI (for organized segment) and National Sample Survey (for unorganized segment). Since, for unorganized segment, data is available only for select time points, the dataset has been prepared for the whole manufacturing sector for the years 1993–94 and 1998–99, 2003–04 and 2007-08, and for the unorganised segment data relates to the period 1994–95 ,2000–01, 2004–05 and 2005–06. Further, sector-specific wholesale price indices have been used to convert all relevant variables at constant 1993–94 prices.

World demand data as well as the competitiveness data for clubbed sectors are also in NIC 1998 and later on into 2004 classifications and matched with Input-Output sectoral classification. Average variable cost data has been derived as the ratio of total inputs and emoluments and the value of output. Capital Stock is defined as the gross fixed capital formation as taken from ASI for the respective years and total assets taken from NSS of both the rounds (51st, 56th and 62nd rounds).

Technological change has been defined as the ratio between change in capital and labour. Labour has been defined as the total number of workers as taken from ASI and NSS according to three digit industry code.

Corresponding to Input-Output tables for the years 1993–94, 1998–99, 2003–04 and 2007-08, all variables used in the econometric models relate to these specific years. Due care has been taken to minimize the inconsistencies that may arise due to multiple data sources[2].

4. Scheme of the Study

The present study is divided into eleven sections. Each section has been divided in several sub sections. In the first section the subject of import intensity, trade liberalization and its related issues have been introduced. The later part of the section spells out the objectives, data sources, and methodology of the study. Further, we not only review the policies initiated after 1990s and beyond in general and trade policies in particular, but also attempt a critical appraisal of it. It also discusses the composition, direction and growth profile of India's exports and imports by broad industry groups/sectors. Based on multiple data sources and methodologies, we analyse the trends, dimensions and determinants of import intensity of India's exports. The next section examines the impact of changing import intensity on exports and employment. The concluding section gives a brief summary of the findings of the study which will be appended with some policy implications.

5. Estimating Import Intensity of Exports: Alternative Approaches

To measure the import intensity of India, both secondary and primary data have been used by the scholars. The secondary data includes Input-Output table, company balance sheet and Annual Survey of Industries of Central Statistical Organisation. Almost all the studies that have estimated the import intensity of Indian exports have used secondary data. Only one study that we have come across is based on primary data. Moreover, in most of studies, including the one based on primary survey, the period covered ends in late 80s. Only two studies, based on company balance sheets, cover early 90s. Thus, there are not many studies on these issues which cover the 1990s. The present study seeks to examine whether the policy of trade liberalization has resulted in an increase in exports, employment and economic growth, especially after witnessing more than two decade of economic reforms.

[2] Further, despite using the data from the same sources, the results may vary, not only due to the choice of period for comparison, but due to reasons like variations in clubbing the industries necessitated due to adoption of different National Industrial Classifications, choice of deflators and so on. But, we strongly believe that with all these modifications, overall direction of changes will not change.

We primarily limit ourselves to study of the trends in import intensity for the 90s and of present decade for the economy as a whole and also for select items/sectors, which constitute a substantial share in the Indian export basket by using different methodologies and databases that were used in previous studies and compare them with the previous decade. *Section 6* provides a critical survey of different databases that have been used to calculate import intensity of exports. *Section 7* and *8* gives a review of literature. *Section 9* measures import intensity of exports by using Input-Output tables. *Section 4* sketches the outline of remaining analysis in the present study**.**

6. Critical Review of Databases

There are two sources of secondary data that have been used to calculate the import intensity of exports. They are, a) ASI, and b) Input-Output table. And both of them have some advantages and disadvantages as well. We shall discuss them one by one.

The Annual Survey of Industries provides information only for organised manufacturing sectors. The time gap (around 2–3 years) between data availability in public domain and the reporting year is higher than annual balance sheet but substantially lower than Input-Output table. It does not distinguish between use of imported inputs for production of exports and domestic sales. Also, the embodied imported inputs cannot be traced. But the advantage of ASI data with respect to balance sheet data is that whatever is reported as imported input consumed by a particular sector is used for its production. So, the import intensity ratio calculated by ASI is likely to be more accurate than company balance sheet.

The second source of data is Input-Output table. The advantage of this data is that it covers the whole economy. It is available at sectoral level. Unlike the data from Annual Reports, the reported imported inputs for a particular product are actually being used for production of that product. Another big advantage of the Input-Output table is that it reports the embodied imported inputs into domestic inputs. But the time gap between data availability in public domain and the reporting year is huge. It is at least 6–7 years. Also, this data does not distinguish between use of imported inputs for production of exports and domestic sales. But unlike company balance sheet data or ASI data, it has one limitation, i.e. it assumes a production function with constant returns to scale. And for all sectors it may not be a realistic assumption.

Data collected through a primary survey could be most useful insofar as information on all the aspects could be collected. It would help us to identify the imported inputs used in the production of exports. But it is not possible to have a very large sample to survey, for the reasons of costs and time and a limited sample may not capture characteristics of population.

7. Review of Literature

Several scholars have studied the import intensity of Indian exports in the past. Our review here primarily covers studies relating to the last three decades, i.e. 1980s, 1990s and 2000's.. There are some studies that have measured the import intensity for the period of 1970s. Those are Bhattacharya (1989), Pitre (1992), and Sathe (1995). Among these studies, Bhattacharya and Sathe have calculated the import intensity of exports, whereas Pitre measured the import intensity of final consumption. Bhattacharya found a declining import intensity of exports in late 70s in comparison to early 70s, whereas Sathe found an increasing import intensity of exports. To calculate import intensity of exports, Bhattacharya has taken the weighted average of sectoral import intensity, where weights are determined through sectoral export shares. To calculate sectoral import intensity, as a first step, he has separated domestic input requirement for per unit of output and imported input requirement for per unit of output from the total input requirement for per unit of output. Then, he calculated the total imported input requirement in a sector to produce output of that sector, which meets one unit's final demand. And finally to get the import intensity of that sector, the ratio between this imported input requirement of that sector and output of that sector is calculated. According to Bhattacharya's calculation, the import intensity of Indian exports in 70s was between 7 to 8 per cent? We have calculated the import intensity of exports for manufacturing using Bhattacharya's methodology in calculating sectoral import intensity. The manufacturing sector showed a decline in import intensity of exports in the late 70s as compared to early 70s. This is similar with his findings regarding import intensity of exports for the whole economy.

Import Intensity of Exports (in per cent)	*Author*	*1973–74*	*1979–80*
Import Intensity of Exports for Whole Economy	Bhattacharya	7.85	7.35
Import Intensity of Exports for Manufacturing	Bhattacharya	10.004	8.255
Import Intensity of Exports for Whole Economy	Sathe	7.75	11.90
Import Intensity of Final Consumption for Whole Economy	Pitre	03.05	4.75

Sathe (1995) has calculated import intensity of exports for the economy for the period 1951–52 to 1983–84. For calculation she has used a different methodology from that of Bhattacharya's. She took the difference between total backward linkages calculated on the basis of domestic inputs and imported inputs to final demand of a sector, and, backward linkages calculated on the basis of only domestic inputs to final demand of that sector. She has defined it as a measure of trade linkages and represents the opportunities for import substitution. Then she measured the aggregate for each sector to get the import intensity of each sector. Sathe's findings are different from that of Bhattacharya's. According to her, there is a rising trend of import intensity.

Pitre has calculated the import intensity of final consumption basket of the economy. The methodology is similar to that of Bhattacharya's. Instead of export share, she has used the share of final consumption in total output as weight. She finds an increase in import intensity in late 70s as compared to early 70s.

The trends in values of import intensities in 80s, based upon various methods, contradict each other. Pitre (1992), using Input-Output table shows that the early 80s had greater import intensity of final consumption than the late 80s. Burange (2001), using ASI data, showed the same trend in import intensity for organised manufacturing sector. Sharma (1990) found the opposite trend in import intensity of final consumption. He has used Input-Output table. But his measure of final consumption bundle is different from that of Pitre's. According to Pitre, that is the reason for difference in result. The studies by Siddharthan (1989), Mani (1991) and Singh (1994) that used Annual Reports of companies show the increase in import intensity in the second-half of 80s in comparison to the first-half of 80s. Both Siddharthan and Singh have used the ratio of imported raw material and capital goods consumed as proportion of total raw material and capital goods consumed as import intensity. Mani has defined import intensity as the ratio of imported raw material to net value added. The details of these studies are presented in the *Text Box 1*.

Box 1: Studies on Import Intensity based on Annual Report of Companies

A number of studies have used the balance sheet of companies published in their Annual Reports. And the value of import intensity of exports that they have calculated is generally different from the values calculated through input-output table (excluding certain exceptions). And during the late 1980s they showed greater Import Intensity compared to early 1980s and 1970s. It may be because of the difference in definitions

Singh[1] (1994) has calculated the Import Intensity of four industries: Chemicals, Engineering, Cotton and textiles, paper and paper products for the period 1975-76 to 1989–90. He found a rising trend in the intensity for the sectors and a sharp increase in the value of index during the post 1985–86 periods as compared to the previous period.

N.S. Siddharthan (1989), covering 19 manufacturing sectors, also has used a similar definition of index (as Singh did) and found that there is a sharp increase in import intensity in the period 1985–86 to 1987–88 period as compared to 1982–83 to 1984–85 period.

Vidya Pitre (1989) has calculated input-output ratio for the manufacturing sector for the period 1960–61 to 1987–88. But she has not got a consistent series for the whole period. This study claims that for the period 1960–61 to 1972–73 and 1974–75 to 1977–78 there is a declining trend in the share of imports to production. For the period 1978-79 to 1987-88, it has a rising share of imports to production.

Mani S. (1989) has calculated the import intensity of manufacturing sector for the period 1982–83 to 1988–89 using another definition[1] of import intensity. The finding is based on post 1985–86 periods where import intensity was higher than the pre 1985–86 periods.

Dhanamanjari Sathe (1997) has calculated it for manufacturing sector for the years 1989–90 to 1992–93. Her definition of import intensity of exports is close to the definition used in input-output table. Her finding is that the imported raw materials' intensities of industries are showing a declining trend in this period. This intensity varies between 10.10 to 11.45 per cent.

Burange (2001) has defined import intensity as the ratio of imported raw materials used to value of output of the economy. By using the balance sheet data of companies, provided by CMIE, he has calculated import intensity for manufacturing sector of the period 1991–92 to 1997–98. He found that the import intensity ranges between 9.27 to 12.27 per cent with an increasing trend.

The change in import intensity is less studied in the 90s. Only two studies Sathe (1997) and Burange (2001), using balance sheet data published in Annual Reports of the companies, have calculated the import intensity in the 90s. Sathe's study covers the period 1989–90 to 1992–93. She has defined import intensity as imported raw material requirement of exports as a percentage share of exports[3]. She finds that the imported raw materials' intensities of industries have a declining trend and their values vary between 10.10 to 11.45 per cent. Burange has calculated import intensity of manufacturing sector for the period 1991–92 to 1997–98. He has defined import intensity as the ratio of imported raw materials used to value of output. The yearly values of import intensity varied within the range of 9.27 to 12.27 per cent with an increasing trend.

Studies By	*1989–90*	*1990–91*	*1991–92*	*1992–93*	*1993–94*	*1994–95*	*1995–96*	*1996–97*	*1997–98*
Sathe	11.45	11.09	10.26	10.10					
Burange			9.27	11.07	10.22	10.65	11.54	12.27	11.28

The findings of these two studies are not comparable as both of them did not use the same set of companies and also they represent the manufacturing sector partially. But these two studies together claim the following:

a) The import intensity of manufacturing sector has declined in early 90s as compared to late 80s.
b) The values of import intensity of manufacturing sector show an increasing trend within the period 1991–92 to 1997–98.

Most of the studies that have used Input-Output table have taken imported input to output ratio of a sector as the import intensity of that sector. And to get the import intensity for the whole economy they have taken a weighted average of each sectors' import intensity. For Most of the studies that have used Input-Output table have taken imported input to output ratio of a sector as the import intensity of that sector. And to get the import intensity for the whole economy they have taken a weighted average of each sectors' import intensity. For import intensity of exports the weights are decided on the basis of each sector's share in total export. For import intensity of final consumption the weights are decided on the basis of ratio of each sector's final consumption to total output. The studies that have mostly used Annual Reports of companies have defined import intensity as the ratio between imported raw material and total raw material used. It may be used to avoid the problem of dividing raw materials, reported in balance sheet according to its use in production for companies with multiple products. These two definitions are different. It is more so if there is technological change that changes the raw material requirement to produce one unit of output. Also, the variation in relative prices between different inputs is another source of difference.

[3] She has assumed that the use of imported raw material is divided between production for domestic sales and export by the ratio equal to domestic sales and export ratio.

Box 2: Studies based on Input Output Table

The studies using input-output table have used various methodologies. Bhattacharya (1989), Pitre (1992) and Sharma (1990), all of them have calculated the import intensity at sectoral level. To calculate import intensity of exports, Bhattacharya has taken the weighted average of sectoral import intensity, where weights are determined through sectoral exports share. According to Bhattacharya's calculation, the import intensity of Indian exports in 1970s was between 7 to 8 per cent (*Table T.1*).

Table T.1

Import Intensity of Exports (in per cent age)	*1973-74*	*1979-80*
Whole Economy	7.85	7.35
Manufacturing Sector	10.004	8.255

Pitre and Sharma, instead of calculating the import intensity of exports have calculated import intensity of final consumption for the whole economy. They have measured the weights through the share of final consumption in total output. Pitre has calculated import intensity for the period 1968–69 to 1987–88. According to her study, the import intensity has gone down in the second-half of the 1980s in comparison to first-half of the 1980s (*Table T.2*). We have seen in our brief trade policy review, that import was more liberalised in the second half of the 1980s as compared to first half of the 1980s. But Pitre's result shows a decline in import intensity.

Table T.2

	1968-69	*1973-74*	*1978-79*	*1983-84*	*1987-88*
Import Intensity of final consumption for the whole economy (in %)	0.0271	0.0305	0.0475	0.0517	0.0477

Sharma covered the study for the period 1978–79 to 1986–87. He found an increase in import requirement for the economy. This is mainly because he computed the total import requirement for the Indian economy based on the assumption that the final demand for 1987–88 was to be met, given the imported input structure of 1984–85. He then compared the estimated import requirement with actual import and found that actual import is higher by 23 per cent. That is the reason for his conclusion of increasing import intensity.

Dholakia, *et al.* (1992) has calculated this ratio for the year 1983–84 with a slightly different definition of import intensity. They have used two definitions of import intensity. Instead of taking imported input and output ratio, they have taken imported input to total use as input and imported input to export as the definitions of import intensity. The import intensity for these two definitions are 4.99 and 2.19 per cent respectively.

Sathe (1995) has calculated import intensity of exports for the economy for the period 1951–52 to 1983–84. She has used a different methodology from Bhattacharya to calculate it. Also, she has reported a different result. According to her, there is a rising trend of this intensity.

Table T.3

Year	*1951-52*	*1959*	*1968-69*	*1973-74*	*1978-79*	*1983-84*
Import Intensity of Exports (in %)	6.71	7.00	7.72	7.75	11.90	12.45

Box 3: Studies on Import Intensity by Using Other Databases

Using ASI data at the four digit level, Burange (2001) has calculated import intensity for the manufacturing sector for the period 1978–79 to 1994–95. He found that in late 80s the import intensity was lower than in early 80s. Further, in early 90s it shows a rising trend but the values are lower than early 80s.

Exim Bank (1991) has calculated the import intensity through a primary survey of 5 manufacturing sectors for the year 1989–90. These sectors are: Gems and Jewellery, Leather, Readymade Garments, Chemicals and Engineering. The values of import intensities of these sectors are 78, 5, 5, 31, and 28 per cent respectively.

8. The Indian Experiences

In Indian case, it is worthwhile to study the impact of trade liberalization on exports, output, employment and growth in the decade of the nineties. The manufacturing sector recorded continuous rise in import intensities in the early part of the 90s, fall in import intensity in 1993–94 and thereafter shows an upward trend. From 1991 onwards, with an outward orientation perspective the country embarked upon a liberalized trade regime with negative list of imports, the removal of quantitative restrictions for all goods except consumer goods, and a phased reduction in custom duties. Also, with an adjustment in exchange rate through devaluation of the Indian Rupee in 1991 and the movement towards market determined exchange rate, the foreign investment policy underwent a complete change with reduction of barriers, alignment of taxes with international levels, etc. The 1991 policy measures were aimed at integrating industrial, trade and exchange rate policies to enhance efficiency of the economy in general and manufacturing in particular. India adopted policies of import liberalization in the mid-80s and the pace of liberalization has accelerated since the launch of economic reforms in 1991 when the country embraced an export-led growth strategy.

The major benefit that is expected from import liberalization is that it will increase competitiveness of the economy through imports of cheaper and quality raw materials and advanced technologies. Competitiveness means reduced average production cost, enhanced production capabilities and improved product quality and delivery.

Given that the manufacturing sector contributed more than seventy per cent to India's total exports in the decade of 90s, this will get reflected in an increased import intensity of exports. This study is an attempt to empirically assess the impact of import liberalization policies in promoting exports, output growth and employment in the Indian manufacturing sector.

Banga (2005) estimated the impact of FDI, trade and technology on wages and employment in the Indian manufacturing industries in the post-reform period. Based on 78 industries at three digit levels, the analysis shows that FDI, trade and technology have differential impacts on wages and employment. Higher FDI in an industry does not lead to higher employment levels but has a significant positive impact on the wage rate of the industry.

Also, higher exports in an industry improve its employment levels though they have little impact on the wage rate; while higher extent of technology acquisition in an industry was found to have an unfavourable impact on the employment levels and no impact on wages. The results of the study brought to the fore the issue of wage flexibility in the organized sector. As the economy opens up, cost adjustments become increasingly important and wage flexibility clearly facilitates cost adjustments. This implies that to become more competitive, both in the domestic as well as in international markets, appropriate linkages are needed between wages and productivity in an industry. With regard to the employment level, one of the implications of the study is that in order to improve the employment in the organised sector, efforts are needed to attract FDI in industries. This will help in improving the skills of the workers. FDI can be encouraged in manufacturing sector by reducing the relative cost of production of foreign firms in this sector.

In another study, Banga (2005a) evaluated the impact of three major components of liberalization, i.e. FDI, trade and technology on labour productivity and wage inequality between skilled and unskilled labour in the Indian manufacturing industries in the post-reform period. Based on 78 industry groups at three digit level (ASI), from the period 1991–92 to 1997–98 the paper shows that FDI, trade and technology have shown an improvement in labour productivity during this period. However, along with higher labour productivity, it was also found that wage inequality between skilled and unskilled workers has also increased. The results show that FDI, trade and technology have differential impact on wage inequality as in the earlier study (Banga, February 2005). Higher FDI in an industry raises wage inequality while-higher export intensity of an industry is associated with lower wage inequality. Further, technological progress is found to be skill biased and accordingly higher extent of technology acquisition in an industry is found to be associated with higher wage inequality.

Goldar and Kumari (2002) showed that there was substantial liberalization of imports in India in the 1990s under the economic reforms programme. This did not, however, result in surge in manufactured imports. Nor did it lead to a sharp rise in the extent of import penetration in the manufacturing sector. In the immediate post-reform period, there has been a notable decrease in the growth rate of TFP in manufacturing sector. The deceleration in productivity growth in manufacturing in the 1990s does not seem to have been caused by import liberalization. Rather, the reduction in effective protection to industries appears to have had a favourable effect on productivity growth in Indian industries. There was an increase in investment activity in Indian industries following the reforms. However, the gestation lag in investment projects may have had an adverse effect on productivity and this appears to be an important cause of the deceleration in total factor productivity growth in Indian manufacturing in the 1990s. The agricultural growth has also been an important factor in influencing industrial productivity. The slow-down in agricultural growth in the 1990s seems to have been another important cause of the deceleration in total factor productivity growth in Indian industries in the second half of 1990s.

Mihir Pandey (2004) using trade and industry data for both the two digit and three digit (ASI) classification for the 1980s and 1990s attempts to ascertain if changes in trade policy had any impact on industry performance. Effective rate of protection based on collection rates was used as the trade policy variable to see the effect on growth of output, labour productivity, employment, wages, price cost margin, export intensity and import penetration. This study found no significant relationship between protection and growth of industries in India during the 1980s and 1990s. Within this, there was low correlation between effective rate of protection (ERP) and growth rates of output and gross value added for the consumer and intermediate goods, and a positive but not so high correlation in the case of capital goods. Sectors that had high protection levels had in general low labour productivity (especially the intermediate goods), but there does not appear to be conclusive association between change in protection and change in labour productivity. The relationship between ERP and average wage is similar to that of ERP and labour productivity. While there is a low positive relationship between the levels of ERP and price cost margin for two years, that between change in ERP and change in price cost margin (PCM) is slightly higher, suggesting that falling protection levels may have led to more competitive pricing. It also revealed that while the number of industry groups classified as importable and exportable remained constant during 1980–81 to 1988–89, there was an increase in the number of exportable sectors during 1988–89 to 1996–97, with a corresponding decrease in the number of importable sectors. Moreover, export intensity increased for most of the sectors during 1988–89 to 1996–97 compared with little change in the earlier period. However, the correlation between change in protection and change in export intensity turns out to be positive. Import penetration decreased and then increased over the period under study, with a low positive association between changes in the two variables. At the three-digit level of classification, although the evidence is mixed, there are a number of industry groups that had falling protection levels associated with increasing import penetration. The empirical results, therefore, show that although there are links between trade policy and industry performance, they are weak. There have been other factors that have been equally or more important in determining the growth performance of Indian industry.

Pandit and Siddharthan (October 2005) used panel data on 33 Indian manufacturing industries for the period 1992–2001, to find the impact of liberalization and in particular, import of technology on direction of change in employment in an efficiency wage framework. It estimates binary logit functions using maximum likelihood method and random effect panel data techniques. The results show that employment grew positively in industries characterised by higher productivity of rupee spent on labour, use of modern technology and differentiated products. These are precisely the industries where value additions are large and where international trade is also growing. The main finding of this study is that industries which used imported technology and incurred higher expenditure on efficiency wage workers, having skills compatible with the new technology, experienced a positive change in employment.

Sonia Bhalotra (2002) assesses changes in the level and structure of employment and wages in India, and their impact on trends in productivity. It is argued that it is inherently difficult to evaluate the effects of economic liberalization for a number of reasons, suggesting at the same time how best one may use insights from economic theory and appropriate econometric techniques to make some progress in this direction. It also says that the experience of economic liberalization in India appears to have been better than in many other countries. Early reforms were initiated in the 1980s and these have been consolidated and pushed further since 1991. Both growth and productivity have accelerated in the economy as a whole and also in organized manufacturing. Capital stocks have been upgraded and investment in manufacturing has increased. Real earnings in this sector have been rising at a fairly rapid pace. Organized sector employment suffered a severe collapse in the early years of the adjustment process but has since recovered to a pace similar to that of the pre-reform era. The share of the public sector in organized manufacturing employment has been shrinking at a fairly remarkable rate. In the economy as a whole, the worker-population ratio fell in the mid-90s after having increased for the previous two decades. The shift in workforce composition from self-employment to casual wage employment that has been going on since the 1970s continued through the 1990s. The unemployment rate increased during this time but it is unclear whether this signifies a lengthening of unemployment spell and a worsening of job opportunities or whether it simply denotes a greater degree of transitional or frictional unemployment as labour is reallocated towards the more productive sectors. Average daily earnings per person per annum in the economy increased at a significant pace in rural and urban areas and for both men and women.

Mahambare and Balasubramanyam (2005) attempt to investigate the impact of liberalization on productive efficiency at the micro firm level taking into account the different characteristics of the firms in each of India's major manufacturing sectors. The impact of the 1991 reforms on the efficiency of the manufacturing sector appears to be mixed. Average technical efficiency of firms increased in eight out of thirteen sectors studied. Improved access to imported technology in the post-reform period seems to have a positive impact on the efficiency. Although foreign owned firms continue to be the most efficient, their advantage in technical efficiency seems to have declined in the late 1990s. There is evidence of productivity spill-over from the presence of foreign firms in three sectors. In general, there are signs that the reforms have had the desired effect.

9. Issues on Employment

Does trade liberalization promote employment creation? Available literature suggests that it is associated with both job destruction and job creation. In the short run, the resulting net employment effects may be positive or negative depending on country specific factors such as the functioning of the labour and product markets. In the long run, however, the efficiency gains caused by trade liberalization are expected to lead to positive overall

employment effects, in terms of quantity of jobs, wages earned or a combination of both (Jansen and Lee, 2007).

A series of International Labour Organization (ILO) case studies on China, India, Malaysia, Mexico and Brazil have focused on the effects of the growth of trade on employment and wages in manufacturing industries[4]. The countries chosen for these studies had all experienced rapid growth in trade in the past two decades and were among the leading group of developing countries that had benefited most from the growth in world trade. The studies focused on the manufacturing sector because it had spearheaded trade growth and had felt the effects of trade expansion most strongly. In the three Asian emerging economies studied, growth of trade had a generally favourable effect on employment and wages in manufacturing. Apart from stimulating output growth, trade growth has had the effect of increasing the employment intensity of manufacturing output. Moreover, unskilled (or low-skilled) workers have benefited more than skilled workers because employment growth has been faster in export-oriented industries, which mainly employ low-skilled workers, than in other industries. It also appears that employment in import-competing industries continued to increase in spite of increased import competition. Real wages of unskilled workers have risen whenever surplus labour has become insignificant, but they have not declined even where surplus labour remains significant. Real wages of skilled workers have generally risen. Thus, wage inequality has improved in some situations but has worsened in others. In contrast to what was the case in the Asian countries, the favourable effects of trade growth on employment and wages were not observed in Latin American countries such as Brazil and Mexico. In these countries, employment in manufacturing has either not risen appreciably or has fallen. Real wages of unskilled workers have tended to decline, and the wage differential between skilled and unskilled workers has increased rather sharply. The studies suggest that these trends may be attributable to unfavourable initial conditions (e.g., extremely unequal distribution of assets), problems of macroeconomic management and overdependence on external resources, but more work is required to develop adequate insights. The sharply contrasting employment effects between countries suggest that country-specific and contingent factors are important, and any broad generalization on the link between trade liberalization and employment is therefore undetermined. This suggests that it would be more fruitful to look at country-specific studies for answers.

A study on Mexico[5] found that during the period between 1984 and 1990 a 10 per cent reduction in tariff levels was associated with a 2–3 per cent reduction in employment. The wage differential between skilled and unskilled workers also widened. The study also argues that the absence of large aggregate employment effects was due to wage flexibility;

[4] These and other studies on "Globalization and Employment Policy" are available from www.ilo.org/public/english/ employment/strat/global/index.htm

[5] Ravenga, A. (1994), "Employment and wage effects of trade liberalization: The case of Mexican manufacturing," World Bank.

wages declined significantly throughout the adjustment period. A study on Brazil[6] found that trade liberalization at the beginning of the 1990s had a slight negative short-term impact on employment. It found that between 1990 and 1997 there was a 32.4per cent drop in employment in capital-intensive industries and a 13.3per cent decline in the labour-intensive industries. This decline in employment could be attributed to trade liberalization per se since trade reforms were carried out in a macroeconomic environment that was marked by high inflation and recessionary conditions. Among the explanations that it offers for the decline in employment are a sharp increase in productivity in the capital-intensive industries and poor export performance in the labour-intensive industries. In Chile[7], trade liberalization of the 1970s coincided with severe macroeconomic shocks. The effects of these on employment far outweighed that of trade liberalization. The combined effect of these two factors resulted in an 8per cent decline in net manufacturing employment between 1979 and 1986. An interesting feature of this study is that in addition to the analysis on the net changes in employment levels, it also attempts to estimate (using firm-level data) job creation and destruction. This suggests that about a quarter of all workers in manufacturing changed jobs during this period, indicating that there was a far greater extent of labour-market adjustment than what was suggested by looking only at industry level figures on the net change in employment. The study also stresses the importance of looking at the impact of trade liberalization on the size structure of enterprises. In the case of Chile, it is important to note that after 1986, employment performance improved significantly although concern was still being expressed in the late 1990s that "a relatively large number of jobs being created include little or no employment or social protection and the situation appears to be worsening[8].

There were also mixed results emerging from three studies of trade liberalization in African countries. In Zimbabwe[9], it was found that the drastic trade liberalization implemented in the early 1990s resulted in a contraction in output and employment that was accompanied by a sharp increase in imports and a rising trade deficit. The study argues that the contraction in output was associated with de-industrialization, a development that may also have had unfavourable effects on the future growth potential of the economy. Real wages also fell in the wake of trade liberalization. In contrast, a study on Mauritius[10] found far more favourable outcomes from trade liberalization. The reduction in protection for

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6 Mesquita, M and S. Najberg (2000), "Trade liberalization in Brazil: Creating or exporting jobs?" *Journal of Development Studies*, February.

7 Levinsohn, J. (1999), "Employment responses to international liberalization in Chile," *Journal of International Economics*, 47, Pp. 321–344.

8 Torres, R. (2001), "Towards a socially sustainable world economy, from Studies on the Social Dimensions of Globalization," Geneva, ILO.

9 Rattso, J. and R. Torvik (1998), "Zimbabwean trade liberalization: Ex post evaluation," *Cambridge Journal of Economics*, 22, Pp. 325–346.

10 Milner, C. and P. Wright (1998), "Modelling labour market adjustment to trade liberalization in an industrializing economy," *Economic Journal*, 108, March, Pp. 509–528.

local firms that was implemented during the period 1985–87 led to the expected rise in employment in export industries but no contraction in employment in the industries producing importable. The latter was due to an increase in the supply of female labour (which eased the labour supply constraint) and strong overall growth in the economy. In Morocco[11], the substantial trade liberalization implemented during 1984–90 did not have very strong employment effects. The average level of import penetration increased only slightly due to a contraction in domestic demand and the devaluation of the currency. A 21 per cent decline in tariff protection in "high impact" industries led to a 6 per cent decline in employment. At the same time a 24 per cent decline in tariffs in the export-oriented sectors led to only a 1.7 per cent decline in employment. It is notable that most of these studies focus on employment in the manufacturing or the organized sector of the economy only.

10. Measurement of Import Intensity of Exports with Input-Output Table

We have calculated the import intensity of exports for the 1990s as well as past decade by using Input-Output table. The Input-Output tables, used in the study, are provided by Central Statistical Organisation, Government of India. The year 2007–08 is the latest year for which Input-Output table is available. For the 90's, CSO provides input-output tables for the year 1993–94, 1998–99, and for the past decades 2003–04 , and 2007-08. To capture the changes in import intensity these Input-Output tables are used.

As mentioned in our review of literature, we have come across several papers that have used Input-Output table to calculate the import intensity. Among them, Bhattacharya, Sathe and Dholakia *et al*. have calculated import intensity of exports. Dholakia, *et al.* (1992) has calculated this ratio for the year 1983–84 with a slightly different definition of import intensity. They have used two definitions of import intensity. Instead of taking imported input and output ratio, they have taken imported input to total use as input and imported input to export as the definitions of import intensity. Pitre and Sharma have calculated the import intensity of final consumption basket of the economy. Sharma covered the study for the period 1978–79 to 1986–87. He found an increase in import requirement for the economy. This is mainly because he computed the total import requirement for the Indian economy based on the assumption that the final demand for 1987–88 was to be met, given the imported input structure of 1984–85. He then compared the estimated import requirement with actual import and found that actual import is higher by 23 per cent. To calculate import intensity of exports, Bhattacharya has taken the weighted average of sectoral import intensity, where weights are determined through sectoral exports shares. To calculate sectoral import intensity, as a first step, he has separated domestic input requirement for per unit of output and imported input requirement per unit of output from

[11] Currie, J. and A. Harriso (1994), "Trade reform and labour market adjustment in Morocco," World Bank.

the total input requirement for per unit of output, then he calculated the total imported input requirement in a sector to produce output of that sector, which meet one unit final demand. And finally to get the import intensity of that sector, the ratio between this imported input requirement of that sector and output of that sector is calculated. Sathe (1995) has calculated import intensity of exports for the economy for the period 1951–52 to 1983–84. She has used a different methodology from Bhattacharya to calculate it. In this study we have used Bhattacharya's definition of import intensity. The reason is that it is relatively more widely used definition of import intensity. Also both of them have calculated the import intensity of exports for a specific period, at least a decade. As we are calculating it for the decade of 90s, it will be advantageous to compare with other decades.

Though, same definition of import intensity of exports has been used by both Sathe and Bhattacharya, the methodologies used by them are different. Bhattacharya has used ratio of imported input and output of user sector as import intensity of that sector. The details are as follows:

The index of import intensity of export of the economy i, for a particular year is

$$\frac{\sum_{i=1}^{n} E_i Q_i}{\sum_{i=1}^{n} E_i}$$

where, Ei is the total value of export of sector i

Q_i is the value of direct plus indirect import content per unit of output of sector i

Q is computed on the basis of Leontieff model in the following way:

Ad = a_{ij} is the domestic input output coefficient

M = m_{ij} is the import coefficient

K = k_{ij}, where $k = M(I-Ad)^{-1}$, i = j = 1,2,---------,n

i.e., there are n number of sectors in the economy

The direct and indirect import requirement of industry j is given by:

$$Q_i = \sum_{i=1}^{n} k_{ij}$$

Sathe has calculated the import intensity of exports in a different way. She has followed the methodology used by Bulmer-Thomas V. (1978)[12]. Bulmer-Thomas V. has taken the difference between column sum of Leontief inverse matrix of the economy that uses both imported and domestic inputs and column sum of Leontief inverse of the economy where all inputs were supplied domestically as a measure of opportunities for import substitution. Sathe has termed this as import intensity. The first problem with this is that

[12] Bulmer-Thomas Victor (1978), "Trade, Structure and Linkages in Costa Rica: An Input-Output Approach," Journal of Development Economics, 5, Pp-73–86.

concept of import intensity and opportunities for import substitution are different to each other. The concept of import intensity includes the imports of those raw materials and capital goods that cannot be produced domestically along with those imports of raw materials and capital goods that can be produced domestically. Whereas opportunities for import substitutions do not include imports of those raw materials and capital goods that are be available domestically.

Secondly, with the available Indian Input-Output tables the opportunities for import substitution, as defined by Bulmer-Thomas, are not possible to calculate. To describe the reason we need to describe the methodology of Bulmer-Thomas in detail.

Bulmer-Thomas's methodology is as following:
The balance equation for the economy (by using input-output table) can be written as:

$q = Aq + f + e - m$
or, $q = [I-A]^{-1}[f + e - m]$ ……(1)

where, q is a vector of gross output,

A is the input-output matrix (co-efficient form),

f is a vector of home final demand, whose i^{th} element shows total purchases of the i^{th} commodity, e is a vector of exports and m is a vector of imports, all of which are assumed to be competitive.

For any sector, one measure of linkages is the column sum of $[I-A]^{-1}$. The j^{th} column sum, for example, (L_{tj}) shows the total backward linkages, direct and indirect, when final demand for the j^{th} commodity (from all sources) increases by unity.
L_{tj} is a measure of potential rather than existing linkages, because it is based on the Input-Output table. It would only be a measure of existing linkages if all inputs were supplied domestically. Such a measure can be supplied by domestic Input-Output table. Now the balance equation can be written as:

$q = Adq + fd + e$,
or, $q = [I-Ad]^{-1}[fd + e]$ …….(2)

where, Ad is the domestic input-output matrix, fd is a vector of domestic demand, where i^{th} element shows purchase of i^{th} commodity from domestic sources only. This is the balance equation for domestic supply and demand assuming that all imports are non-competing. Imports appear neither in intermediate purchases (Adq) nor in final demand (fd+e).

The j^{th} column sum of $[I-Ad]^{-1}$, which can be called Ld_{tj}, is a measure of total existing backward linkages when final demand for the j^{th} commodity (from domestic sources only) increases by unity. The difference between L_{tj} and Ld_{tj} is measure of the opportunities for import substitution.

Now the problem is that the output vector q will be different for both equations 1 and 2 unless the domestic inputs and capital goods completely substitute the imported inputs and capital goods. The domestic Input-Output table with this condition is not available for India. In the available domestic Input-Output table, the input coefficient is measured by the difference between total input (imported inputs), divided by output produced using both the domestic and imported input. And this is different from the input coefficient of domestic Input-Output table that is required to follow Bulmer-Thomas methodology.

So in this study, instead of Sathe's methodology, we are following Bhattacharya's methodology to calculate the import intensity of exports for the 90s as well as the recent period.

For the whole economy, we found that Indian economy has experienced an increase in import intensity of exports in late 90s as compared to early 1990s. It has gone up from 10.54 per cent in the year 1993–94 to 12.61per cent in the year 1998–99. (*Table 1*) Among the broad sectors of the economy, Indian manufacturing sector has highest import intensity of exports. In the year 1993–94, it was 12.89 per cent. And it had increased to 16.77 per cent in 1998–99. It further increased to 29.6 per cent in 2007-08.The service sector has the second highest import intensity of exports. And in regard to the overall trend of the economy, service sector's import intensity of exports has also gone up in the year 1998–99 as compared to the year 1993–94. Raw Tea and Coffee, Milk and Milk products, Animal Services (Agriculture), Construction, Electricity, Gas, Water Supply, Storage and Warehousing, Banking, Ownership of Dwelling, Education and Research, Medical and Health, and Public Administration have zero import intensity of exports, as the exports of these sectors are zero. Other sectors that include agriculture, livestock products, forestry and logging, fishing, and mining products are showing comparatively lower import intensity of exports. But all of them have experienced an increase in import intensity of exports. As manufacturing and services are the two sectors with highest import intensity of exports, we shall discuss them separately. We shall discuss the manufacturing sector in detail as it constitutes more than 70 per cent of Indian exports.

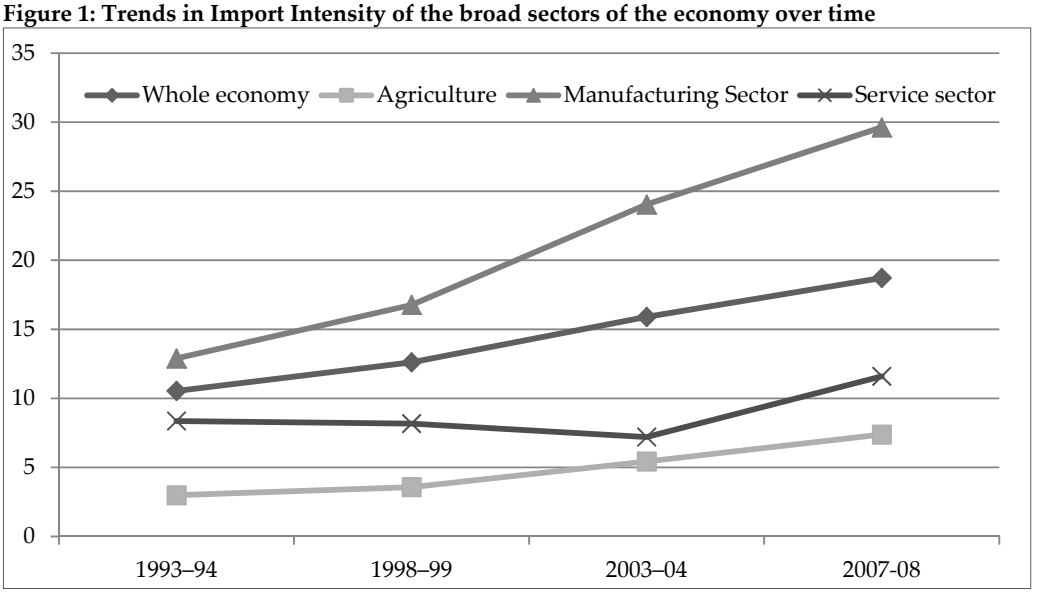
Table 1: Import Intensity of Exports for the Broad Sectors of the Economy (in per cent)

	1993–94	*1998–99*	*2003–04*	*2007-08*
Whole economy	10.54	12.61	15.9	18.72
Agriculture	2.99	3.57	5.43	7.38
Livestock products	1.22	1.04	2.68	3.17
Forestry and logging	-	1.24	2.16	2.52
Fishing	-	2.81	5.69	5.07
Mining Products	3.22	3.84	2.33	3.53
Manufacturing Sector	12.89	16.77	24.04	29.63
Service sector	8.36	8.17	7.2	11.6

Note: Our calculation based on the Input-Output matrices for the years 1993–94, 1998–99, 2003–04, and 2007-08

Source: Input Output Tables provided by Central Statistical Organisation, Government of India

Figure 1: Trends in Import Intensity of the broad sectors of the economy over time



Import intensity of India's exports increased steadily from 10.54 per cent in 1993-94 to 15.9 per cent a decade later in 2003-04. In 2007-08, import intensity of exports rose again to 18.72 per cent in 2007-08. The steep rise in import intensity between 2003-04 and 2007-08 in fact mirrored in import intensity of manufacturing exports which fell to 29.63 per cent in 2007-08. Both services and agriculture also saw rising import intensity of exports between 2003-04 and 2007-08.

11. Import Intensities of Indian Manufacturing Sector

CSO has published the Input-Output table for the years 1993–94, 1998–99, 2003–04,and 2007-08. The economy was divided into 115 sectors for 1993-94 and 1998-99. For the years 2003-04 and 2007-08, the economy has been divided into 130 sectors. We have broadly classified sectors to analyze the sectoral composition of import intensity (see *Table 2* below).

Table 2: Import Intensity of Exports for the Major Manufacturing Sectors (in per cent)

		1993–94	*1998–99*	*2003–04*	*2007-08*
1	Food Processing	4.44	5.81	8.05	9.96
2	Textile	6.78	9.44	13.20	13.53
3	Drugs and Pharmaceuticals	14.01	15.10	16.75	27.30
4	Petroleum Products	57.65	40.61	52.36	61.14
5	Leather Products	7.04	12.68	9.89	11.6
6	Automobile and Ancillaries	11.00	13.91	15.48	23.60
7	Gems and Jewellery	-	-	59.89	22.07

Source: Our calculation is based on the Input-Output matrices for the years 1993–94, 1998-99, 2003–04 and 2007-08 respectively.

There are 5 sectors that have substantially high import intensity. One of the sectors is Petroleum products. We have discussed some selected sectors like Textile, Leather and Leather Products, Drugs and Pharmaceuticals Food Processing and Automobile and Ancillaries, which are major contributors to India's manufacturing exports. We wanted to include gems and jewellery sector in this list of 5 high exporting sectors. But in the sectoral classification of Input-Output table (during 1993–94 1998–99), the gems and jewellery sector is clubbed with other sectors and we are unable to separate it. But during the period 2003–04 and 2007-08, separately gems and jewellery product has been mentioned.

Within the Manufacturing sector, exports of Petroleum products have always been the most import-intensive. Import intensity of Drugs & Pharma exports rose steadily, and almost doubled from 14 per cent in 1993-94 to 27 per cent in 2007-08. Automobile and Ancillaries exports have also become more and more import-intensive over the years; more than doubling from 11 per cent in 1993-94 to about 24 per cent in 2007-08. Food Processing and Textiles sectors have also become more import-intensive, increased marginally between 2003-04 and 2007-08. Import intensity of exports of Leather products have not changed significantly, between 1993-94 and 2007-08.

11.1 Import Intensity of Different Products

The petroleum products have experienced a sharp reduction in import intensity in late 1990s as compared to early 1990s. The primary reason is the decline in import requirement of crude petroleum. In 1993–94, 77.23 per cent of crude petroleum requirement for production of petroleum products was imported whereas in 1998–99 it declined to 58.95 per cent. The import intensity in petroleum product increased in 2003-04 and in 2006-07. The import intensity for this sector had declined to 61 per cent in 2007-08. This sector is subject to high fluctuations in international crude prices.

The major exporting sectors of India, i.e. leather and leather products, drugs and pharmaceuticals, automobile and ancillaries have experienced an increase in import intensity during the period 1993–94 and 2007–08 ; textiles and food processing industries import intensity also increased during the period. Between 2003-04 and 2007-08, leather, petroleum products have shown increasing trend in their import intensity and gems and jewellery have shown decreasing trend in their import intensity. Another major exporting sector, gems and jewellery, is difficult to identify from this CSO classification. It is not mentioned as a single sector in CSO's 115 sectors classification of the economy for the years 1993-94 and 1998-99.

Table 3: Import Intensities of Petroleum Products

	Exports in Rs lakh				*Import Intensities (in per cent)*			
	1993–94	*1998–99*	*2003–04*	*2007-08*	*1993–94*	*1998–99*	*2003–04*	*2007-08*
Leather footwear	101302	35707	1377448	6985819	57.65	40.61	52.36	61.14

11.2 Import Intensity of Textile Sector

In CSO's 130 sectors classification, textile segment is divided into 9 sectors. These sectors are: 1) Khadi, cotton textiles (handlooms); 2) Cotton textiles; 3) Woollen textiles; 4) Silk textiles; 5) Art silk, synthetic fibre textiles; 6) Jute, hemp, mesta textiles; 7) Carpet weaving; 8) Readymade garments; and 9) Miscellaneous textile products. Apart from jute, hemp, mesta textiles sector, all other textile sectors have experienced an increase in import intensity in the year 1998–99 in comparison to the year 1993–94. The import intensity of Jute, hemp, mesta textiles sector has declined from 1993–94 to 1998–99 (*Table 4*). The use of imported plant & machinery has increased in all the nine textile sectors during the same period. The share of imported machinery in the direct use of plant and machinery in all the textile sectors has gone up during the same period.

Table 4: Import Intensity of Different Textile Sectors

	Exports in Rs lakh				*Import Intensities (in per cent)*			
	1993–94	*1998–99*	*2003–04*	*2007-08*	*1993–94*	*1998–99*	*2003–04*	*2007-08*
Khadi, cotton textiles (handlooms)	48389	63974	175083	186985	3.82	6.65	5.12	7.91
Cotton textiles	236898	575544	604688	1250039	6.53	7.71	3.84	10.94
Woollen textiles	12165	30972	39041	96060	9.37	10.33	14.43	16.16
Silk textiles	23574	48410	113511	100977	4.92	8.88	24.56	23.62
Art silk, synthetic fibre textiles	90811	213152	434686	576267	10.05	16.58	16.95	21.34
Jute, hemp, mesta textiles	23918	56561	38655	59162	9.13	7.29	5.8	8.78
Carpet weaving	43769	107843	260771	380850	4.57	8.49	15.2	13.53
Readymade garments	601600	1484354	2976495	4112191	6.63	9.18	9.87	12.83
Miscellaneous textile products	68856	255834	348363	391407	7.56	10.43	10.95	17.85

Cotton textile is the major raw material for khadi, cotton textiles (handlooms) sector. The direct use of cotton textile in absolute value and share of imports in this sector has gone up in the year 1998–99 in comparison to the year 1993–94. In 2003–04 it has increased further up to 3.67 per cent . (*Table 5*). The use of plant and machinery in this sector has gone up during this period. The direct use of Industrial Machinery (Food & Technology) has gone up from ₹2,507 lakh in the year 1993–94 to ₹3,046 lakh in the year 1998–99. For 2007-08 except for silk textiles and art., silk and synthetic fibre textiles all other sectors experience a steep decline in import intensity. Both use of machine tools and its imports by this sector have increased during this period. Use of other non-electrical machinery and electrical industrial machinery by this sector has gone down during this period. But on the whole, the use of plant & machineries and its import of by the khadi, cotton textiles (handlooms) sector has gone up.

Raw cotton is the main raw material for the production of cotton textiles. And the other important raw materials are cotton textile, electricity, other transport services and trade. All of these raw materials have experienced an increase in their direct use in the cotton textile

sector. Raw cotton that is being used in cotton textile sector is completely domestically produced. It is the same for electricity and trade for obvious reasons. The direct use of imported cotton textile as raw material to cotton textile industry has experienced a decline in share in total direct use in cotton textile industry. It increased to 3.68 per cent in 2003–04.The direct use of imported synthetic fibres, resin as raw material for cotton textile industry has gone up substantially in 1998–99 but afterwards shows a decline in both 2003–04 . For 2007-08 the share of imports in direct use was 25.35 per cent. The direct use of imported plant & machinery in production of cotton textile has also increased substantially (*Table 6*).

Table 5: Share of Imports in Major Inputs used in Khadi, Cotton Textiles (handlooms) Sector

	Direct Use as Input in Rs Lakh				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Cotton textiles	90961	103777	150203	105586	-	1.53	3.67	4.3
Industrial machinery(F&T)	2507	3046	6128	-	-	27.38	33.09	-
Industrial machinery (others)	74	82	1	5011	-	63.79	-	-
Machine tools	501	1106	91	587	-	42.9	15.38	2
Other non-electrical machinery	835	807	133	-	-	40.53	24.06	-
Electrical industrial Machinery	614	-	-	295	-	-	-	-

Table 6: Share of Imports in Major Inputs used in Cotton Textiles Sector

	Direct Use as Input in Rs Lakh				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Cotton	712737	1180783	1441295	3041566	-	-	-	-
Cotton textiles	202122	439465	664018	79340	1.59	1.53	3.68	25.35
Synthetic fibres, resin	49545	113307	9545	663	16.33	32.94	17.84	21.56
Electricity	130775	671379	412278	103087	-	-	-	-
Other transport services	369341	429027		-	-	0.04	-	-
Trade	274859	495729	440178	35479	-	-	-	-
Industrial machinery(F&T)	10504	17860	65065	-	-	27.38	33.1	-
Industrial machinery (others)	716	1026	5	51828	-	63.79	20	-
Machine tools	220	394	866	-	-	42.9	15.7	-
Other non-electrical machinery	717	1400	10137	967	-	40.53	24.34	21.1
Electrical industrial Machinery	489	845	-	14315	-	23.96	-	-

The share of imported raw materials in all the major raw materials directly used in woollen textile sector has gone up in the year 1998–99 in comparison to the year 1993–94. The share of imported plant & machinery directly used in woollen textile sector has gone up substantially during this period (*Table 7*). For the year 2007-08, only cotton textiles and synthetic fibres, resin have shown significant import share in direct use.

The share of imported silk textiles in total silk textiles directly used in silk textile sector has gone up roughly by 20 per cent in the year 1998–99 in comparison to the year of 1993–94. The share further increased to 71 per cent in 2003–04, and reached to around 95 per cent in 2007-08 (*Table 8*). Also, the use of imported plant and machinery in the silk textile sector has gone up substantially during the same period.

Table 7: Share of Imports in Major Inputs used in Woollen Textiles Sector

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Khadi, cotton textiles (handlooms)	17443	19666	503		-	1.79	14.71	-
Cotton textiles	29019	41196	2122	453	-	1.53	3.68	14.17
Synthetic fibers, resin	6747	18897	82	129	-	32.94	18.29	9.29
Trade	15822	31855	40400	3734	-	-	-	-
Industrial machinery(F&T)	1350	1735	30248		-	27.38	33.1	-
Industrial machinery (others)	58	62	52	20622	-	63.79	25	0.05
Machine tools	129	173	-	87	-	42.9		-
Other non-electrical machinery	124	178	6	-	-	40.53	33.33	-
Electrical industrial Machinery	77	122	-	-	-	23.96	-	-

Table 8: Share of Imports in Major Inputs used in Silk Textiles Sector

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Other livestock products	14149	32485	1159	6590	-	0.7	0.86	0.13
Silk textiles	11336	14870	13526	70	4.33	24.71	71.61	95.5
Industrial machinery(F&T)	1101	1802	499	-	-	27.38	33.07	0
Industrial machinery(others)	27	39	15	660	-	63.79	26.67	0.44
Machine tools	293	452	-	95	-	42.9	-	-
Other non-electrical machinery	198	369	-	-	-	40.53	-	-

The two major raw materials used in art silk, synthetic fibre textiles sector are synthetic fibres, resin and art silk, synthetic fibre textile. In both, the inputs in the share of imports has gone up from 16.33 per cent in the year 1993–94 to 32.94 per cent in the year 1998–99 and up to 91 per cent in 2007–08. From 1.54 in the year 1993–94 to 2.49 in the year 1998–99 for the art silk, synthetic fibre textile respectively, the share increased to 6.34 per cent in 2003–04. Thereafter it increased steeply in 2007-08 (*Table 9*). The share of imported organic heavy chemicals in total direct use of organic heavy chemicals has gone down from 59.34 per cent in the year 1993–94 to 47.24 per cent in the year 1998–99. It further increased to 48 per cent in 2003–04 but declined in 2007-08. The share of imported plant & machinery in total direct use of plant & machinery has gone up substantially during this period.

Table 9: Share of Imports in Major Inputs Used in Art Silk, Synthetic Fibre Textiles Sector

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Art silk, synthetic fibre textiles	374907	393204	469276	9916	1.54	2.49	6.34	24.5
Cotton textiles	58838	57129	36215	6813	-	1.53	3.67	16.08
Organic heavy chemicals	22436	61795	115905	216127	59.34	47.24	48.28	21.32
Synthetic fibre, resin	177499	209505	449054	5534	16.33	32.94	178.18	91.4
Industrial machinery(F&T)	13563	12871	18801		-	27.38	33.1	-
Industrial machinery (others)	392	310	26	23676	-	63.79	23.08	0.02
Machine tools	650	646	152	210	-	42.9	15.79	9.37
Other non-electrical machinery	726	755	322	366	-	40.53	24.22	17.63

Raw jute is the major input used in the jute, hemp, mesta textile sector. The use of imported raw jute has come down in the year 1998–99 in comparison to the year 1993–94. The share

reached to 4 per cent in 2007-08. But the use of imported plant & machinery has increased substantially during this period for the jute, hemp, mesta textile sector (*Table 10*).

Woollen textile is the major raw material in the carpet weaving sector. Share of imports in direct use of woollen textile in this sector has gone up from 3.98 per cent in the year 1993–94 to 21.72 per cent in the year 1998–99. For 2007-08 it has shown an increase in its share. Also the use of imported plant & machinery has gone up substantially (*Table 11*).

Table 10: Shares of Imports in Major Inputs Used in Jute, Hemp, Mesta Textiles Sector

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Jute	43706	118530	140304	186032	13.21	7.19	6.94	4.31
Industrial machinery(F&T)	5207	8931	6146	-	-	27.38	33.11	-
Industrial machinery (others)	79	112	-	7111	-	63.79	-	-
Machine tools	161	501	11	-	-	42.9	18.18	-
Other non-electrical machinery	147	288	62	16	-	40.53	24.19	78.23

Table 11: Shares of Imports in Major Inputs Used in Carpet Weaving Sector

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Woollen textiles	10597	17336	16423	7548	3.98	21.72	24.36	43.65
Industrial machinery(F&T)	83	214	11318	-	-	27.38	33.1	-
Industrial machinery (others)	6	24	-	11556	-	63.79	-	-
Machine tools	140	156	11036	1	-	42.9	15.71	**42.8**
Other non-electrical machinery	22	58	20	14628	-	40.53	24.47	0.03

The major raw materials used in readymade garments sector are cotton textiles and art silk, synthetic fibre textiles. The share of imported cotton textiles in total direct use as raw material in readymade garments sector has gone down from 2.41 per cent in the year 1993–94 to 1.53 per cent in the year 1998–99 (*Table 12*). It again increased in 2003–04 to 3.67 per cent. For 2007-08, the share increased to around 11 per cent. The share of imported art silk, synthetic fibre textiles in total direct use as raw material in this sector has remained same at 2.49 per cent during this period. The share increased to 6.34 per cent in 2003–04. For 2007-08 it has shown an increase. The share of imported plant & machinery in total used plant & machinery has also gone up substantially during this period.

Table 12: Shares of Imports in Major Inputs Used in Readymade Garments Sector

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Cotton textiles	184028	309459	678258	185520	2.41	1.53	3.67	**11.06**
Art silk, synthetic fibre textiles	94802	158669	213099	86494	2.49	2.49	6.34	**12.87**
Jute, hemp, mesta textiles	21422	43188	5315	510171	-	3.66	4.63	**0.04**
Industrial machinery(F&T)	4144	6208	68178	-	-	27.38	33.1	**-**
Industrial machinery (others)	85	108	-	85604	-	63.79	-	**-**
Machine tools	96	144	15984	-	-	42.9	15.72	**-**
Other non-electrical machinery	229	458	89	33943	-	40.53	24.72	**0.05**
Electrical industrial Machinery	441	902	-	387	-	23.96	-	-

The major raw materials used in miscellaneous textile products are: a) cotton textiles, b) art silk, synthetic fibre textiles, c) jute, hemp, mesta textiles, and d) synthetic fibres, resin. The share of imports of all these raw materials in their total use in production of miscellaneous textile products has gone up in the year 1998–99 in comparison to the year 1993–94. The figure for the year 2003-04 also shown an increase. Also the use of imported plant & machineries has increased substantially during this period (*Table 13*). For 2007-08 there has been significant increase in the share of imports in direct use.

Table 13: Share of Imports in Major Inputs Used in Miscellaneous textile products

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Cotton textiles	86321	204851	250236	104009	-	1.53	3.67	7.28
Art silk, synthetic fibres textiles	32155	83822	210204	12428	1.4	2.49	6.34	8.33
Jute, hemp, mesta textiles	23773	75818	4330	417232	-	3.66	4.64	0.04
Synthetic fibres, resin	24589	65137	93152	15545	16.33	32.94	17.84	88.06
Industrial machinery(F&T)	3638	7740	74332	313	-	27.38	33.1	64.9
Industrial machinery (others)	116	208	4478	81314	-	63.79	24.16	1.1
Machine tools	167	350	63887	7828	-	42.9	15.71	55.6
Other non-electrical machinery	435	1117	251	98050	-	40.53	24.3	0.05
Electrical industrial Machinery	1775	2226	1	483	-	23.96	-	0.01

11.3 Import Intensities of Leather Sector

The import intensities of exports for leather sector have increased from 1993–94 to 1998–99. This sector consists of two sub-sectors. These are: a) leather footwear; and b) leather and leather products. For the year 2007-08 there has been a rise in import intensity as compared to 1993-94. The major input of leather footwear industries is leather and leather products. The share of imported leather and leather products in total used leather and leather products in leather footwear industries has gone up from 7.4 per cent in the year 1993–94 to 12.31 per cent in the year 1998–99. It further increased to 14 per cent in 2003–04. (*Table 15*). For 2007-08, the share is on rise. During the same period, the share of imported plant & machinery in the total use of plant & machinery in this industry has gone up substantially.

Table 14: Import Intensities of Leather Sector

	Exports in Rs lakh				*Import Intensities (in per cent)*			
	1993–94	*1998–99*	*2003–04*	*2007-08*	*1993–94*	*1998–99*	*2003–04*	*2007-08*
Leather footwear	123399	165244	58934	68858	7.04	10.45	8.87	11.3
Leather and leather products	189982	309538	528962	640736	7.04	13.87	9.22	11.92

Table15: Shares of Imports in Major Inputs Used in Leather Footwear

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Leather and leather products	58173	105363	151188	2391	7.4	12.31	14.27	42.9
Industrial machinery (others)	102	136	5194		-	63.79	24.16	-
Machine tools	62	77	-	7005	-	42.9	-	-
Other non-electrical machinery	491	757	652	59	-	40.53	24.39	21.36
Electrical industrial Machinery	96	69	-	1808	-	23.96	-	-

The major inputs of leather and leather products industries are other livestock products and leather and leather products itself. The share of imports in the total use of other livestock as inputs to leather and leather products industries has declined in the year 1998–99 in comparison to the year 1993–94. The same trend continues during 2003–04 ,the share of imported leather and leather products in total use of it as input in the same industry has gone up during the same period (*Table 16*). For 2007-08, it has shown a declining trend. The share of imported plant & machineries in total use of plant & machineries in this industry has gone up substantially.

Table 16: Share of Imports in Major Inputs Used in Leather and Leather Products

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Other livestock prds	42059	68378	115555	290099	0.97	0.7	0.87	0.29
Leather and leather products	114680	205093	200375	225	1.79	12.31	14.28	10.39
Industrial machinery (others)	639	859	-	4865	-	63.79	-	-
Machine tools	234	404	-	-	-	42.9	-	-
Other non-electrical machinery	426	831	636	35	-	40.53	24.32	36.89
Electrical industrial Machinery	110	175	-	1526	-	23.96	-	-

11.4 Import Intensity in Drugs and Pharmaceuticals Industries

The import intensity in drugs and pharmaceuticals industries has gone up from 14.01 per cent in the year 1993–94 to 15.1 per cent in the year 1998–99. It increased to 27.3 per cent in 2007-08. The major raw materials it uses are: a) Drugs and medicines; b) Organic heavy chemicals; c) Paper, paper products & newsprint; d) Other chemicals; and e) Inorganic heavy chemicals. In three major raw materials used in drugs and pharmaceuticals industry the share of imports has gone down in the year 1998–99 in comparison to the year 1993–94 (*Table* 18).

Table 17: Import Intensities of Drugs and Pharmaceuticals

	Exports in Rs lakh				*Import Intensities (in per cent)*			
	1993–94	*1998–99*	*2003–04*	*2007-08*	*1993–94*	*1998–99*	*2003–04*	*2007-08*
Miscellaneous food products	95142	326219	3484165	1452725	14.01	15.1	16.75	27.3

Table 18: Share of Imports in Major Inputs Used in Drugs and Pharmaceuticals Industries

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Drugs and medicines	246586	601822	1153562	910	10.15	2.78	3.65	**15.73**
Organic heavy chemicals	92362	221441	618870	112478	59.34	47.24	48.28	**106**
Paper, paper prods. & newsprint	48859	112702	6822	37341	17.12	29.78	17.49	**2.63**
Other chemicals	51921	85365	91662	344	7.92	14.94	13.86	**30.4**
Inorganic heavy chemicals	19071	65888	73260	-	31.94	30.86	20.99	**-**
Industrial machinery (others)	1027	1563	18177	-	-	63.79	24.16	**-**
Machine tools	669	1348	47	22869	-	42.9	14.89	**0.63**
Other non-electrical machinery	1009	1963	1166	46	-	40.53	24.36	**50.7**
Electrical industrial Machinery	82	119	-	1546	-	23.96	-	**-**

These three raw materials are: 1) Drugs and medicines; 2) Organic heavy chemicals; and 3) Inorganic heavy chemicals. The share of imports in the use of Paper, paper products & newsprint and other chemicals has gone up during the period 1993–94 and 1998–99, increased further in 2003–04. 2007-08 shows decline in some of the inputs used. Also, the use of imported plant & machineries in the total use of plant & machineries has gone up substantially in this period.

11.5 Import Intensities in Food processing Industries

The food processing sector consists of 6 sectors. These are: a) Sugar; b) Khandsari and boora; c) Hydrogenated oil (vanaspati); d) Edible oils other than vanaspati; e) Tea and coffee processing; and f) Miscellaneous food products. Among these industries, excluding tea and coffee processing industries, all other industries have experienced an increase in import intensity in the year 1998–99 in comparison to the year 1993–94. The value of import intensity of tea and coffee processing industries has stagnated around a little higher than 5 per cent during this period. The import intensities of sugar, khandasari and boora, and edible oil other than vanaspati are very low. The import intensities of Hydrogenated oil (vanaspati), Tea and Coffee processing, and miscellaneous food products are relatively high—(*Table 19*). For 2003-04, the import intensities were lower than , in 2007-08.

Table 19: Import Intensities in Food Processing Industries

	Exports in Rs lakh				*Import Intensities (in per cent)*			
	1993–94	*1998–99*	*2003–04*	*2007-08*	*1993–94*	*1998–99*	*2003–04*	*2007-08*
Sugar	13877	173	80781	341759	3.06	3.23	3.42	10.96
Khandsari, boora	6057	1101	-	-	4.3	4.22	-	-
ydrogenated oil (vanaspati)	726	4182	-	-	7.37	10.3	-	-
Edible oils other than vanaspati	163798	177882	350255	780240	3.56	4.46	4.44	8.1
Tea and coffee processing	98232	254937	172281	234507	5.21	5.05	2.8	11.94
Miscellaneous food products	161647	278989	1039359	986438	4.97	7.3	4.52	10.62

The import intensity of hydrogenated oil (vanaspati) has gone up from 7.37 per cent in the year 1993–94 to 10.3 per cent in the year 1998–99. The major raw materials this sector uses are: a) Other crops; b) Edible oils other than vanaspati; and c) Other chemicals. In the total use of all of them as raw material to this sector, the share of imports has gone up in the year 1998–99 in comparison to the year 1993–94 (*Table 20*). Share of all inputs further increased in 2003–04. For 2007-08-, the share of imports in direct use for edible oils other than vanaspati have increased. Similar is the situation in the use of imported plant & machineries.

The import intensity of miscellaneous food products has gone up from 4.97 per cent in the year 1993–94 to 7.3 per cent in the year 1998–99 (*Table 21*). Among the major inputs it directly uses, the share of imports in total direct use as inputs has gone down for other crops and petroleum products for the year 2003–04. For 2007-08 there has been a decline in import share in most of the sectors. In the same period, for rest of the major inputs, the share of imports in total direct use as inputs has gone up. The use of imported plant &

machineries has also gone up during the same period. During the period 2003–04, some of the inputs share had gone down as compared to the previous year. For 2007-08 the share of most of the inputs have declined except few in their share in imports in direct use.

Table 20: Share of Imports in Major Inputs Used in Hydrogenated oil (Vanaspati)

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Other crops	116096	366985	34762	104009	-	1.36	0.59	0.34
Edible oils other than vanaspati	39170	139937	257061	12428	8.53	21.62	25.83	39.54
Other chemicals	29900	74135	43828	417232	7.92	14.94	13.86	-
Industrial machinery(F&T)	2	6	2886	15545	-	27.38	33.09	-
Industrial machinery (others)	18	42	-	313	-	63.79	-	-
Machine tools	372	1092	-	81314	-	42.9	-	-
Other non-electrical machinery	24	63	7	7828	-	40.53	28.57	-

Table 21: Share of Imports in Major Inputs Used in Miscellaneous Food Products

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Paddy	67870	509925	379420	438782	-	0.01	-	-
Wheat	135223	628905	713870	730682	-	2.29	0.01	0.01
Pulses	7814	153230	246935	297577	-	4.33	4.13	2.82
Groundnut	40467	89737	12661	14070	-	0.01		-
Other crops	191748	1054979	138852	130140	7.93	1.36	0.59	0.52
Coconut	18350	75538	1526	3177	-	-	0.13	0.05
Milk and milk products	420240	948057	1246053	1263141	-	-	-	-
Other livestock products	56349	278577	191989	303287	-	0.7	0.87	0.45
Fishing	73881	146033	419791	740417	-	0.53	0.34	0.16
Sugar	45812	134283	254986	1605	-	8.07	0.34	5.12
Khandsari, boora	61802	125464	191116	296677	-	0.65	-	-
Miscellaneous food products	96922	879547	867750	5096	-	0.62	0.67	4.48
Plastic products	15998	80460	119025	-	-	12.1	5.55	-
Petroleum products	16092	91834	154514	87074	36.27	26.99	9.83	14.36
Industrial machinery(F&T)	3634	8518	71222	-	-	27.38	33.1	-
Machine tools	467	3751	273	32	-	42.9	15.75	10.28
Other non-electrical machinery	732	6636	1206	253	-	40.53	24.3	95.51
Electrical industrial Machinery	3132	13390	-	1984	-	23.96	-	-

11.6 Import Intensity of Automobile and Ancillaries Sector

The import intensity of automobile sector has gone up in the year 1998–1999 as compared to the year 1993–94 (*Table 22*). This sector consists of motor vehicle and motor cycles and scooter industries. There has been a sharp fall in import intensity for this sector in the year 2007-08.

Table 22: Import Intensity of Automobile and Ancillaries Sector

	Exports in Rs lakh				*Import Intensities (in per cent)*			
	1993–94	*1998–99*	*2003–04*	*2007-08*	*1993–94*	*1998–99*	*2003–04*	*2007-08*
Motor vehicles	98682	190769	551611	1265760	11.08	13.83	10.89	9.02
Motor cycles and scooters	15578	24510	122855	153297	10.47	14.57	12.4	7.66

The major raw materials used in motor vehicle industries are: a) Iron, steel and ferro alloys; b) Iron and steel casting & forging; c) Rubber products; d) Hand tools, hardware; and e) Motor vehicles. The share of direct use of imported Iron, steel and ferro alloys, rubber products and motor vehicles in total direct use as raw material to motor vehicle industries has gone down in the year 1998–99 in comparison to the year 1993–94. But in the year 2003–04, some sectors have shown increase in their respective shares, while some show decline. In 2007-08 there has been a downward trend. Whereas the share of direct use of imported iron and steel casting & forging and hand tools, hardware in total direct use as raw material to the same sector has gone up during the same period. The share of imported plant and machinery in its total direct use in this sector has gone up during the same period only with the exception for other non-electrical machinery. As already mentioned, the information regarding use of other non-electrical machinery provided in CSO's Input-Output table, 1993–94, is erroneous.

Table 23: Share of Imports in Major Inputs Used in Motor Vehicle Industries

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Iron, steel and ferro alloys	110116	281353	694955	15048	6.95	6.42	8.83	17.74
Iron and steel casting & forging	72443	105188	110930	1670476	-	6.06	3.75	0.2
Rubber products	49525	89860	116800	93540	11.22	4.1	4.79	4.93
Hand tools, hardware	42156	83411	83349	134816	-	8.26	29.82	15.18
Motor vehicles	187487	198719	765727	-	5.62	4.67	3.8	-
Electricity	80906	164279	223206	95635	-	-	-	-
Industrial machinery (others)	558	628	2506	21499	-	63.79	24.16	0.46
Machine tools	500	703	88867	2490	-	42.9	15.71	25.8
Other non-electrical machinery	25062	48296	360005	520801	101.85	40.53	24.34	13.85
Electrical industrial Machinery	5906	8012	81987	2003660	-	23.96	6.56	0.22

The major raw materials used in motor cycles and scooter sector are: a) Rubber products; b) Iron, steel and ferro alloys; c) Non-ferrous basic metals; d) Motor cycles and scooters; and e) Miscellaneous manufacturing. The share of imported rubber products and miscellaneous manufacturing in total direct use as raw material to motor cycles and scooter sector has gone down in the year 1993–94 to the year 1998–99 (*Table 24*). In the year 2003–04 it increased somewhat , further increase in 2006–07 whereas the share of imported iron, steel and ferro alloys, non-ferrous basic metals and motor cycles and scooters in total direct use as raw material to motor cycles and scooter has gone up during the same period. For 2007-08, the shares of the inputs have decreased. With the exception of other non-electrical machinery, the use of imported plant & machinery has also increased in this sector.

In service sector (*Table 25*) we found, high trend for the economy as a whole, a very high increase in import intensity of exports in 1998–99 in comparison to 1993–94. In the Input-Output table, 16 sectors can be identified as part of service sector. Among these sectors 9 did not export in 1998–99 (according to CSO's Input-Output table). And in all of them import intensity has increased. But to calculate the import intensity of exports, these sectors cannot be included as exports are nil. In the remaining 7 sectors, the import intensity has declined in 2 sectors. They are: other transport services and trade. The decline in import

intensity of exports in service sector in 1998–99 in comparison to 1993–94 is because of decline in import intensity in these two sectors—other transport services and trade. The import intensity increased in most of the sectors in 2007-08.

Table 24: Share of Imports in Major Inputs Used in Motor Cycles and Scooters Sector

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Rubber products	13036	16583	8429	1792	11.22	4.1	16.05	22.19
Iron, steel and ferro alloys	12866	23119	56984	840	0.37	6.42	4.21	34.96
Non-ferrous basic metals	20122	28402	44242	32838	23.37	52.77	55.46	61.54
Motor cycles and scooters	97595	72487	2136	156066	-	1.02	51.83	0.58
Miscellaneous manufacturing	13051	17191	55409	-	47.58	35.76	70.58	-
Industrial machinery (others)	356	318	-	391	-	63.79	-	-
Machine tools	169	189	14625	-	-	42.9	15.71	-
Other non-electrical machinery	5457	8196	59660	78316	101.85	40.53	24.34	73.27
Electrical industrial Machinery	418	445	4466	226836	-	23.96	6.56	0.11

Table 25: Import Intensity in Service Sector

	Exports in Rs lakh				*Import Intensities (in per cent)*			
	1993–94	*1998–99*	*2003–04*	*2007-08*	*1993–94*	*1998–99*	*2003–04*	*2007-08*
Electricity	1	-	-	23	6.86	8.29	-	17.58
Gas	807	-	-	-	0.94	0.98	-	-
Water supply	-	-	-	-	3.28	5	-	-
Railway transport services	54426	94222	420907	533572	4.8	6.76	8.17	9.12
Other transport services	826994	1685415			15.06	13.28		
Communication	2911	19602	9470	1056787	1.77	3.42	6.4	11.49
Trade	1217266	2298708	2977390	7708605	5.72	3.27	1.3	2.46
Hotels and restaurants	234005	420001	903832		3.04	5.09	3.26	4.13
Insurance	43819	83999	192700	606038	3.43	4.72	2.52	
Other services	682197	2213381	933246	3970838	8.43	10.19	8.1	20.24
Ownership of dwellings	-	-	-	-	0.66	0.9	-	-
Education and research	-	-	-	-	-	-	-	-
Medical and health	-	-	-	-	-	-	-	-
Public administration	-	-	-	-	-	-	-	-
Storage and warehousing	-	-	-	-	-	-	-	-
Banking	-	-	137200	-	0.7	2.87	1.63	-

Note: Our calculation based on the Input-Output matrices for the years 1993–94 and 1998–99, 2003–04 and 2007-08.

Source: Input Output Tables, Central Statistical Organisation

In other transport services sector, the reason behind decline in import intensity is that its two major inputs—petroleum products and other services have experienced a decline in their share of imports in total direct use as inputs of other transport services sector in the year 2003–04, the share improved further in 2007-08. (*Table 26*)

In trade, the major inputs are: other services, other transport services, petroleum products, miscellaneous manufacturing, hand tools, hardware and communication (*Table 26*). The share of direct use in imports of other services, petroleum products and miscellaneous manufacturing in their total use as inputs to trade has declined in the year 1998–99 in

comparison to the year 1993–94. And this may cause the decline in import intensity of trade services. The share of direct use of imports of petroleum products in their total use as inputs has declined during 2003–04 .

Table 26: Share of Imports in Major Inputs Used in Trade

Name of Inputs	*Direct Use as Input in Rs Lakh*				*Share Imports in Direct Use in per cent*			
	1993-94	*1998-99*	*2003-04*	*2007-08*	*1993-94*	*1998-99*	*2003-04*	*2007-08*
Other services	753329	974077	137	8699	63.05	12.65	5.11	0.07
Other transport services	278254	834375	-	-	-	14.78	-	-
Petroleum products	20983	233894	404936	38032	36.27	26.99	9.76	61.54
Miscellaneous manufacturing	64633	175621	1958758	-	47.58	35.76	5.82	-
Hand tools, hardware	45040	170725	266030	-	-	8.26	8.96	-
Communication	139661	107028	222836	432813	-	0.44	0.06	0.02

12. Model Specification and Results: Impact of Change in Import Intensity on Output, Exports and Employment

This section investigates the impact of change in import intensity on output, export and employment in the manufacturing sector. The table below presents the list of variables used in the econometric analysis.

As the number of observations is more than the data points, we have used panel regression techniques. Statistically, fixed effects are always preferable with panel data, as they give consistent results, but may not be the most efficient model to run. Random effects model gives us better P values as they are more efficient estimators.

12.1 First Model: Impact of Import Intensity on Exportability

Exports of a particular sector mainly depend upon three factors: (a) world demand for the product, (b) competitiveness of that sector in world market, and (c) surplus in the domestic market or lower domestic demand for the products.

World demand of sector 'i' has been measured by share of total world exports of that sector. Competitiveness has been measured by share of Indian exports in total world exports in sector 'i'. Increase in import intensity can affect both world demand and competitiveness.

Competitiveness can be affected due to three factors at the sectoral level: import intensity, average variable cost and change in technology. Import intensity affects competitiveness positively in three ways: (a) by facilitating production for exports when imported amount of inputs are not available domestically, hence expanding export capacity; (b) by reducing costs when imported raw material is cheaper (this may happen when the cost of transporting the raw material domestically is more than when imported); and (c) through improvement in quality when imported material is superior to those produced domestically. So, change in import intensity should influence competitiveness positively. Imports of cheaper inputs reduce average costs of production, while technology permits

scaling up of production. All these are expected to have positive impact on output growth. Theoretically, change in import intensity can change world demand, too.

List and Description of Dependent and Independent Variables

Variables	*Description*
EXPOUT	Exportability
WEXP	World export demand
COMP	Competitiveness
INT	Import intensity
AVC_i	Average Variable Costs of sector i
K_t	Capital stock of sector i at point t
L_t	Workers employed in sector i at point t
$TC = (K_t - K_{t-1}) / (L_t - L_{t-1})$	Technological change
XOD	Ratio of Exports to Domestic Demand
X	Export
IMPCOM	Import-competing Industries
INPIMCOM	Import intensity of sectors which use these import-competing sectors as the major imported inputs for production.

To determine the impact of changes in import intensity on exports for a sector we shall estimate the equation given below:

Proportionate change in exports is a function of a constant, total world exports of each product group, import intensity, relative unit price.

Relative unit price implies ratio between unit price of India's exports to world and unit price of total world exports.

$$(X_i/O_i) = C + X_w + (X_i/X_w) + (M/O)_i$$

where, Xi is the Indian Exports of sector 'i',

O_i is the Output of sector 'i'. '$(X_w)_i$' is the World exports of sector 'i'. Trade data of WORLD and INDIA has been extracted from UN Commodity Trade Statistics website following HS 1992 Classification according to the concordance table (NIC 1998 and Input-Output table) for the years 1993 and 1998 and 2003–04, 2006-07 and 2007-08.

$(M/O)_i$ = Import intensity of sector 'i', has been calculated for the four years for the sectors by the methodology followed by Manas Bhattacharya[13] and concorded with NIC 1998, 2004 and 2008 respectively.

(X_i/O_i): (EXPOUT) is exportability (exports/output)

X_w: (WEXP) is world export demand

(X_i/X_w): (COMP) is competitiveness

[13] Bhattacharyya, Manas (1989), "Import Intensity of Exports: A Case Study of Indian Economy," Indian Economic Journal, Vol. 36, No. 3, p. 94.

(M/O): (INT) is import intensity

An increase in world demand for the 'ith' industry's output (that is, export demand), for obvious reasons, is expected to raise exports as a proportion of total sectoral output. The estimation result supports this argument. We find that the estimated coefficient on world export demand is positive. However, the coefficient is not significant. Increased competitiveness of the 'i'th industry (measured as Xi/Xw) will raise world export demand. It can be argued that this will get reflected as an increase in the proportion of total sectoral output that goes to meet world demand. This is in fact evident from the estimation results of the model specified above. The coefficient on export competitiveness is positive and highly significant. Import intensity increases exportability of products through an increase in competitiveness. It is then apparent that in the estimated equation the coefficient on import intensity variable should be positive. Indeed the estimated coefficient is positive and highly significant. The results are also consistent with Goldar (2002), who finds higher employment elasticity of demand in export oriented industries in the post-reform period.

12.2 Second Model: Impact of Import Intensity on Competitiveness of a Sector

Average cost of production declines with increase in the competitiveness of a sector. Falling average costs of production can be attributed to decline in labour costs, decline in raw material prices used in production and/or increasing returns to scale. More capital intensive technologies are believed to have greater scale advantages. Competitiveness also depends on production capacity and the quality of products. Both of them are believed to be dependent upon the amount and nature of plant and machinery used in a sector. These two and the scale advantages can be captured by a ratio between change in the capital stock and change in labour employed. We have termed it as technological change. Increase in import intensity can affect the competitiveness through reduction in both average costs and technological change.

So, to model the impact of import intensity on competitiveness we have estimated the following equation:

$$(X_i/X_w)_i = f\,[((M/O)_i(+), AVC_i(-), (K_t - K_{t-1}) / (L_t - L_{t-1})(+)]$$

where, AVC_i = Average Variable Costs of sector i
K_t = Capital stock of sector i at point t
L_t = workers employed in sector i at point t
$(K_t - K_{t-1}) / (L_t - L_{t-1})$= Technological change

Impact of import intensity on competitiveness is positive and significant, effect of technological change is positive and average variable cost is negative and insignificant on competitiveness. Given that firms are driven by the goal of maximization of profit, a decline in average variable cost of production will permit firms to charge a lower price for their output. This will boost the export competitiveness of the sector, the estimated coefficient is negative. Technological change will enable firms to produce output in a more

cost-effective manner. Increased productive efficiency is expected to raise the export competitiveness of a sector. As expected, the estimated coefficient is positive.

12.3 Third Model: Impact of Import Intensity on Output Growth

Output growth for a particular sector depends on both demand and supply side factors. Demand side factors include domestic as well as export demands. The output demand for a particular sector depends upon the exports and production for domestic market of previous year. On the supply side, the factors that influence a firm's decision on the amount of output to be produced include average variable costs, availability of raw materials and the technology used. Production technology determines the scale of production, as capital-intensive technologies are believed to have greater scale advantages.

In addition to this we shall incorporate import intensity as an independent variable. On the demand side, increase in import intensity of exports can enhance export profitability, as discussed in the previous model. On the supply side, increase in import intensity can facilitate production when imported raw materials and machinery are not domestically available or when imported raw materials are found to be cheaper. This will reduce the average cost of production. It can help in availability of the technology that helps to expand the scale of production. All these, taken together, are expected to exercise a positive influence on output growth.

Output growth is a function of a constant, technological change, wage rate, and import intensity. Here, we have taken factors that affect output from supply side. Technological change is the ratio between change in plant and machinery and change in output.

To estimate the impact of import intensity on output growth, we have divided the industrial sectors into two components: non-import competing industries and import-competing industries. We have calculated the ratio between the total imports to total output of the economy from the Input-Output table for the year 2003–04, 2006–07 and 2007–08 for all manufacturing industries. We have identified the import-competing industries sector from the above two Input–Output tables, where the value of this ratio is at least five per cent. Thus, all industries for which this ratio is greater than or equal to five per cent are categorized as import-competing industries and those for which this ratio is less than five per cent are categorized as non-import competing industries.

The sectors that utilize the output of import-competing industries as major inputs are easily identified from Input-Output table.

For non-import competing industries the equation is:

$$(1/O)dO/d_t = f\ [\{(X/Od\}t(+), (M/O)_i(+), \{(1/X)dX/d_t\}, AVC_i(-), (K_t - K_{t-1}) / (L_t - L_{t-1})(+)]$$

where, Od = domestic demand for each sector and 'X' is exports,

Od = total output less net exports where net exports is exports less imports.

Therefore, X/Od is ratio of exports to domestic demand.

The impact of non-import competing industries on output has been positive and significant.

For import-competing industries, we have identified the sectors which use these import-competing sectors as the major imported inputs for production. And we have used the import intensity of these sectors in the above equation in addition to these import-competing sectors' own import intensity.

$(1/O)dO/d_t = f[\{1(X/Od)\}_t(+), (M/O)_i(+), (M/O)_j(+/-), \{(1/X)dX/d_t\}, AVC_i(-), \{(K_t - K_{t-1})/(L_t - L_{t-1})(+)\}]$

where, $(M/O)_i(+)$ = import-competing sector's own import intensity

$(M/O)_j(+/-)$ = import intensity of those sectors that use import-competing sector's products as major inputs.

$(K_t - K_{t-1}) / (L_t - L_{t-1})$ = technological change

X/Od = Ratio of Domestic Demand of each sector and exports

O = Output of each sector

It is necessary to take into account the import intensity of other industries that utilize the output of these industries as major inputs in their production process. If import intensity of these industries is high enough, it means declining demand for the output of import-competing industries, which are major input suppliers. Hence, there will be reduction in output growth.

In the estimated regression for import-competing industries, impact of output has been positive, that of average variable cost, negative and technological change positive as expected and the coefficient of sectors within import-competing industries which uses imported inputs for production is positive. With the increase in the import intensity in an economy, imports may increase which should reduce the demand for import-competing industries, as a result of which output may decline. Also, these import-competing industries will face competition from abroad and that may make these industries more efficient and as a result, the output in these sectors may go up.

12.4 Fourth Model: Impact of Import Intensity on Employment Growth

The impact of liberalization measures on employment is crucial given the fact that in recent years, the employment growth in India has declined in all the sectors.

Employment growth in a sector depends upon the demand for labour as well as the cost of labour. The demand for labour depends upon the production target of the firms as well as on the choice of technology. The major factor to influence the cost of labour is the wage rate.

Change in import intensity affects employment growth through its influence on availability of technologies and output growth. Also, change in import intensity may influence employment by changing the relative price of labour with respect to raw material. As we

have discussed in the previous section, the impact of import intensity on output for import-competing industries is expected to be different from non-import competing industries. We have used a dummy variable to separate the two types of industries.

Employment growth is a function of a constant, change in output growth rate, technological change, wage rate, change in import intensity.

Hence the equation is:

$$(1/L)dL/d_t = f[(1/O)dO/d_t(+), (K_t - K_{t-1}) / (L_t - L_{t-1})(-), w(-), (M/O)_i(+) D_i]$$

where, $(1/L)\, dL/d_t$ is the proportionate change in growth of labour,
L is number of workers employed in a sector.
D1 = 1, for import-competing sectors, otherwise=0

For dummy variables, we have introduced it in multiplicative form in the equation in our dataset by separating out import-competing and non-import competing industries. We have multiplied each observation by the appropriate value of the dummy (0 or 1), and used the modified observations (D_i). The estimated coefficient captures the differential effect of an industry being import-competing or non-import competing.

The coefficient of D1 is positive and significant, the very coefficient has differential effect on employment for import-competing industries as compared to non-import competing industries i.e., import-competing industries import intensity has significant impact on labour than that of non-import competing industries.

In the post-reform period (1993–94/1998–99 and further between 2003-04 and 2007-08), it was expected that the opening of the economy would not only lead to a higher output growth due to better allocation of resources, but increase in trade will restructure production towards more labour-intensive avenues, thereby generating substantial increases in employment; this is again consistent with Goldar (2000), who finds increase in employment growth at the aggregate manufacturing level during post-reform period.

Labour being a primary input in the production process, it is expected that an expansion of output will necessitate increased labour employment. Hence we expect to find that output growth impacts employment growth positively. Indeed, the estimated coefficient is positive.

Technological change is found to have a negative influence on employment as indicated by the negative sign but not significant; although technological innovations are usually labour substituting, but import of technology in an industry is labour utilising.

Real wages have negative impact on employment, which is consistent with the study by Banga (2003). Trade reforms along with reforms in industrial policy created competitive environment, strong pressure on domestic manufactures to reduce costs, thereby reducing the nominal wages. In India, with large scale unemployment, one can say that employment is demand-constrained. A fall in the real wage rate will therefore enable producers to hire

more labour, while maximizing profits. Therefore, the estimated coefficient on wages is expected to be negative.

12.5 Updated Estimated Results Interpretation

The study further extends the estimations to the new and updated Input-Output tables for the year 2007-08 as well as ASI data for the year 2007-08 to match with NSS unorganised manufacturing 2005–06. For the input output table for the year 2007-08, the sectors are clubbed according to that of 1998–99 (into 115 sectors) so that comparison can be made along with the previous year's performance.

The import-competing sectors for the year 2003–04 as well as 2007-08 changed drastically, for the year 2003–04, the sectors having the ratio of imports to output of at least five per cent are more in number and also the sectors which were non-import competing in 1998–99 have become import-competing in the year 2003–04. But the scenario changed significantly in the year 2007-08. It is more or less same as that of 1998–99. The sectors which were import-competing in the year 2003–2004, have become non-import competing in 2007-08. Here also multiplicative dummy has been used to analyse the impact of import-competing and non-import competing industries import intensity on exports, output and growth.

The dummy variable has become significant and the coefficient is negative and do not have differential effect for both import-competing and non-import competing industries on exports, growth and output.

In our study, all the equations have Haussmann test statistics value insignificant so we safely used random effects model.

In the first equation, we have random effects estimation results. The impact of world exports on exportability is positive and significant. But unlike previous years, the impact of competitiveness and import intensity is positive and also significant.

In the second equation, the impact of import intensity on competitiveness is negative, that of average variable cost and technological change are also negative and not significant.

In the third equation, the impact of import-competing industries intensity on output has been negative, technological change is negative, average variable cost and change in exports are also negative, whereas change in export demand has a positive impact on output .

Finally, in the last equation, impact of import intensity on employment has been negative, the coefficient for multiplicative dummy assigned for differential impact on employment for import-competing and non-import competing industries impact has also been negative and not significant, the impact of output on employment is positive, technological change and wage rates also have negative impact on employment.

Wage rates have a negative relation on employment, as wages rise, cost of firms go up and employment will decline.

In India, export industries continue to be labour intensive, like garment manufacturing and are likely to have a positive impact on employment as exports increase. Import competition faced by industry is found to have a negative (or not significant) impact on employment.

In 2007-08, import-competing industries were fewer, meaning reduced domestic supply of imported raw materials.

If export sectors become less import sensitive, it will mean that their dependence on imported raw materials is reduced, but it will be possible if material requirement of export sectors shifted to those available in the domestic market. If so, increase in import intensity cannot be expected to help exports and hence the coefficient is negative in our present case.

Also, if the dependence of exports on imported raw materials decreases, import intensity cannot have a positive influence on export competitiveness, and thereby reducing output growth.

The impact of import intensity of exports on competitiveness is positive and significant.

The detailed estimated results are provided in the Appendix at the end.

13. Conclusion

The present study evaluates the impact of changing import intensity on output, exports and employment. The above discussions, based on econometric investigations, clearly bring out that the impact of import intensity on different variables is diverse and of different magnitudes. Further, it varies significantly among different industry groups. While the present exercise reveals that the impact of import intensity on manufacturing sector is mixed with many rising sectors and few falling sectors, a more dis-aggregated level study will unfold the industry specific impact. Import intensity of India's exports increased steadily from 10.54 per cent in 1993-94 to 15.9 per cent a decade later in 2003-04 and further upto 18.72 per cent in 2007-08. The steep rise in import intensity between 2003-04 in import intensity of manufacturing exports which fell to 29.63 per cent in 2007-08.

The fall in the industrial production led to decline in demand for intermediate inputs. This in fact reduced the import intensity effectively. At the same time, the fall in global trade reduced the production of intermediate goods. This also coupled with the depreciation of rupee that pushed up the prices of imported goods. These are the probable reasons for the fall in import intensity in case of India in recent years.

Whether, trade liberalization measures will boost manufacturing sector in terms of output, exports and employment, it depends on, inter alia, the quality of existing institutions, initial conditions, the history of policies, the political and economic factors, and last but not the least, the art of economic policy making. Further, the positive and significant effects of trade liberalization on employment and wages will persist in the long-run if the Indian economy is able to attract investors and increase exports. In the selected random effects model, the impact of world exports on exportability is positive and statistically significant.

The impacts of competitiveness and import intensity are also positive and statistically significant. India, export industries continue to be labour intensive, like garment manufacturing and are likely to have a positive impact on employment as exports increase. Import competition faced by industry is found to have a negative (or not significant) impact on employment.

Import liberalization measures should be appropriately sequenced to implement the liberalisation measures. This is critically important from the point of view of the export growth strategy. Emphasis ought to be on the products which can win in the world market.

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Appendix:
Latest Results with Absolute Figures and Transformed into Logs

Impact of Import Intensity on Employment

Dependent Variable: LLABOUR				
Method: Least Squares				
	Coefficient	*Std. Error*	*t-Statistic*	*Prob.*
LOUTPUT	0.752917	0.054029	13.93535	0.0000
LWAGES	0.038575	0.017016	2.266911	0.0245
LINT	0.340333	0.050693	6.713538	0.0000
C	2.419425	0.710899	3.403333	0.0008
R-squared	0.587769	Mean dependent var		12.40964
Adjusted R-squared	0.581225	S.D. dependent var		1.552488
S.E. of regression	1.004659	Akaike info criterion		2.867681
Sum squared resid	190.7652	Schwarz criterion		2.935301
Log likelihood	-272.7312	Hannan-Quinn criter.		2.895065
F-statistic	89.82677	Durbin-Watson stat		1.310422
Prob(F-statistic)	0.000000			

LOUTPUT: Output in logs
LWAGES: Wages in logs
LINT: Import Intensity in logs

Impact of Import Intensity on Exportability

Dependent Variable: LEXPORTABILITY				
Method: Least Squares				
	Coefficient	*Std. Error*	*t-Statistic*	*Prob.*
LCOMP	0.004944	0.011798	0.419059	0.6756
LINT	0.189869	0.122423	1.550920	0.1226
C	-2.696947	0.109806	-24.56107	0.0000
R-squared	0.027286	Mean dependent var		-2.817068
Adjusted R-squared	0.017047	S.D. dependent var		1.303925
S.E. of regression	1.292763	Akaike info criterion		3.366863
Sum squared resid	317.5348	Schwarz criterion		3.417578
Log likelihood	-321.9022	Hannan-Quinn criter.		3.387401
F-statistic	2.664866	Durbin-Watson stat		2.008733
Prob(F-statistic)	0.072210			

LEXPORTABILITY: Exportability in logs
LCOMP: Competitiveness in logs

Impact of Import Intensity on Competitiveness

Dependent Variable: LCOMP				
Method: Least Squares				
	Coefficient	*Std. Error*	*t-Statistic*	*Prob.*
LINT	8.658109	0.409042	-21.16680	0.0000
LAVC	-0.421956	0.311209	-1.355859	0.1768
C	1.705316	0.696692	2.447733	0.0153
R-squared	0.719106	Mean dependent var		9.613894
Adjusted R-squared	0.716036	S.D. dependent var		15.02199
S.E. of regression	8.004962	Akaike info criterion		7.013998
Sum squared resid	11726.53	Schwarz criterion		7.066026
Log likelihood	-649.3018	Hannan-Quinn criter.		7.035082
F-statistic	234.2451	Durbin-Watson stat		0.957732
Prob(F-statistic)	0.000000			

LAVC: Average Variable cost in logs

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