

**ESTIMATES OF IMPORT INTENSITY
IN INDIA'S MANUFACTURING SECTOR**
Recent Trends and Dimensions

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ESTIMATES OF IMPORT INTENSITY IN INDIA'S MANUFACTURING SECTOR

Recent Trends and Dimensions*

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[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 alternative methodologies. The paper finds an overall increase in import intensity for most of the broad sectors of the economy as well as many branches of the manufacturing sector in 1998-99 as compared to 1993-94. 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 an accelerated and wide ranging process of economic reform for the last one and half decade. A major component of this process is the opening up of the external sector. Both the commodity market and financial sector have been opened at diverse extents. Policies of import liberalization, export promotion, 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 being institutionalised through World Trade Organisation (WTO). 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 stable and faster rate and will become the engine of growth for the whole economy.

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Over the years the import liberalization measures have been an important component of India's development strategy. The reason behind import liberalization policy is to internationalise the production process as measured by import intensity of exports. Necessity to import in order to produce for export is an integral feature of international economic integration and globalization of production. But in India, there are apprehensions expressed by policy makers, academia and business that liberalized trade policies would lead to an increase in demand for imports without commensurate increase in exports. 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 impact 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 liberalization policy for growth. The imported raw materials should improve the international competitiveness of exports and generate competition for the domestic suppliers. The import of plant and machinery is supposed to allow the 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 studies¹, even under the restrictive policy regime in some selected cases, where imported raw materials have been allowed, 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 liberalization under structural adjustment programme. Also,

¹ Sathe, 1997.

since the import requirement of this industry is high, it is imperative to examine the net gain in foreign exchange after adjustment for import demands are made.

The impact of import liberalization on GDP growth can be positive as well as negative. Increase in import liberalization 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 leading to reduction in GDP. Also, import liberalization may cause greater export than import. The import of cheaper and better quality inputs in comparison to domestic inputs would increase the exports and may be reduce the prices of products consumed in the economy. In that situation greater demand will be added in the national economy and GDP will increase.

The import liberalization may have adverse impacts 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 the 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 liberalization the exporting sectors are probably going to benefit and import competing sectors will lose out. The impact on employment will depend upon the relative employment elasticity of these sectors.

In past, several studies have analyzed the trends and patterns of import intensity of India's exports of the manufacturing sector. These studies have provided valuable insights into its impact on trade and employment. These studies, however, examine the issues at the aggregate industry level or at the level of broad sectors. Such studies, at the aggregate industry or sector level fail to capture the response of individual firms to changes in trade policy in each of the sectors. Such responses could differ across firms depending on the sector to which they belong, the nature of their ownership and many other characteristics of the firms. The present study, based on input-output tables, attempts to investigate the trends and patterns of import intensity of India's manufacturing sector.

To measure the import intensity, 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 (ASI) of Central Statistical Organization (CSO). But most of these studies are based on secondary data. Further, large number of the studies, including the one based on primary survey, ends their story in late 1980s. Thus, there are

hardly any studies on these issues, which cover the period 1990s and beyond. Thus, the present study is relevant to examine the trends and patterns of import intensity during the reform period. Based on input-output tables, we primarily limit ourselves to study of the trends in import intensity in 1990s for the economy as a whole and also for select items/sectors, which constitute a substantial share in the Indian export basket.

The present paper has been divided into five sections. Following this introduction, Section 2 briefly reviews the trade policies during the last two decades or so. Section 3 presents a critical survey of different databases that have been used to calculate import intensity of exports. In Section 4 we review past studies on import intensity in Indian context. Section 5 analyses the trends and changes in import intensity, based on input-output tables. Section 6 gives some concluding observations.

2. A Brief Review of Trade Policy in India

Soon after independence, India's import policy was liberalized. However, the foreign exchange crisis in 1956–57 put an end to the phase. And comprehensive import controls were introduced and maintained until 1966². In June 1966, under pressure from the World Bank, India devalued the rupee from Rs. 4.7 to Rs. 7.5 per dollar. This 57.5 per cent devaluation was accompanied by some liberalization of import licensing and cuts in import tariffs. But by 1968, all liberalizing initiatives were reversed and import controls tightened. This regime was consolidated and strengthened in subsequent years and remained more or less intact until the beginning of a period of phased liberalization in the late 1970s.

The effect of import controls was reflected in a decline in the proportion of non-oil and non-cereals imports in the GDP from the low level of 7 per cent in 1957–58 to a lower level of 3 per cent in 1975–76. Since consumer goods imports were banned, this decline was mainly due to decline in imports of machinery, raw materials and components. The prevailing regime rested on a complex system of licensing. Liberalization was done through a liberal grant of licenses, without any policy announcements. The pace of liberalization picked up significantly in 1985. The Open General Licence (OGL) list was steadily expanded. The list was introduced in 1976 with 79 items on it. By April 1990 when the import policy covering the years 1990 to 1993 was issued, the list came to have 1,339 items on it. In 1987–88, 30 per cent of all imports came under OGL. The inclusion of an item in OGL list was usually accompanied by an 'exemption', which amounted to a

² Bhagwati, and Desai, 1970.

tariff reduction. In most of the cases, the items on the list were machinery or raw materials for which no substitutes were produced at home. Several export incentives were introduced after 1985, which helped to expand imports directly when imports were tied to exports and indirectly by relaxing the foreign exchange constraint. Replenishment (REP) licenses could be freely traded on the market and it helped to relax foreign exchange constraints on some imports. The main feature of the REP licenses was that it allowed the holder to import items on restricted list. Even though their limits to the import competition were provided through these licenses, as exports expanded, the volume of these imports increased as well. The final and important source of external liberalization was a market determined exchange rate; rupee was allowed to depreciate in response to market signals.

Implementation of comprehensive import liberalization was undertaken in the backdrop of 1990–91 BOP crisis. The objective was to enhance openness to strengthen the external sector and improve competitiveness in the economy. Efforts began with a two-pronged strategy of reduction in import duties and dismantling of import controls or quantitative restrictions (QR's). Import duties were gradually brought down from a peak level of 300 per cent to 30 per cent over the years. Dismantling of the QR regime began with capital and intermediate goods and at a later stage with consumer goods. The import control mechanism was complex in 1990–91. This was particularly the case with regard to duty free input import regime for exporters. It was based on efficiency principle of either not taxing or refunding input taxes. An effort was made to clean up this regime by introducing 'Exim scrip' (August, 1991)—a freely tradable import license (30% of export value as import entitlement from the limited permissible list)—a premium on which incentive was based. Relaxation of the QR regime over the years came in the form of shifting of items from restricted items to limited permissible category and from there to Open General license (OGL). Some of the canalized items were also shifted to limited permissible category. In addition, procedural simplification was also effected in the capital goods import regime for exporters.

The process of import liberalization was further carried in the Exim Policy of 1992–93, which imports almost all intermediate and capital goods. A Special Import License (SIL) was issued to star exporters for importing restricted items. Further, the scope of SIL was extended and the second hand capital goods (with residual life of 5 years) were also allowed to be imported. The Exim Policy of 1995–96 put 78 items of consumer goods in the freely importable category. At this point of time, out of the total of 5021 (6 digit) items list, 3000 items were importable and 1487 items were importable under freely saleable SIL. Finally, when India lost the dispute case at the WTO on maintaining the QR on 1415

items on the grounds of BOP crunch, it led to the elimination of QR's in two phases by the year 2000–01.

In 2004, a reduction of the basic 25 per cent ceiling tariff rate to 20 per cent (with several notable exceptions) was effected. Further, 4 per cent special additional duty (SAD) was eliminated, which had been levied on all imports since 1998–99 budget. A substantial progress was made to simplify applied tariff rate structure to two-tier tariff structure (10 per cent on inputs and 20 per cent on finished products) by March 2004. The average tariff duty rate was 29 per cent in 2003 down from 32 per cent in 2002. While the average duty was again reduced in 2004 on some selected products such as coal, nickel and nickel articles, power transmission and distribution project equipment, electric meters, certain raw materials and inputs for optical fibers and cables, capital goods for manufacturing electronic goods, certain telecommunication and infrastructure equipments, cellular telephones, VCD and DVDs, life saving bulk drugs, formulations and medical equipments, surgical and dental equipment, aviation turbine fuel equipment for industrial and agricultural water supply projects. The reduction in the tariff duty for textile products from 25 per cent to 20 per cent was also effected. In 2004–05, the peak tariff rate was brought down to 20 per cent and in 2005–06 it was further down to 15 per cent. Thus, in more than 90 per cent of non-agricultural items, the import tariffs are around 10–15 per cent points below the bound rates. The objective is to align Indian tariff rates to the level of Southeast Asian countries tariff rates.

The basic aim of import tariff reform was to enhance competitiveness of Indian industries. The option was to reduce protection by bringing down the average tariff rates. Its intention was also to minimize the arbitrary distribution of protection among the industries by reducing the dispersion of tariffs. Over a period of time, a large number of general, specific and end use exemptions had been built up in response to the demands of vested interests. The Chelliah Committee Report on Tax Reform suggested reducing the peak tariff rates for different categories of goods. This formed the basis for import duty reform of far reaching impact. In 1991–92 budget, the peak rate was slashed from 300 per cent to 150 per cent. In subsequent years, in a gradual manner, the peak rate was cut down and by 1999–2000 the nominal peak rate was reduced to 40 per cent. In 2001–02 the peak rate was further brought down to 35 per cent, reducing the effective duty to 38 per cent. Subsequent removal of surcharges reduced the effective rate of duty to 35 per cent. The gradual elimination of exemptions helped reduce the variance in rates.

Import regime for the exporters was mainly directed to provide free access to intermediates, which go into production of exportables and reduce duty access to capital goods used in export production. Under the Export Promotion Capital Goods (EPCG)

scheme for exports, the concessional duty on capital goods was reduced to 25 per cent with an obligation to export 3 times the value of imports and 15 per cent with an obligation to export 4 times the value of imports. The Export-Oriented Units (EOU) and Export Processing Zones (EPZ) had access to duty free imports. In 1994, the Electronic Hardware Technology Park was introduced on par with EPZs. Finally, the concept of Free Trade Zone was accepted and implemented in 1999–2000.

In India, broadly, the import liberalization centred on expansion of OGL list and increased value limits for imports with reduction in tariff duties. Some of these import facilities were exclusively offered to exporters to provide incentive for exports. Fluctuations in premiums fetched by schemes such as REP or EXIM scrip's in the market indicated the changing export advantages, particularly through the resale and transfer of special import concessions allowed on preferential basis. These schemes could not remain attractive over a period of time as imports were liberalized. Efforts to replace export incentives by EPCG scheme, VBAL and Actual User License enabled exports to remain attractive to some extent. Extension of import concessions to EOU's and EPZ's also increased import intensity of exports. These measures were specially designed to revive and sustain import link in export incentives. However, these incentives got diluted as import restrictions were gradually eliminated.

3. Data Sources: A Critical Appraisal

In past, both secondary and primary data have been used to calculate the import intensity of Indian exports. The present section critically discusses the various secondary databases that are being used to calculate the import intensity of the economy. Broadly, there are three different data sources to calculate the import intensity of exports. They are: (a) Input-Output table, (b) Annual Reports of companies, and (c) Annual Survey of Industries. The scope, coverage and sampling framework of each data source is different and hence their own advantages and disadvantages.

The first data source is input-output table, which is a useful analytical tool to measure the relationship to link between a country's exports and imports. Input-output tables are also useful to measure the relationship between producers of goods and services (including exports). So these tables can be used to estimate the contribution made by imports to the production of any good for exports. The total direct and indirect imports are known as embodied imports. In an input-output framework, the relationship between producers and consumers can be explained as:

$g = A^*g + y$, where g is an n^*1 vector of the output of n number of industries within an economy;

A is an n^*n matrix describing the relationships among industries, [$(I-A)$ is known as Leontief Matrix] where a_{ij} is the ratio of inputs from domestic industry i used in the output of industry j and Y is an n^*1 vector of final demand for domestically produced goods and services, including exports.

Assuming that no other imports (re-exports) are recorded, total imports embodied in exports can be derived as $m^*(I-A)^{-1} * e$ where m is n^*1 vector with components m_j (the ratio of intermediate imports purchased to output produced in industry j) and e is an n^*1 vector of exports by industry.

Estimates of imports of goods embodied in exports of goods can be calculated by including only imported goods in m and setting all exports of services in e to zero, with the assumption that goods industries produce goods only and services industries produces services only.

Thus, the import content of exports (the share of imports used in production to make one unit of export) is equal to:

$$m^*(I-A)^{-1} * e/E \text{ where } E \text{ is } \sum_{i=1}^n ei \text{ (total exports)}$$

Similarly, the embodied imports in exports by industry j can be shown as $\sum m_i * L_{ij}$ where L_{ij} is the ij th element of the Leontief inverse $(I-A)^{-1}$

Also, the share of imports used in the production process to produce exports is equal to $m^*(I-A)^{-1} * e/M$, where $M = m^*g$ (total imports)

Likewise, one can estimate the total indirect and direct contribution of exports to value added by replacing the import vector m above with an equivalent vector that shows the ratio of value added to output (v). So, the contribution of exports to value added is equal to $v^*(I-A)^{-1} * e/E$; and the share of value-added embodied in exports is equal to $v^*(I-A)^{-1} * e/V$, where $V = \text{Total value added}$.

The advantage of this data is that it covers the whole economy and is also 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

important 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 sphere and the reference year is quite long, say at least 6–7 years. Further, this data does not distinguish between the use of imported inputs for production for the purpose 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 return to scale, which may not hold true for all sectors.

The advantage of using Annual Reports of companies is that the time gap between the release of data and the reference year is substantially short. But it has got many disadvantages. First, while the Annual Reports of listed companies are widely available, the availability of annual balance sheet of unlisted companies is very limited. So this database covers only a small portion of organized sector. Even among the companies, whose Annual Reports are available, many of them do not report the imported raw materials. Second, from the reported data on imported inputs it is not possible to divide on the basis of its use. For instance, if a company produces multiple products, there is no way we can identify how much imported inputs are being used for each product. Also, it is impossible to separate (without making assumptions regarding similarity of production functions and similar quality of inputs used) imported inputs used for exports and domestic sales. Third, many companies import inputs not to use for their own production purposes, but to sell it to others. It is not reported in Annual Reports. Fourth, companies may be indirectly using imported inputs (domestically purchased raw materials, imported by some other company). This cannot be traced out from Annual Reports. Also, embodied import content of domestically produced inputs cannot be captured by the data taken from this source.

The Annual Survey of Industries provides information only for organized manufacturing sectors. The time gap (around 2–3 years) between data availability in public sphere 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.

4. Review of Past Studies in Indian Context

Several scholars have studied the import intensity of Indian exports in the past. Text Box 1 presents the studies based on input-output table. Our review here primarily covers studies relating to the last three decades, i.e. 1970s, 1980s and 1990s. 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 1970s in comparison to early 1970s 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 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 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. According to Bhattacharya's calculation, the import intensity of Indian exports in 1970s was between 7 to 8 per cent (Table-1). We have calculated the import intensity of exports for manufacturing by using Bhattacharya's calculation method of sectoral import intensity. The manufacturing sector showed a decline in import intensity of exports in late 1970s as compared to early 1970s. This is similar with his findings regarding import intensity of exports for the whole economy.

Table-1
Import Intensity of Exports

<i>Import Intensity (in %)</i>	<i>Studies by (year)</i>	<i>1973-74</i>	<i>1979-80</i>
Import Intensity of Exports for Whole Economy	Bhattacharya (1989)	7.85	7.35
Import Intensity of Exports for Manufacturing	Bhattacharya (1989)	10.004	8.255
Import Intensity of Exports for Whole Economy	Sathe (1995)	7.75	11.90
Import Intensity of Final Consumption for Whole Economy	Pitre (1992)	3.05	4.75

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. She took the difference between total backward linkages, calculated on basis of domestic inputs and imported inputs, to final demand of a sector and backward linkages, calculated on 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 took an aggregation of it for each sector to get import intensity of each sector. Sathe's findings are different from 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 Bhattacharya's. Instead of export share, she has used share of final consumption in total output as weights. She finds an increase in import intensity in the late 1970s as compared to early 1970s.

The trends in values of import intensities in 1980s, based upon various methods, contradict each other. Pitre (1992), using input-output table shows that the early 1980s had greater import intensity of final consumption than the late 1980s. Burange (2001) using Annual survey of Industries data, showed the same trend in import intensity for organized 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 Pitre's study. 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 1980s as compared with first half of 1980s. 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-2.

The change in import intensity is not adequately studied in the 1990s. 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 1990s. 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 exports³. 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

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.

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 (Table-2).

Table-2
Trends in Import Intensity in 1990s

<i>Studies by</i>	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 1990s as compared with late 1980s.
- b) The values of import intensity of manufacturing sector have increasing trend within the period 1991–92 to 1997–98.

Text Box-1
Studies on Import Intensity based on Input-Output Table

The studies using input-output table have used various methodologies. Bhattacharya (1989), Pitre (1992) and Sarma (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 %)	1973-74	1979-80
Whole Economy	7.85	7.35
Manufacturing Sector	10.004	8.255

Pitre and Sarma, 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, import intensity has gone down in the second-half of the 1980s as compared with 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 with the first half of the 1980s. But Pitre's result shows a decline in import intensity.

contd...

Text Box-2 contd...

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

Sarma covered the study for the period 1978–79 to 1986–87 in an input-output framework and finds rank correlation coefficient between sectoral export growth and their respective import intensities to be very high at 0.94 for the period 1983–87. He found an increase in import requirement for the economy. This is mainly because he computed the total import requirement 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. However, Latika Argade (1991) had shown an inbuilt underestimation phenomenon in methodology used by Sarma.

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 that of Bhattacharya to calculate it. Also, she has reported a different result. According to her, there is a rising trend of this intensity due to change in the composition of exports in favour of non-traditional exports. We are reporting her results in T.3.

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

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 exports. 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 used Annual Reports of companies mostly 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 sheets 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.

Text Box-2

Studies on Import Intensity based on Annual Reports 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 (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 with 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 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 definition¹ 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.

Text Box-3

Studies on Import Intensity based on 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 1980s import intensity was lower than the early 1980s. Though in early 1990s it shows a rising trend but the values are lower than early 1980s.

Exim Bank (1991) has calculated the import intensity, through the 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% respectively.

5. Import Intensity: Estimates based on Input-output Tables

Based on input-output tables for the year 1993-94 and 1998-99, the present section analyses the trends and patterns of import intensity of exports in the economy as a whole and manufacturing sector in particular.

As mentioned in section 4, 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. Pitre and Sarma have calculated the import intensity in final demand. Sathe and Bhattacharya have defined import intensity of a sector as the ratio between imported inputs to total output. Dholakia et al. have used imported input to total use of input and imported input to export as the definitions of import intensity. In this study we have used Bhattacharya and Sathe'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 period, at least a decade. As we are calculating it for the decade of the 1990s, to compare it with another decade will be advantageous.

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, E_i 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:

$A_d = (a_{ij})$ is the domestic input output coefficient

$M = (m_{ij})$ is the import coefficient

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

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

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

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

Sathe has calculated the import intensity of exports in a different way. She has followed the methodology used by Bulmer-Thomas (1978)⁴. He 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 the concept of import intensity and opportunities for import substitution are different from each other. The concept of import intensity includes the imported raw materials and capital goods that are not produced domestically along with those imported raw materials and capital goods that are produced domestically. Whereas, opportunities for import substitutions do not include the imported raw materials and capital goods that are not at all available domestically.

Secondly, with the available Indian input-output tables the opportunities for import substitution, as defined by Bulmer-Thomas, are possible to calculate. To describe the reason we need to describe the methodology of Bulmer-Thomas.

Bulmer-Thomas's uses the following methodology:

The balance equation for the economy (by using input-output table) can be written as—

$$q = Aq + f + e - m$$

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

where, q is a vector of gross output,

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

⁴ Bulmer-Thomas Victor, 1978.

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_{ij}) shows the total backward linkages, direct and indirect, when final demand for the j^{th} commodity (from all sources) increases by unity.

L_{ij} 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—

$$q = Adq + fd + e,$$

$$\text{or, } q = [I-Ad]^{-1}[fd + e] \dots \dots \dots (2)$$

where Ad is the domestic input-output matrix, fd is a vector of domestic demand, where i^{th} element shows purchases 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_{ij} , 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_{ij} and Ld_{ij} is measure of the opportunities for import substitution.

Now the problem is that the output vector q will be different for both the 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 imported input, 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 we are following Bhattacharya's methodology to calculate the import intensity of exports for 1990s.

For the whole economy, we found that Indian economy has experienced an increase in import intensity of exports in late 1990s as compared to early 1990s (see Appendix Table-A1 for sectoral import intensity). It has gone up from 10.504 per cent in the year 1993–94 to 12.611 per cent in the year 1998–99⁵. Among the broad sectors of the economy, Indian manufacturing sector has highest import intensity of exports. In the year 1993–94, it was 12.889. And it has increased to 16.777 in 1998–99. The service sector has the second highest import intensity of exports. And in contrast to the overall trend of the economy, its import intensity of exports has come down in the year 1998–99 as compared with 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 (Appendix Table-A1). Other sectors that include agriculture live stock products, forestry and logging, fishing, and mining products are showing a comparatively lower import intensity of exports. But all of them have experienced an increase in import intensity of exports (see Table-3). As manufacturing and services sector are the two sectors with highest import intensity of exports we shall discuss them separately. The following section discusses the manufacturing sector in detail as it constitutes more than 70 per cent of Indian exports.

Table-3
Import Intensity of Exports for the Economy and Broad Sectors (in per cent)

	1993-94	1998-99
1	2	3
Whole Economy	10.504	12.612
Agriculture	2.99	3.57
Live stock products	1.22	1.7
Forestry and logging	0.0128	0.0186
Fishing	0.0215	0.289
Mining Products	3.224	3.845
Manufacturing Sector	12.889	16.777
Construction*	0.000	0.000
Service sector	8.360	8.171

Source: Our calculation is based on the Input-Output matrices for the years 1993-94 and 1998-99.

* The value of import intensity for construction industries are 0.119 and 0.1316 for the year 1993-94 and 1998-99 respectively. But, the import intensity of exports is zero in this sector because of no exports.

⁵ The figures of import intensity in 1998–99 are marginally over estimated as the import matrix is at purchaser’s price

5.1. Import Intensities in India's Manufacturing Sector

The input-output table gives data for 115 sectors. Out of these 115 sectors, 66 are manufacturing industry. We have broadly re-classified these 66 sectors into 16 sectors to analyse the sectoral composition of import intensity more easily (see Table-4). Among these 16 sectors, 3 sectors—*a*) petroleum products, *b*) iron and steel, and *c*) non-electrical machine and machine tools have experienced a decline in import intensity in the year 1993–94 as compared to the year 1998–99.

Table-4
Import Intensity of Exports for Manufacturing Sector

SNo	Sectors	1993-94	1998-99	Change in Import Intensity of Exports (Col. 3 -Col.2)
0	1	2	3	4
1	Food Processing	4.44	5.81	1.37
2	Tobacco and Beverages	5.20	9.47	4.27
3	Textile	6.78	9.44	2.66
4	Wood, Wood Products and Furniture	3.13	6.54	3.41
5	Paper, Printing	11.11	17.43	6.32
6	Leather and Leather Products	7.04	12.68	5.64
7	Plastic and Rubber Products	12.44	17.36	4.92
8	Drugs and Pharmaceuticals	14.01	15.1	1.09
9	Petroleum Products	57.65	40.61	-17.04
10	Other Chemicals Product	16.01	17.80	1.79
11	Structural Clay, Cement and non-Metallic Mining Products	21.45	22.45	1.0
12	Iron and Steel	14.23	12.59	-1.64
13	Non-Ferrous Basic Metals	17.08	24.65	7.57
14	Non -Electrical Machine and Machine Tools	18.29	16.44	-1.85
15	Electrical and Electronic Machine Tools	17.51	20.08	2.57
16	Automobile and Ancillaries	11.00	13.91	2.91

Source: Our calculation is based on the Input-Output matrices for the years 1993-94 and 1998-99.

Among these 16 sectors, five sectors have substantially high import intensity. These sectors are: 1) petroleum products, 2) structural clay, cement and non-metallic mining products, 3) non-ferrous basic metals, 4) non -electrical machine and machine tools, and 5) electrical and electronic machine tools. We shall discuss 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 (both in the year 1993–94 and the year 1998–99) the gems and jewellery sector is clubbed with other sectors and therefore, we are unable to separate it.

6. Conclusions

Wide ranging process of economic reform was witnessed in India during the last one and a half decade. The main component of this process is the opening up of the foreign trade segment. The policies relating to import liberalization, export promotion and attracting foreign investment are the main features. Due attention has been paid to enhance the competitiveness of the domestic industry by increasing efficiency by importing quality and cost-effective inputs and technology. The objective is to make exports grow faster and turn it into an engine of growth for the economy as a whole.

The import liberalization policy internationalizes the production process; import intensity of exports indicates the internationalization of production process. This process takes into account the relative dependence on foreign inputs by the different sectors of the economy. However, the impact of import liberalization is not uniform on growth of GDP and employment. It has been viewed by some that import liberalization did not increase exports from India. This view needs to be examined. It is a fact that the availability and accessibility of imported raw materials will have significant influence on cost and quality of the product manufactured domestically. Imported raw material meet two objectives: one, it serves as an input to industry where domestic raw material is not available, in essence, it is complementary to the domestic inputs. Two, when it competes with domestic raw materials, it becomes cost-effective and better quality, and it also enhances competitiveness both in domestic and foreign markets.

It has been viewed that the restrictive trade policy regime constrained improvement in export competitiveness in India. The import liberalization on GDP growth may be positive or negative; it depends upon the situation in the economy. If it reduces output in the import competing industries, it leads to fall in GDP. If it increases exports through greater efficiency and reduction in costs, it may increase the GDP. It also depends upon demand conditions. Import liberalization may have adverse impact on employment, if domestic industry contracts. If it pushes exports, it will increase domestic employment. The net effect depends upon variety of conditions prevailing in the domestic economy.

Some studies done during the last three decades have measured import intensity. These have calculated import intensities of exports or import intensities of final consumption. The methodologies applied in the measurement of the studies also differ. Some have indicated that the import intensity of exports has declined in 1970s and others have shown it has increased. It was also found that the import intensity of final consumption has increased during this period. It was found that import intensity of manufacturing has declined in early 1990s as compared to the late 1980s. And some studies have indicated that the value of import intensity of manufacturing sector has shown an increasing trend from the period 1991–92 to 1997–98.

Among all definitions, the study uses import intensity of sector as the ratio between imported inputs to total output. This is a widely used definition of import intensity. The study finds that import intensity of exports has increased in late 1990s as compared with early 1990s. It increased from 10.50 per cent in 1993–94 to 12.61 per cent in 1998–99 for the economy as a whole. The import intensity of the manufacturing sector has increased from 12.89 per cent in 1993–94 to 16.78 in 1998–99. The services sector import intensity declined from 8.36 per cent to 8.17 per cent and that of agriculture rose from 2.99 per cent to 3.57 per cent in the same period. 16 sector analysis based on CSO data indicates that import intensity has significantly increased in manufacturing activities such as non-ferrous basic metals (7.57 per cent), paper and printing (6.32 per cent), leather and leather products (5.64 per cent), plastic and rubber products (4.92 per cent), and tobacco and beverages (4.27 per cent) from 1993–94 to 1998–99. Import intensities declined in the case of petroleum products (17.04), non-electrical machines and machine tools (1.85 per cent), and iron and steel (1.64 per cent) in the same period. The high import intensity sectors are: 1) petroleum products, 2) structural clay, cement and non-metallic mining products, 3) non-ferrous basic metals, 4) non-electric machine and machine tools and 5) electrical and electronic machine tools.

Thus, both for the whole economy and also manufacturing sector there has been a significant rise in import intensity. Though individual manufacturing group showed a diverse pattern of change, in most of these industry groups import intensity has increased at varied pace. The liberal import of raw material in India by large corporations to satisfy the demand for better quality in the international market has increased the import intensity. The changing pattern of import intensity has important implications for growth of exports, output and employment in the manufacturing sector in India. Therefore, the import liberalization measures need to be implemented and sequenced sensibly, as a part of broader effective growth strategy.

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Appendix

Table-A1
Import Intensity of Exports

	1993-94			1998-99		
	<i>Import-Intensity</i>	<i>Exports</i>	<i>Export-Intensity</i>	<i>Import-Intensity</i>	<i>Exports</i>	<i>Export-Intensity</i>
Paddy	4.7	109099.80	1.863	4.32	604757.78	6.868
Wheat	5.69	215.66	0.006	5.56	731.56	0.012
Jowar	3.34	1411.99	0.284	4.45	97.83	0.012
Bajra	3.73	202.40	0.081	4.96	301.82	0.062
Maize	3.36	793.18	0.213	5.41	159.47	0.025
Gram	1.93		0.000	2.2		0.000
Pulses	3.61	2573.87	0.264	5.37	13463.78	0.940
Sugarcane	1.74	188.57	0.012	2.52	853.02	0.035
Groundnut	3.74	16035.57	2.100	3.52	13492.81	1.087
Jute	0.97	52.49	0.065	2.43	920.11	0.688
Cotton	2.76	36937.21	4.416	4.36	10481.03	0.808
Tea	0.82		0.000	1.8		0.000
Coffee	1.31		0.000	1.65		0.000
Rubber	1.63	27.17	0.035	2.01	211.24	0.132
Coconut	1.77	11617.69	3.131	4.17	138659.03	24.333
Tobacco	2.2	23382.89	22.699	2.02	44881.34	19.823
Other crops	1.99	159855.55	2.335	2.2	356881.22	2.504
Milk and milk products	0.75		0.000	1.01		0.000
Animal services (agricultural)	3.3		0.000	5.21		0.000
Other livestock products	1.22	2198.99	0.092	1.7	15181.54	0.395
Forestry and logging	1.28	33830.41	2.980	1.86	115947.30	5.849
Fishing	2.15	172125.73	15.852	2.89	371371.54	17.489
Coal and lignite	6.35	3406.38	0.239	7.19	7602.18	0.309
Crude petroleum, natural gas	2.08	21623.86	2.528	3.76	2467.95	0.187
Iron ore	5.18	49531.27	52.158	5.32	58293.90	31.409
Manganese ore	1.31	2876.49	20.835	2.94	934.96	5.379
Bauxite	2.07	310.50	3.983	4.68	1026.81	8.439
Copper ore	4.05	742.25	3.330	6.59	4.01	0.012
Other metallic minerals	2.84	9530.71	14.247	4.12	21072.61	21.095
Lime stone	3.9	128.52	0.225	4.15	237.45	0.211

contd...

	1993-94			1998-99		
	Import-Intensity	Exports	Export-Intensity	Import-Intensity	Exports	Export-Intensity
Mica	9.44	207.78	98.945	6.49	220.06	94.853
Other non metallic minerals	1.56	45252.15	23.697	2.09	67078.89	18.667
Sugar	3.06	13877.46	1.324	3.23	173.05	0.013
Khandsari, boora	4.3	6056.96	3.521	4.22	1101.42	0.398
Hydrogenated oil(vanaspati)	7.37	725.86	0.189	10.3	4181.97	0.371
Edible oils other than vanaspati	3.56	163798.17	21.055	4.46	177881.59	7.347
Tea and coffee processing	5.21	98232.11	17.176	5.05	254936.99	26.478
Miscellaneous food products	4.97	161647.29	7.360	7.3	278988.52	3.107
Beverages	5.74	5114.72	1.339	10.79	7900.29	0.650
Tobacco products	5.05	18807.01	2.207	9.29	59446.53	3.002
Khadi, cotton textiles(handlooms)	3.82	48389.54	11.656	6.65	63974.06	13.242
Cotton textiles	6.53	236898.13	8.765	7.71	575544.09	10.246
Woolen textiles	9.37	12165.30	5.357	10.33	30972.04	9.378
Silk textiles	4.92	23574.57	20.979	8.88	48410.42	23.441
Art silk, synthetic fiber textiles	10.05	90811.67	5.359	16.58	213152.61	12.036
Jute, hemp, mesta textiles	9.13	23918.68	9.943	7.29	56561.57	10.896
Carpet weaving	4.57	43769.20	57.676	8.49	107843.10	62.324
Readymade garments	6.63	601600.22	73.992	9.18	1484353.76	113.874
Miscellaneous textile products	7.56	68855.74	11.739	10.43	255833.78	17.142
Furniture and fixtures-wooden	3.27	773.03	0.384	7.0	3961.31	0.511
Wood and wood products	3.12	17617.33	2.186	6.43	16845.23	0.930
Paper, paper prods. & newsprint	11.17	32766.43	3.646	17.62	238716.26	14.495
Printing and publishing	10.92	9656.05	1.234	16.27	40084.11	3.258
Leather footwear	7.04	123398.48	30.555	10.45	165243.48	27.216
Leather and leather products	7.04	189981.87	46.181	13.87	309537.93	42.411

contd...

	1993-94			1998-99		
	Import-Intensity	Exports	Export-Intensity	Import-Intensity	Exports	Export-Intensity
Rubber products	11.62	65861.50	7.080	14.64	136862.84	7.956
Plastic products	13.18	73173.75	6.356	19.98	141566.10	8.001
Petroleum products	57.65	101301.74	5.175	40.61	35707.27	0.805
Coal tar products	7.71	106.49	0.040	9.81	144.37	0.026
Inorganic heavy chemicals	13.97	37807.71	10.295	17.14	250515.65	29.084
Organic heavy chemicals	17.63	111847.63	29.428	18.34	434960.60	58.665
Fertilizers	18.33	11600.20	0.934	25.27	3704.53	0.118
Pesticides	15.7	16607.34	5.417	16.24	78549.54	10.828
Paints, varnishes and lacquers	18.17	78489.67	13.818	21.08	131906.21	11.579
Drugs and medicines	14.01	95141.92	6.836	15.1	326219.13	10.750
Soaps, cosmetics & glycerin	15.77	142434.53	18.425	17.48	279868.45	18.372
Synthetic fibers, resin	15.27	9039.10	0.866	18.72	37831.19	2.827
Other chemicals	9.99	41906.65	3.505	11.59	122496.05	5.121
Structural clay products	22.48	2921.08	0.936	24.99	5313.22	1.013
Cement	14.56	14348.97	1.959	16.05	8954.92	0.675
Other non-metallic mineral prods.	21.6	624490.11	78.132	22.48	1278621.09	76.333
Iron, steel and ferro alloys	11.95	75563.48	2.499	11.52	115682.90	1.904
Iron and steel casting & forging	10.87	12239.99	3.923	13.99	58648.65	12.947
Iron and steel foundries	16.75	84871.09	8.447	13.21	66353.07	5.376
Non-ferrous basic metals	17.08	42333.64	3.663	24.65	77115.60	3.771
Hand tools, hardware	9.19	41526.68	11.611	13.19	77263.68	11.149
Miscellaneous metal products	13.84	68954.34	4.453	16.53	210230.17	7.809
Tractors and agri. implements	14.29	1475.13	0.395	13.82	5865.22	0.810
Industrial machinery(F & T)	22.01	18728.60	6.113	20.37	43708.46	7.527
Industrial machinery(others)	10.2	24364.08	8.603	15.71	62037.18	16.132
Machine tools	11.9	16169.02	6.890	12.49	48124.94	13.372

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	1993-94			1998-99		
	Import-Intensity	Exports	Export-Intensity	Import-Intensity	Exports	Export-Intensity
Office computing machines	6.42	757.19	3.741	18.44	19613.00	16.399
Other non-electrical machinery	20.86	95333.11	6.860	16.63	209554.42	7.220
Electrical industrial Machinery	16.08	31098.45	3.375	20.47	79959.39	4.919
Electrical wires & cables	18.31	4095.71	0.844	30.31	22044.63	2.239
Batteries	17.32	6047.38	5.222	25.62	14928.76	7.327
Electrical appliances	16.15	83231.92	26.615	21.92	148486.30	21.014
Communication equipments	14.94	37344.88	7.911	17.44	270386.29	21.585
Other electrical Machinery	17.35	16881.59	26.476	20.37	47639.76	29.697
Electronic equipments(incl.TV)	22.14	54972.17	7.830	23.97	23092.40	1.937
Ships and boats	9.08	410.00	0.286	16.0	25934.42	10.291
Rail equipments	8.5	8458.63	1.186	12.29	4287.93	0.425
Motor vehicles	11.08	98682.24	6.050	13.83	190768.96	6.908
Motor cycles and scooters	10.47	15578.23	3.101	14.57	24509.99	4.059
Bicycles, cycle-rickshaw	9.29	41604.98	13.158	17.41	43289.75	11.946
Other transport equipments	14.37	3081.86	3.467	10.77	723.73	0.472
Watches and clocks	8.37	3751.18	3.499	16.68	8102.97	5.314
Miscellaneous manufacturing	12.54	735127.23	34.494	28.88	1808902.95	32.788
Construction	11.94		0.000	13.16		0.000
Electricity	6.86	0.91	0.000	8.29		0.000
Gas	0.94	806.82	0.674	0.98		0.000
Water supply	3.28		0.000	5.00		0.000
Railway transport services	4.81	54426.48	3.032	6.76	94221.94	3.135
Other transport services	15.06	826994.42	8.329	13.28	1685415.37	9.184
Storage and warehousing	3.14		0.000	6.25		0.000
Communication	1.77	2911.13	0.257	3.42	19601.87	0.686
Trade	5.15	1217265.78	8.745	3.27	2298707.69	9.121
Hotels and restaurants	3.04	234004.80	13.907	5.09	420000.57	9.445

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	1993-94			1998-99		
	<i>Import-Intensity</i>	<i>Exports</i>	<i>Export-Intensity</i>	<i>Import-Intensity</i>	<i>Exports</i>	<i>Export-Intensity</i>
Banking	0.7		0.000	2.87		0.000
Insurance	3.43	43818.88	6.508	4.72	83999.00	5.448
Ownership of dwellings	0.66		0.000	0.9		0.000
Education and research	1.89		0.000	2.07		0.000
Medical and health	7.41		0.000	12.25		0.000
Other services	8.43	682197.00	23.466	10.19	2213381.44	27.720
Public administration	0		0.000	0		0.000
Index of Import Intensity of whole Economy (in per cent)	10.50391			12.61157		

Source: Input-Output matrices for the years 1993-94 and 1998-99.

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