

Interdependence in Imports, Production, Exports and Terms of Trade in India - An Empirical Study

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Abstract

Emphasis has been laid down on liberalisation of imports as part of transformation process, and globalisation programme in India. Accordingly, many policy initiatives have been taken, which brought down the applicable customs duty rate to less than 20 percent on an average. Further, the licensing requirements on 95 percent of India's imports have been removed. Trade liberalisation, to a significant extent, is aimed at facilitating the availability of imported raw materials and capital goods at a lower cost to the Indian producers. With this background, this paper aims to analyse the trends in import of industrial sector and interdependence of imports, production and exports, based on the available data, with a focus on post-liberalisation period. The hypothesis is that the import of finished goods, raw materials and capital goods are expected to increase, even though the terms of trade have not been deteriorated significantly.

Key Words : Imports, Terms of Trade, Trend Growth Rate, Causality

Introduction

Upto the seventies, the focus on trade policy in India, were quota restrictions on imports. This implied licensing of all categories of imports. The policy also conformed with the objectives of the import substitution and protection of domestic industry. But the industrial stagnation that marked the period from the mid-sixties to the late seventies led to some re-thinking, which resulted a gradual liberalisation in the eighties and structural adjustment programs in 1991. At the same time, imports have become necessity in the process of industrialisation

in the developing countries. The programmes of industrialisation make a heavy demand for capital goods, machinery and raw materials, which have to be imported from advanced industrialised countries (Armstrong and Read, 1998).

The implications of trade liberalization can be analysed in two phases (Bhagwati and Srinivasan, 1984). The first, intermediate liberalisation, that promotes free trade in raw materials and machineries. As a result, the notional price of imported input falls. The availability of imported intermediate goods and of technology whether licensed or embodied in imported capital goods, is an important

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source of gain in shedding a restrictive trade system. The second phase; full liberalization, that permits free trade in finished goods, including non-competitive consumer goods. Two effects of protection of domestic final goods markets are captured on the demand side (Banik, 2001). First, demand switches to domestic goods when foreign goods are not available. Second, when the demand for imports is not satisfied, part of the income can be set as savings.

Bhattacharyya and De (2001), have empirically examined whether the import-dependence of the Indian Corporate Sector has increased in the post liberalization period for most of the industry groups/sub groups. They have found that the corporate sector in India is increasingly becoming import oriented, though the relationship between trade liberalization and export growth is not so solid. Further, a positive impact of import liberalization on exports is also found in 10 industry groups/ sub-groups out of 18 industry groups/sub-groups, included in the sample.

Panchamukhi (1987), has presented a broad review of the structural changes in trade and trade policies of India between the period 1960-61 and 1984-85. The share of exports and imports in GDP, shares in the world trade, balance of trade, quantity and unit value index numbers, terms of trade, geographical pattern and commodity composition have been analysed in the study. The findings show the deteriorating and fluctuating trend in terms of trade in India during the period of analysis.

Banerji (2000), showed that a reduction in import tariff of a commodity might lead to an increase in the imports of the commodity, however, the increase in the imports of intermediate goods used in the production should lead to increase in exports by shifting the cost curves downwards.

It has been amply revealed that import liberalisation is an integral part of the transformation and globalisation process (Nayyar, 1997). It has varied implications to the industrial performance of an economy. However, detailed

studies on the impact of trade liberalisation on imports, import intensity of production and terms of trade in India are not many. The present research is an attempt to bridge this gap in the literature by analysing the said three parameters for different sub-sectors in the industrial sector.

Growth in industrial production serves as the base for expansion of exports, and thereby terms of trade of a country. As the increase in import intensity, especial intensity of capital goods might lead to increase in the production and exports in many sectors, changing import intensity in some sectors would have direct impact on terms of trade in those sectors.

Imports - Commodity Group-Wise Trends

This section attempts to analyse the trends in imports of goods belonging to industrial sector in India. For this purpose, yearly data has been compiled from Handbook of Statistics on Indian economy for the period to 2000 and reported periodically for five time points in table 1. From the table, ratio of the sector-wise imports to total imports in India have been calculated and given in table 2.

It is quite evident from the table 2 that except in the case of crude petroleum products and electronics goods, the percentage shares of imports of finished goods in the industrial sector have shown a tendency to come down. The Compound Annual Growth Rate (CAGR) presented in table 1, indicates that imports of these products have increased, except in the case of electrical machinery and project goods. However, the growth rates applicable to important sectors like fertilisers (3.98 percent), capital goods (4.89 percent), medicinal and pharmaceutical goods (3.64 percent) and the chemical products (0.35 percent) are far less than the growth rate of total imports (8.38 percent). Thus, in general, as compared to overall growth of imports in the country, growth of imports of finished products in the industrial sector is noticeably lower.

**Table 1 : Imports of Principal Commodity Groups in Industrial Sector
(Million US\$)**

Sector / Year	1987-88	1990-91	1993-94	1996-97	1999-2000	CAGR (%)
Petroleum, crude and products	3118	6028	5754	10036	12611	8.54
Fertilisers	392	984	826	911	1399	3.98
Capital Goods	5064	5835	6243	9922	8965	4.89
Machine tools	163	263	155	525	262	0.00
Electronic Goods	NA	NA	912	1424	2796	20.52
Computer Goods	NA	NA	18	84	197	49.00
Machinery except electrical & electronics	2016	2100	1881	3644	2745	3.02
Electrical machinery except electronic	843	949	204	325	438	-8.23
Transport equipment	586	931	1270	1484	1136	2.24
Project Goods	1331	1425	1623	2118	986	-4.00
Mainly Export Related Items	2585	3680	4387	6138	9117	10.61
Medicinal and Pharma products	129	261	258	306	360	3.64
Chemical materials and products	148	159	167	264	164	0.35
Total Imports	17156	24072	23306	39132	49670	8.38

NA= Not Available

Table II: Contribution of Imports of Principal Commodity Groups of Industrial Sector to Total Imports (%)

Sector / Year	1987-88	1990-91	1993-94	1996-97	1999-2000
Petroleum, Crude & Products	18.17	25.04	24.69	25.65	25.39
Fertilisers	2.28	4.09	3.54	2.33	2.82
Capital Goods	29.52	24.24	26.79	25.36	18.05
Machine Tools	0.95	1.09	0.67	1.34	0.53
Machinery Except Electrical & Electronic	11.75	8.72	8.07	9.31	5.53
Electronic Goods	0.00	0.00	3.91	3.64	5.63
Electrical Machinery Except Electronic	4.91	3.94	0.88	0.83	0.88
Transport Equipment	3.42	3.87	5.45	3.79	2.29
Project Goods	7.76	5.92	6.96	5.41	1.99
Mainly Export Related Items	15.07	15.29	18.82	15.69	18.36
Medicinal & Pharma products	0.75	1.08	1.11	0.78	0.72
Chemical Materials and Products	0.86	0.66	0.72	0.67	0.33

* Computed based on the Table 1

Interdependence between Imports, Production and Exports

The Problem and Econometric Model

It has been seen that, although, many aspects of globalisation viz., capital flows, labour standards, environmental concerns have captured worldwide attention, the driving force behind the global integration has been liberalisation of trade in goods and services. The link between the trade liberalisation and industrial production has been theoretically viewed as: Firstly, when tariffs are lowered, relative prices change and resources are reallocated to production activities that raise industrial output. Secondly, production may get a substantial boost, as economies of scale adjust to technological innovation, new production structures and changing pattern of competition. In turn, increased industrial production accentuates exports, as growth in the production is an important base for export expansion. Any stagnation in the production is likely to influence the capacity to increase exports. The sluggish industrial growth creates supply bottlenecks and, thereby fuels domestic inflation. This, in turn, encourages domestic sales over exports. Exports play dual role in a developing country like India. Firstly, exports are related to income through foreign trade multiplier. Secondly, foreign exchange earnings obtained from exports, facilitate expansion of imports. On the other hand, imports have become most essential in the process of industrialisation in developing countries. The programme of industrialisation makes a heavy demand for capital goods, equipments, machinery and raw materials, which have to be

imported from advanced industrialized countries.

It has been further seen earlier, that trade liberalisation measures as part of economic reforms and opening up process, on the one hand, and the birth of WTO in 1995, on the other, has reduced the tariff level substantially. QRs on imports have also been removed to the extent of 95% of items. Further, Foreign Investment Promotion Board (FIPB) was set up to attract foreign investment from other countries and multinationals.

Based on the above theoretical points, the following seven hypotheses are postulated as part of the empirical verification of the interdependence among Industrial Production (IP), Exports (EXP) and Imports (IMP) in India. They are :

- (i) Growth in IP leads to growth in EXP and IMP
- (ii) Growth in EXP leads to growth in IP and IMP
- (iii) Growth in IMP leads to growth in IP and EXP
- (iv) Growth in IP and IMP leads to growth in EXP
- (v) Growth in EXP and IMP leads to growth in IP
- (vi) Growth in IP and EXP leads growth in IMP
- (vii) Growth in IMP leads to growth in IP All the seven hypotheses are tested for four time periods i.e. on the one hand, pre and post trade liberalisation periods; and pre and post WTO periods, on the other. Therefore, the tests are put forth to verify whether there are differences in the pattern of causal relationships implicit in the interdependence of production, export and import in the industrial sector over pre and post trade

liberalisation and pre-WTO and post-WTO eras.

Block Granger Non-Causality Test

Block Granger non-causality test (Pesaran and Bahram, 1997), is based on the following general form of Vector Auto Regression, VAR (p):

$$z_t = a_0 + a_1 t + \sum_{i=1}^p \phi_i z_{t-i} + \Psi w_t + u_t \quad (1)$$

Where, z_t is an $m \times 1$ vector of jointly determined (endogenous) variable, t is a linear time trend, w_t is a $q \times 1$ vector of exogenous variables, and u_t is an $m \times 1$ vector unobserved disturbances. Based on the estimated VAR equations, log-likelihood ratio statistic for testing the null hypothesis that the coefficients of a subset of jointly determined variables are equal to zero. This is known as block Granger non-causality test and provides a statistical measure of the extent to which lagged values of a set of variables, say z_{2t} , are important in predicting another set of variables, say z_{1t} , once lagged values of the latter set are included in the model. For example, in equation 1, let $z_t = (z'_{1t}, z'_{2t})'$, where z_{1t} and z_{2t} are $m_1 \times 1$ and $m_2 \times 1$ subsets of z_t . Consider now the following equations :

$$z_{1t} = a_{10} + a_{11} t + \sum_{i=1}^p \phi_{i,11} z_{1,t-i} + \sum_{i=1}^p \phi_{i,12} z_{2,t-i} + \Psi_1 w_t + u_{1t} \quad (2)$$

$$z_{2t} = a_{20} + a_{21} t + \sum_{i=1}^p \phi_{i,21} z_{1,t-i} + \sum_{i=1}^p \phi_{i,22} z_{2,t-i} + \Psi_2 w_t + u_{2t} \quad (3)$$

The hypothesis that the subset z_{2t} does not 'Granger-cause' z_{1t} is defined by :

$$H_0: \phi_{12} = 0 \text{ where } \phi_{12} = (\phi_{1,12}, \phi_{2,12}, \dots, \phi_{p,12})$$

The maximized log-likelihood values for the restricted and unrestricted equations will be computed and the likelihood ratio (LR) test in the form of chi-square will be applied to test the $H_0: \phi_{12} = 0$ against $H_1: \phi_{12} \neq 0$, as per the model.

The above described Block exogeneity test was originally proposed by Sims (1980), as a multi-variate version of the Granger causality test, and tests whether omitting a particular variable from a system lead to any loss of information. The non-causality test is, therefore, truly a systems' test and more robust than the traditional bi-variate testing.

Data and Estimation

Monthly data has been used in the analysis. The data source has been International Financial Statistics of the IMF. The estimation of likelihood ratios has been carried out using Micro fit software. The software captures the lag automatically (as per the model) when the values of variables are keyed in the VAR framework. Index numbers were computed using the data on exports, imports and industrial production with same base; for the estimation purpose. The values of

variables were entered in their log forms for the computation procedure.

Results of Causality Test

Pre and Post - Trade Liberalisation Periods

The results of the Likelihood Ratio (LR) test of Block

Table III: Results of LR Test of Block Granger Non-Causality in the VAR Framework (Pre-Liberalisation (1982-90) and Post-Liberalisation (1991-99) Periods)

Sr. No.	Null Hypotheses	Ch-Square (1982 to 1990)	Chi-Square (1991 to 1999)
1	IP ≠> EXP and IMP	4.78	9.81**
2	EXP ≠> IP and IMP	11.22**	10.74**
3	IMP ≠> IP & EXP	6.24	5.75
4	IP and IMP ≠> EXP	5.70	9.85**
5	EXP and IMP ≠> IP	7.01	10.25**
6	IP & EXP ≠> IMP	4.95	9.72**
7	IMP ≠> IP	4.59	4.86

** Indicates the value of Chi-square is significant at 5% level.

Granger non-causality in the VAR framework is presented in table 3

The table III reveals the following points:

- (i) According to the estimated values of Chi-square, all the null hypotheses, except the 2nd hypothesis (EXP ≠> IP and IMP), pertaining to the pre-trade liberalisation period, are found to be statistically insignificant.
- (ii) On the other hand, in case of the post-liberalisation period, five of the null hypotheses are found to be statistically significant, based on the values of Chi-square (at 5% level). Alternatively, the 3rd hypothesis (IMP ≠> IP and EXP) and the 6th hypothesis (IMP ≠> IP) are insignificant.

The above results indicate that over the period of trade liberalisation, the production, exports and imports in the industrial sector have shown tendency for being interdependent. The bi-directional causal linkage between exports and production is well evidenced according to the results. In fact, even before the era of trade liberalisation, the causality running from export variable to production is noticeable. However, export causes production and as well imports in both the periods. Production causes exports as well as imports in the post liberalisation period. It is salient to note that, in both the periods, imports variable has not been a causal variable.

Pre and Post WTO Period

The relevant results are presented in table 4.

From the results, it can be observed that:

Table IV : Results of the LR Test of Block Granger Non-Causality in the VAR Framework for Pre-WTO (1990-95) and Post-WTO Period (1995-2000)

Sr. No.	Null Hypotheses	Chi-square (1990 to 95)	Ch-Square (1995 to 2000)
1	IP \nRightarrow EXP and IMP	0.59	18.29*
2	EXPs \nRightarrow IP and IMP	0.58	12.54**
3	IMP \nRightarrow IP and EXP	5.80	12.11**
4	IP and IMP \nRightarrow EXP	6.92	21.09*
5	EXP and IMP \nRightarrow IP	4.83	9.82**
6	IP and EXP \nRightarrow IMP	4.66	11.21**
7	IMP \nRightarrow IP	4.71	6.93

* Indicates the value of Chi-square is significant at 1% level

** Indicates the value of Chi-square is significant at 5% level

(i) None of the seven null hypotheses is statistically significant for the pre-WTO period.

(ii) At the same time, all the null hypotheses (excepting the one IMP IP) are significant (at least at 5% level of significance) during the post-WTO period.

The results thus, convey that during the post-WTO period, the economy has got integrated in terms of the bi-directional causal links between industrial production, exports and imports. However, production does not show causal link with imports, if it (imports variable) is taken in isolation. The analysis, thus, has vindicated that even during the trade liberalisation period, which started in early 1990s, WTO era has been found as the critical period that has made the economy more integrated with the external sector. In fact, the effect of policies of the period 1990 to 1995 aimed at opening up process has not been captured at all in the results. This implies that import liberalisation can be considered to be the most vital policy tool for integrating the economy globally.

Analysis of Terms of Trade

Terms of Trade of India

Net Terms of trade of a country, denotes whether the exports of a country as a ratio of imports have increased over a given period. It is based on both Unit Value Index of Exports and Unit Value Index of Imports. The former is a measure of degree of price realisation while exporting and the latter signifies the degree of price

burden while importing. There are two important measures of terms of trade i.e., (i) net terms of trade given by Unit Value Index of Exports expressed as percentage of Unit Value Index of Imports and (ii) gross terms of trade given by Volume Index of Imports expressed as percentage of Volume Index of Exports. The net terms of trade has been considered for the present analysis as it is a measure of price realisation of exports and imports.

The hypothesis here is there could be substantial difference in trend growth rate between pre and post liberalisation period. The data on net terms of trade of India during the pre-liberalisation (1983 to 1991), and post-liberalisation (1992 to 2000), are reported in Table 5 and 6. The trend growth rate of net terms of trade also has been estimated to test the hypothesis and given in the same tables. The results show that the trend growth rates are statistically not significant even at 10 percent level of significance. This is mainly because of the fluctuations in the Terms of Trade performance of India. In other words, there has not been any improvement in terms of trade, as revealed by the insignificant values of estimated growth rates. This point applies to both periods of analysis. i.e., pre and post liberalisation periods. The respective graphs are depicted in figure 1 and 2. The inter-year fluctuations (indicating absence of a clear trend) can be easily gauged from these two figures.

Despite wide inter-year variations and absence of a statistically significant trend, one important point emerging from the tables is that overall terms of trade for the country has been favourable during both the periods of analysis. It is important, in this context, to report that, terms of trade value increased from 105 (1983-84), to 109 (1990-91), in the pre-liberalisation period. During the post-liberalisation period, the value increased from 127 (1992-93), to 151 (1999-00). Thus, in absolute sense, India enjoyed a favourable position according to the value of overall terms of trade. Also, over the whole

Table V: Net Terms of Trade in India (1984 to 1991)

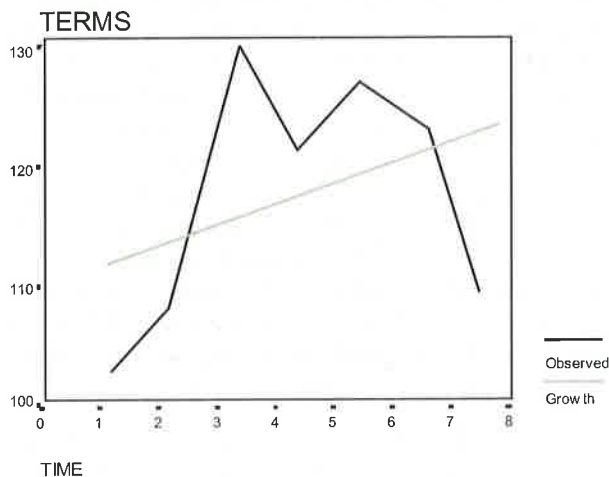
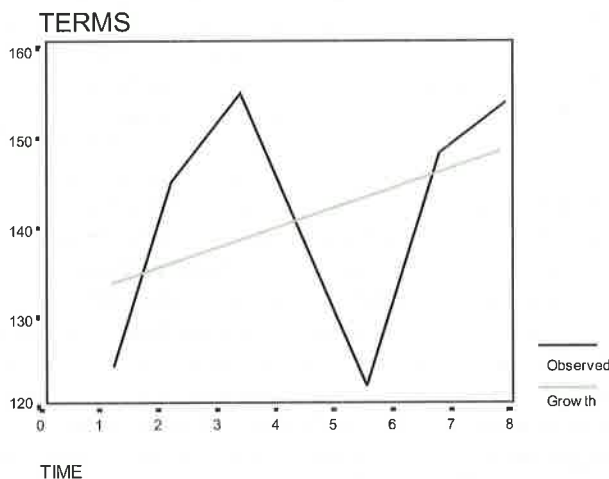
1983-84	84-85	85-86	86-87	87-88	88-89	89-90	90-91	Trend Growth
105	105	108	129	122	125	121	109	1.10*

*Computed and Trend Growth insignificant even @10% level.

Table VI: Net Terms of Trade in India (1992 to 2000)

1992-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	Trend Growth
127	145	152	138	126	146	150	151	1.16*

*Computed and Trend Growth insignificant even @10% level.

Figure I: Net Terms of Trade of India Trend Graph (1983-1991 Period)**Figure II: Net Terms of Trade Trend Graph (1992-2000 Period)**

Terms of Trade for Industrial Sector in India

An attempt has been made in this section to make a comparative analysis of the trends in net terms of trade of important commodity groups of industrial sector, pertaining to the two periods of pre and post trade liberalisation. The net terms of trade for the commodity groups have been computed using yearly data on Unit Value Indices of exports and imports and reported in table 7 (The basic data used in this respect are appended).

Table 7 indicates that in case of beverage & tobacco and crude materials, India continues to have adverse net terms of trade. Mineral and chemical sectors have been characterised by changing scenario as far as the favourable and adverse patterns of movements in the terms of trade over the years. At the same time,

manufactured goods and machinery & transport sectors (as per the classification in the basic data) show favourable values for most of the years of the period of analysis, which implies that export competitiveness and performance of these sectors have improved.

Further, the analysis of the trend in net terms of trade has been carried out and presented in table 8. Here, the trend rates of growth have been estimated using linear trend equations. It is seen, from the table, that majority of the trend growth estimates are statistically insignificant. This reveals that the export competitiveness has not improved in Indian industries, in comparison to imports. It was seen earlier that trend growth of overall net terms of trade also was statistically insignificant. It is to be noted that significant negative values are obtained in case of beverage and tobacco and crude materials sectors in the pre-liberalisation period. In case of post-liberalisation period, significant positive values are obtained in case of crude materials and minerals sectors. However, for these two sectors, net terms of trade are yet adverse (excepting for 1998-99, in case of crude materials). However, it can be seen from a close observation of the table that there is a tendency for reversal in the trend in the values of the terms of trade during the post-liberalisation period.

Table VII : Net Terms of Trade of Commodity Groups in the Industrial Sector*

Year	Beverages & Tobacco	Crude materials	Mineral	Chemical	Manu Goods	Machine & Transport
83-84	77	87	78	104	132	130
84-85	78	87	80	107	134	133
85-86	86	104	218	93	139	113
86-87	84	92	76	113	164	100
87-88	50	84	82	124	141	87
88-89	49	85	72	96	132	104
89-90	56	73	92	50	127	122
90-91	42	74	60	83	122	107
92-93	42	73	128	111	93	170
93-94	33	92	139	127	124	158
94-95	42	94	139	113	114	274
95-96	39	91	143	81	94	126
96-97	35	87	138	91	91	145
97-98	39	98	153	97	118	134
98-99	47	125	180	106	142	135
99-00	48	126	180	110	146	140

*Computed from tables given in Appendix

Table VIII : Trend Growth Rates of Terms of Trade

Sectors / Commodity Groups	1983 to 1991	1992 to 2000
Beverage & Tobacco	-11.6**	1.7
Crude Materials, Inedible, except Fuels	-4.5**	5.9**
Mineral Fuels, Lubricants	-9.4	4.3*
Chemicals	-7.7	-3.2
Manufactured Goods (leather, textile yarn, iron & steel)	-2.4	3.4
Machinery & Transport Equipment	-1.6	-5.9
Net Terms of Trade of India	1.10 #	1.16 #

@ Computed based on table 8., # indicates as given in table 6 and 7.

* Indicates significance at 1 % level of significance

** indicates significance at 5 % level of significance.

Trend Analysis of Unit Value Indices of Exports and Imports in 1990s

The commodity-wise unit value index numbers of exports and imports for different industry groups (as classified in the Handbook of Statistics of Indian Economy, Reserve Bank of India) have been given in tables 9, 10, 11 and 12. As given in table 10, the general unit value index of exports was 422 in the year 1992-93 (Base value of index number = 100 in 1978-79) and it increased to 474 and 495 in 1993-94 and 1994-95 respectively. However, the index value declined to 484 in 1995-96, but picked up again to 505 next year and touched 589 in 1997-98 followed by 617 in 1999-2000. The trend on the basis of Unit Value Index numbers reveals that the export performance of Indian industry has been reasonably good during the post-liberalisation period. The Unit Value Index of exports of chemicals and related products was 410 in 1992-93, 428 in 1993-94, but increased to 457 in 1994-95 and 469 in 1995-96. This index value also showed gradual improvement in exports in the subsequent years. The export performance of other sectors given in the table is more exemplary than chemical products because they seem to have achieved higher growth in terms of unit value index.

The unit value index numbers of imports, of different major commodity groups given in table 12 has shown consistent increase in value throughout post-liberalisation period. All commodity groups mentioned in the table, except miscellaneous manufactured articles have shown overall increase in the unit value of imports. This trend clearly substantiates the increasing import dependence of Indian industries.

The slope coefficients and trend growth rates have been estimated using the Ordinary Least square regression estimation method for the commodity industry groups, as given in tables 10 and 12 to compare the performance of each industry groups. The Unit Value Index numbers have been taken as dependent variable against time. The estimated slope coefficients of yearly data on unit value index of exports, 't' values with the statistics of level of significance are given in table 13. The estimated value of trend growth rate coefficient for beverage and tobacco exports is obtained as 5.87 percent, imports as 6.18 percent which clearly indicate that the extent of increase of imports has been high compared to that of exports during the post-liberalisation period 1990. The values of slope coefficients of exports for industries such as crude materials (inedible, except fuels. Raw cotton, iron ore etc), mineral fuels, chemicals and manufactured goods (put together) and general index are found to be

statistically significant at 1 percent level of significance with positive 't' values that indicate increase in unit value index of exports without much ups and downs in exports from India. The slope coefficients for exports of machinery and transport equipments and miscellaneous manufactured articles are statistically not significant even at 10 percent level of significance, which implies that exports have fluctuated much on an year-to-year basis. i.e., there would have been positive growth one year, next year negative and so on. The trend growth rates of exports for the period 1992-2000 (in percentage) are 5.87 (beverages and tobacco), 9.42 (Crude minerals, inedible except fuel), 7.47 (mineral fuels and lubricants), 3.56 (Chemicals and related products), 8.98 (Manufactured items) and 5.76 (General index of exports from industrial sector).

The estimated slope coefficients, t values, level of significance and trend growth rates of imports of different industry groups for the post-liberalisation period 1992-99 are reported in table 14. The slope coefficients are statistically not significant even at 10 percent level of significance in the case of imports of crude materials, mineral fuels and lubricants. This could be due to heavy fluctuations in year-to-year imports. Hence, trend growth rates for these two sectors assume no significance. The trend growth rates of imports for the period 1992-2000 (in percentage) are 6.18 (Beverages and Tobacco), 6.82 (Chemicals and related products), 5.44 (Manufactured products), 11.85 (Machinery and transport equipments), -14.36 (Miscellaneous manufactured articles) and 4.50 (General Import Index). The above reported trend growth rates of imports clearly point out that the machinery and transport equipment industry has witnessed higher import growth (11.85 percent), compared to other major industries. The trend growth rate of general import index shows that the trend annual increase in imports in the industrial sector in India during 1992-2000 has been 4.50 percent, which is slightly lower than the trend annual increase in exports i.e., 5.76 percent.

Conclusion

The present analysis has demonstrated that, in general, there is no noticeable trend in the net terms of trade in case of the commodity groups considered as part of industrial sector as a result of trade liberalisation. It is quite clear that there are inter-year fluctuations in the values of net terms of trade for the commodity groups under reference, which could be the reason for statistical insignificance. The important observations can be summarised as follows.

- i. Interdependence between the variables in external sector (imports and exports), and production has increased during the post-WTO period because of the transformation taken place in foreign trade

policy in India.

- ii. Overall net terms of trade, which has continued to be favourable, has increased during 1990s as compared to 1980s. However, the trend is not statistically significant. This observation is true of most of the commodity groups belonging to the industrial sector. These results show that the export competitiveness of Indian industries have not increased significantly, in comparison to the imports.
- iii. The estimated results show that the average increase in terms of unit value of exports has been

Appendix

Table IX : Unit Value Index of Exports of Commodity Groups in the Industrial Sector (Pre-Liberalisation Period) (Base 1978-79 =100)

Commodity	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
Beverage & Tobacco	152	154	160	163	156	195	226	228
Crude Materials, Inedible, except Fuels	161	162	183	163	156	195	220	228
Mineral Fuels, Lubricants, etc.	221	227	229	153	158	176	354	246
Chemicals & Related Products	166	168	157	158	205	217	260	232
Manufactured Goods Classified by Material (leather, textile yarn, iron & steel etc)	169	172	182	193	221	275	346	378
Machinery & Transport Equipment	140	145	134	149	130	162	175	201
General Index	104	105	108	179	195	232	277	293

Table X : Unit Value Index of Exports of Commodity Groups in the Industrial Sector (Post-Liberalisation Period) (Base: 1978-79 =100)

Commodity	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
Beverage & Tobacco	371	338	372	372	398	428	528	530
Crude Materials, Inedible, except Fuels	418	369	452	520	565	550	690	698
Mineral Fuels, Lubricants, etc.	563	603	620	730	896	826	794	799
Chemicals & Related Products	410	428	457	469	476	468	530	545
Manufactured Goods Classified by Material (leather, textile yarn, iron & steel etc)	457	537	538	586	554	707	848	860
Machinery & Transport Equipment	309	337	310	241	327	394	450	466
General Index	422	474	495	484	505	589	612	617

marginally higher than the unit value of imports. Above all, trend growth rates of general unit value index numbers when looked upon give clear picture that the exports and imports have increased in the post-liberalisation period from which the former one showing higher growth compared to latter. Thus, on the suffix, the conclusion is that the globalisation and trade liberalisation policies have contributed for the increase in exports and imports of Indian industries in India.

Table XI : Unit Value Index Number of Imports of Commodity Groups in the Industrial Sector Pre-Liberalisation Period (Base 1978-79=100)

Commodity	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
Beverage & Tobacco	190	196	185	193	314	399	407	536
Crude Materials, Inedible, except Fuels	176	186	176	177	186	228	302	308
Mineral Fuels, Lubricants, etc.	277	284	105	201	193	244	383	407
Chemicals & Related Products	150	157	168	140	165	225	515	280
Manufactured Goods Classified by Material (leather, textile yarn, iron & steel etc)	121	128	131	118	157	209	273	311
Machinery & Transport Equipment	101	109	119	148	150	155	143	188
General Index	153	162	159	139	160	186	228	268

Table XII: Unit Value Index Numbers of Imports of Commodity Groups in the Industrial Sector Post Liberalisation Period (Base: 1978-79 =100)

Commodity	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
Beverage & Tobacco	878	1002	885	939	1131	1433	1121	1140
Crude Materials, Inedible, except Fuels	571	402	478	570	532	560	552	560
Mineral Fuels, Lubricants, etc.	441	435	447	511	649	540	439	448
Chemicals & Related Products	369	337	406	579	522	484	498	505
Manufactured Goods Classified by Material (leather, textile yarn, iron & steel etc)	489	432	472	626	612	595	596	612
Machinery & Transport Equipment	181	213	113	191	226	293	333	351
Misc. Manufactured Articles	292	368	224	201	170	127	152	161
General Index	331	327	325	351	400	404	408	415

Table XIII : Slope Coefficients and Trend Growth Rates of Exports of Industry Groups in India (1992-2000)

Commodity	Slope	Standard Error	t-value	Significance value	Significance Level (%)	Trend Growth (%)
Beverage & Tobacco	.057	.016	3.63	.015	5	
Crude Materials, Inedible, except Fuels	.090	.016	5.61	.0025	1	9.42
Mineral Fuels, Lubricants, etc.	.072	.017	4.18	.0087	1	7.47
Chemicals & Related Products	.035	.006	5.71	.0023	1	3.56
Manuf Goods (leather, textile yarn, iron & steel)	.086	.016	5.19	.0035	1	8.98
Machinery & Transport	.053	.033	1.60	.1698	Insignificant	5.44
Mis.Manuf items	.021	.021	1.02	.3552	Insignificant	2.12
General Index	.056	.008	6.37	.0014	1	5.76

Table XIV : Slope Coefficients and Trend Growth Rates of Imports of Industry Groups in India

Commodity	Slope	Standard Error	t-value	Significance value	Significance Level (%)	Trend Growth (%)
Beverage & Tobacco	.060	.023	2.54	.052	10	6.18
Crude Materials, Inedible, except Fuels	.023	.023	.245	.974	Insignificant	2.33
Mineral Fuels, Lubricants, etc.	.028	.028	.993	.366	Insignificant	2.84
Chemicals & Related Products	.066	.028	2.38	.0618	10	6.82
Manuf Goods (leather, textile yarn, iron & steel)	.053	.019	2.69	.0428	5	5.44
Machinery & Transport	.112	.052	2.14	.084	8.4	11.85
Mis.Manuf items	-.155	-.155	.032	-4.76	1	-14.36
General Index	.044	.008	5.13	.0037	1	4.5

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