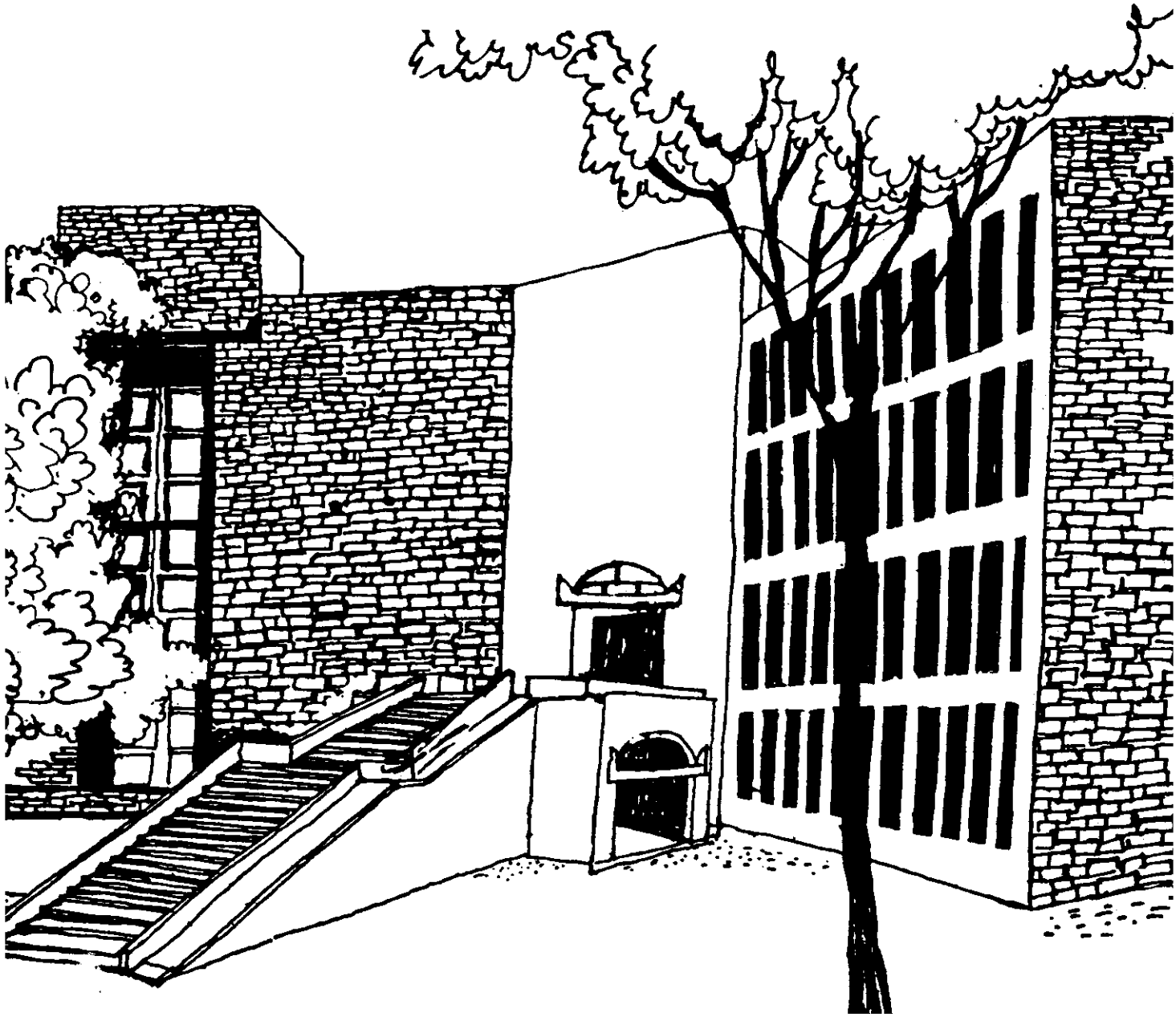
विद्याविनियोगाधिकारः

IIM

AHMEDABAD

Working Paper



ISSUES IN STRATEGY FOR EXPORT PROMOTION: AN INTER-INDUSTRY ANALYSIS

By

Ravindra H. Dholakia
Bakul H. Dholakia

&

Ganesh Kumar

W P No. 1046
August 1992

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD-380 015
INDIA

ISSUES IN STRATEGY FOR EXPORT PROMOTION : AN INTER-INDUSTRY ANALYSIS

By

Ravindra H. Dholakia
Bakul H. Dholakia
Ganesh Kumar
Indian Institute of Management
Ahmedabad

I. Introduction

The Eighth Five Year Plan of India is based on the critical assumption of achieving a 13.6% annual growth in the volume of exports and of restricting the growth of imports to only 8.4% p.a. over the plan period. The new EXIM policy for the period 1992-97 also envisages a greater role for the external sector in the Indian economy. It aims at achieving a sharp increase in the trade to GDP ratio from the current (1990-91) level of 15% to 20% by 1995. International trade will be one of the most significant forces influencing the pattern of future growth in the country. Since our country has followed the path of planned economic development, the task of export promotion should be viewed in that perspective rather than only from the narrow angle of trade balance. While formulating the strategy of export promotion, adequate attention has to be given to the other objectives of planned economic development because export promotion is considered as the means to achieve rapid overall economic development. The new EXIM policy is, however, totally silent on such wider considerations. The statement of the objectives of the new policy does not make any mention either explicitly or

even implicitly of the linkages of the exports of different industries to the domestic economy. The aspects of income and employment generation or government revenue augmentation when exports from different sectors or industries are promoted do not get mentioned even in the passing. Indicative planning on the other hand would certainly involve explicit mentioning of all such implications since they represent national concerns. When the trade-offs are clearly spelt out, it becomes easy to choose one strategy vis-a-vis the other in case where such a choice has to be made. Available empirical evidence has to be examined to get some idea about the nature of the trade-offs involved in choosing different alternatives.

In the present paper, we make an attempt to, examine the available empirical evidence on the linkage effects of export growth in different sectors of Indian economy. Input-output framework is used for the purpose. Basically the direct and indirect effects of export growth on (i) value-added or income; (ii) gross output; and (iii) government revenue through indirect taxation are estimated for individual commodity producing sectors. The methodology and sources of data used in the present study are discussed in the next section. In the third section, we present our estimates of the effects of growth of exports from individual sector/industry on the aggregate gross output, value added and indirect taxes in Indian economy and the forward and backward linkage coefficients for different sectors. In the fourth section, we present some estimates of import intensity of

exports for selected export oriented sectors. The fifth section considers alternative strategies of export promotion and their implications on the economy. It also brings out some issues not addressed in the new EXIM policy in India. The final section presents the summary of main findings and conclusion.

II. Methodology and Data Sources

Standard input-output (I-O) analysis in the framework of statics and comparative statics is used to get empirical estimates in the present study. We have used 60 commodities x 60 commodities I-O table for India for the year 1983-84. This is the latest year for which a comprehensive and consistent I-O table for the Indian economy is available from official sources (CSO, 1990). The Eighth Five Year Plan of India has also used an updated version of the basic 1983-84 I-O table. The I-O transactions table presents the flow of commodities from each sector of the economy for intermediate input use in different sectors and for final use. The latter consists of private consumption expenditure, gross fixed capital formation, change in stocks, government final consumption expenditure, exports and imports. It is important to note that CSO as of now treats import as a component of final use and does not provide its break-up between intermediate use and final use.*[1] Thus, the

---

*1. The Planning Commission (1986) makes its own estimates of such break-up of imports, but the CSO does not use this information, perhaps because of inadequate reliability of such estimates. However, it may be noted that Sarma (1990) haas used the I-O matrix and the import coefficients matrix for 1984-85 prepared by Planning Commission to estimate import requirements of different sectors within an input-output framework.

existing data from CSO do not give us precise idea about the extent of imported inputs vis-a-vis the domestic inputs used in the production of different commodities. To this extent, our estimates of linkage effects of export growth on the domestic economy contain an upward bias.

The I-O methodology followed in the present study is described in the Appendix below. Here we only define briefly some concepts and measures of linkages and effects which are estimated by us and discussed in the subsequent sections. As we have mentioned earlier, the effects of the export growth are considered here only in terms of three important macro-aggregates viz., (1) Gross Output (GO); (2) Gross Value Added (GVA); and (3) Indirect Tax revenue of the government (IDT). The effects of export growth on the economy could be considered in three parts : (a) Direct effects; (b) Direct and Indirect effects, i.e. DI effects; and (c) Direct, Indirect and Inducted effects, i.e. DII effects. The direct effects of the export growth in an industry is the immediate effect felt on the relevant aggregates of the same industry, other things remaining the same. Thus, the direct effect of a Re.1 increase in ith industry's exports is the increase GO in the industry by Re.1 and GVA and IDT by the given proportion of Re.1 in the industry. The DI effects are essentially the first round effects which take into account increase in sector's own output and subsequent increases in the input supplying sector's output which in turn set in motion a chain reaction on the outputs of all sectors. The system,

however, is still not in the new equilibrium. The DII effects cover a wider canvas and incorporate the full effects of increased exports leading the system to new static equilibrium. The DII effects would thus include not only the first round effects (i.e. DI) but also the second round, third round and so on. In the first round, the increased demand for exports in a sector, other things remaining the same, would lead to increased GO, GVA and IDT in the economy. If exports in a sector increase by only one unit, say Re.1, the DI on GVA and IDT together would be exactly Re.1. When the income in the first round increases by Re.1, private consumption of commodities is induced and in the next round, the private consumption expenditure increases on various commodities. This again leads to the direct effect through chain reaction on outputs of sectors to complete the second round effects. Again the third round effects set in as a result of induced increase in consumption from second round increase in income. When this chain works itself out, we get the total effects or what we call DII effects of a one unit increase in exports in a given sector. It should be noted that the DII effects would take much longer time to work themselves out in the system than the DI effects. In order to estimate the DII effects, the data requirements are enormous. We require for instance, industry specific income distribution, marginal propensity to save for different income earners, income elasticity of demand for all commodities, etc. These estimates are not readily available. If we have to replace hard data by

assumptions, it would not serve any purpose because the DII effects for each of the sectors would turn out to be the same in that case. In the present study, therefore, we have estimated only the DI effects of export growth in each industy on GO, GVA, and IDT. They may be considered to represent short term to medium term effects.

As far as the measurement of linkages are concerned, the backward and forward linkages area measured through coefficients of Direct Forward Linkage (DFL), Direct Backward Linkage (DBL), Total Linkage Coefficient (TLC), and Total Linkage Receipts (TLR). DFL shows the proportion of a sector's total output going to all sectors for intermediate use. The DBL, on the other hand, shows the increased direct output demand generated in all sectors by an additional unit of gross output of a given sector. The TLC which is also known as 'index of power of dispersion' considers both the direct as well as the indirect effects of a unit increase in the final demand of a given sector on outputs of all sectors taken together. The TLR which is also known as 'index of sensitivity of dispersion' represents both direct and indirect effects received by the given sector when simultaneous one unit increase in the final demand of each one of the sectors in the economy is considered. The precise formulae of these coefficients are given in the Appendix. As can be seen from these definitions, the coefficients of linkages view the structural interrelationships existing among various sectors in the economy from different angles. Larger are the coefficients,

the more important is the sector in contributing to the generation of activities in the economy. In the next section, we present our estimates of the linkages as well as the DI effects of export growth in different sectors of the economy.

III. Empirical Estimates

Out of the 60 sectors in the Indian I-O table for 1983-84, 13 are service sectors. The remaining 47 sectors are commodity producing where the forward and backward linkages would play an important role. In each of these 47 sectors taken individually, when we consider an increase in the export demand by Re.1, all other things remaining the same, we get the DI effects on gross output (GO), gross value added (GVA) and government revenue through indirect taxation (IDT). Table 1 presents the DI effects of a rupee increase in exports individually considered for each of the 47 commodity producing sectors separately. The table clearly brings out that there are considerable variations in the DI effects of export growth in different sectors. The DI effects of a rupee increase in exports in terms of GO vary from as high as Rs.2.63 in coaltar products (sector 27) to as low as Rs.1.14 in fishing (sector 7). In terms of gross value added at factor cost (i.e. GVA), the DI effects are highest for the food crops (sector 1) and lowest for paint, varnishes and lacquers (sector 31). Since the DI effects of a rupee increase in exports of a given industry in terms of GVA and IDT always add up to one rupee, DI effects in terms of IDT also show the same absolute variation across sectors as in the case of GVA but in the

Table 1

Sector-wise Direct and Indirect Effects of Unit Increase in Exports

Sect. No.	Sectors	Gross	GVA	Net IDT
1	FoodCrops	1.57611	0.99913	0.00084
2	Cash Crops	1.43129	0.99482	0.00514
3	Plantation Crops	1.26708	0.98998	0.00999
4	Other Crops	1.36278	0.99709	0.00289
5	Animal Husbandry	1.76378	0.99458	0.00539
6	Forestry & Logging	1.17218	0.97912	0.02083
7	Fishing	1.13787	0.98585	0.01408
8	Coal & Lignite	1.57552	0.92828	0.07163
9	Crude Petro., Natural Gas	1.19582	0.97499	0.02498
10	Iron Ore	1.30548	0.96261	0.03688
11	Other Minerals	1.34892	0.95791	0.04185
12	Sugar	2.20191	0.96887	0.03104
13	Food Products (excl. sugar)	2.46557	0.95717	0.04276
14	Beverages	2.15348	0.86537	0.13422
15	Tobacco Products	1.93034	0.89548	0.10439
16	Cotton Textiles	2.13284	0.91489	0.08503
17	Wool, Silk & Synth. Textiles	2.28665	0.75815	0.24174
18	Jute, Hemp & Mesta Textiles	2.14097	0.92857	0.07111
19	Textile Products	1.85417	0.92267	0.07724
20	Wood Products (excl. furniture)	1.92422	0.94294	0.05688
21	Furniture & Fixtures	1.73782	0.94736	0.05174
22	Paper & Paper Products	2.42319	0.83298	0.16677
23	Printing, Publg.& Allied Activities	2.19724	0.84599	0.15376
24	Leather & Leather Products	2.19868	0.88903	0.11073
25	Plastic & Rubber Products	2.14073	0.75525	0.24460
26	Petroleum Products	2.13156	0.84618	0.15376
27	Coaltar Products	2.62886	0.89030	0.10938
28	Inorganic Heavy Chemicals	2.58673	0.81294	0.18658
29	Organic Heavy Chemicals	2.13858	0.80216	0.19754
30	Fertilizers	2.46584	0.83090	0.16891
31	Paint, Varnishes & Lacquers	2.25104	0.75425	0.24539
32	Pesticides, Drugs & Other Chemicals	2.27917	0.80218	0.19770
33	Cement	2.16320	0.91194	0.08786
34	Non-metallic Mineral Product	1.98112	0.88415	0.11571
35	Iron & Steel Ind. & Foundries	2.53764	0.85369	0.14619
36	Other Basic Metal Industry	2.44734	0.81309	0.18666
37	Metal Prod. (Excl. Machinery)	2.27720	0.84639	0.15346
38	Agricultural Machinery	2.53778	0.83999	0.15968
39	Machinery for Food & Text. Ind.	2.42404	0.85383	0.14587
40	Other Machinery	2.28895	0.84264	0.15724

(Table 1 contd..)

(Table 1 concluded)

Sect. No.	Sectors	Gross	GVA	Net IDT
41	Electronic & Elec. Machinery	2.14600	0.76989	0.22999
42	Railway Transport Equipment	2.08175	0.88910	0.11070
43	Other Transport Equipment	2.19047	0.84530	0.15458
44	Misc. Manufg. Industries	1.98578	0.85006	0.14979
45	Construction	2.13515	0.88015	0.11977
46	Electricity	2.15606	0.91146	0.08845
47	Gas & Water Supply	2.02923	0.91431	0.08542
	Average	2.0168	0.8901	0.1097

opposite direction. Thus, the highest DI effects in terms of IDT are about Rs.0.25 in paint, varnishes and lacquers (Sector 31) and the lowest DI effects are about Re.0.001 in food crops (sector 1).

It is also evident from our estimates in Table 1 that primary and agri-based sectors have much larger income (GVA) effects whereas the other manufacturing sectors have much larger output (GO) and tax revenue (IDT) effects of export growth. By dividing the 47 sectors into the three sub-sectors, viz., primary sector (consisting of sectors 1 to 11); agri-based manufacturing sector (consisting of sectors 12 to 22) and other manufacturing sectors (consisting of sectors 23 to 47), we get mean and variance of different DI effects of the export growth for the three groups of sectors as reported in Table 2 below :

Table 2 : Mean and Variance of DI Effects

Sector Groups	Average/ Variance	Gross Output*	Net Indirect Taxes*	Gross Value Added*
Primary Sectors	Avg.	1.3761	0.0213	0.9786
	Var.	0.0347	0.0004	0.0004
Agri-based Manufacturing	Avg.	2.1137	0.0966	0.9031
	Var.	0.0489	0.0036	0.0036
Other Manufacturing	Avg.	2.2561	0.1544	0.8454
	Var.	0.0339	0.0020	0.0020

*DI Effects of Export Growth.

Source : Table 1 above.

It can be seen from Table 2 that the differences between these 3 sector groups in terms of the gross output, value added and net

indirect tax revenue effects of export growth are all statistically highly significant except the one between the agri-based and other manufacturing sectors in terms of gross output effects. Thus, if export promotion effort is made successfully in the primary sectors, it will have larger income effects on the gross output or the volume of economic activities and net indirect tax revenue of the government. On the other hand, export promotion effort in the manufacturing sectors will lead to much larger effects on gross output and the indirect tax revenue of the government, but a much smaller effect on the income generated in the system. The agri-based manufacturing sectors fall between agriculture and manufacturing in terms of all the three criteria.

It is also interesting to examine the linkage effects of export growth in different sectors on the economy. Table 3 presents our estimates of four different measures of linkages described earlier for each of the sectors. It can be seen from the table that there are considerable variations in all the four measures of linkages across the sectors in the Indian economy for the year 1983-84. Direct forward linkages are higher for sectors like Crude, Petroleum, Natural Gas (No.9); Fertilizers (No.30); Inorganic Heavy Chemicals (No.28); etc. Direct backward linkages are higher for Cotton Products (No.27); Food Products (No.13); Petroleum Products (No.26); etc. Total linkage receipts are higher for Electricity (No.46); Iron & Steel (No.35); Petroleum Products (No.26), etc. And total linkage coefficient is higher

Table 3

Sector-Wise Linkages Coefficients

Sect. No.	Sector	DFL	DBL	TLR	TLC
1	FoodCrops	0.1798	0.3058	0.8740	0.8187
2	Cash Crops	0.7836	0.2246	1.6076	0.7434
3	Plantation Crops	0.5047	0.1399	0.6491	0.6582
4	Other Crops	0.4904	0.1928	1.1997	0.7079
5	Animal Husbandry	0.3136	0.5081	1.0164	0.9161
6	Forestry & Logging	0.4544	0.0892	1.1349	0.6089
7	Fishing	0.1409	0.0704	0.5402	0.5910
8	Coal & Lignite	0.9873	0.2778	1.4522	0.8184
9	Crude Petro., Natural Gas	1.7885	0.1013	1.8579	0.6211
10	Iron Ore	0.3185	0.1510	0.5379	0.6781
11	Other Minerals	1.2176	0.1702	0.8331	0.7007
12	Sugar	0.1902	0.7916	0.5910	1.1437
13	Food Products (excl. sugar)	0.2257	0.8671	0.8004	1.2807
14	Beverages	0.0584	0.5998	0.5350	1.1186
15	Tobacco Products	0.0997	0.5412	0.5742	1.0027
16	Cotton Textiles	0.3341	0.6183	0.9324	1.1078
17	Wool, Silk & Synth. Textiles	0.2781	0.6269	0.7444	1.1877
18	Jute, Hemp & Mesta Textiles	0.8523	0.6735	0.7410	1.1121
19	Textile Products	0.1655	0.4403	0.6758	0.9631
20	Wood Prod. (excl.Furniture)	0.9681	0.6884	0.7662	0.9995
21	Furniture & Fixtures	0.3937	0.4555	0.5663	0.9027
22	Paper & Paper Products	1.0107	0.6980	1.2301	1.2587
23	Printing, Publishing & Allied Activities	0.4868	0.5484	0.6333	1.1413
24	Leather & Leather Products	0.2212	0.6232	0.6536	1.1420
25	Plastic & Rubber Products	0.4729	0.5874	0.8357	1.1119
26	Petroleum Products	0.7795	0.8303	1.9412	1.1072
27	Coaltar Products	0.9858	0.9067	0.6859	1.3655
28	Inorganic Heavy Chemicals	1.2701	0.7502	1.0444	1.3436
29	Organic Heavy Chemicals	1.2502	0.5538	0.9487	1.1108
30	Fertilizers	1.2747	0.7163	0.8053	1.2822
31	Paint, Varnishes & Lacquers	0.9437	0.6030	0.6695	1.1692
32	Pesticides, Drugs & Other Chemicals	0.6758	0.6338	1.5694	1.1839
33	Cement	0.9746	0.6312	0.6248	1.1236
34	Non-metallic Mineral Product	0.7637	0.5191	0.8134	1.0290
35	Iron & Steel Industries and Foundries	1.0734	0.7060	2.5357	1.3181
36	Other Basic Metal Industry	1.2678	0.7289	1.0961	1.2712
37	Metal Products (excluding Machinery)	0.6217	0.5700	1.1599	1.1828
38	Agricultural Machinery	0.5105	0.6754	0.6648	1.3182

(Table 3 contd..)

(Table 3 concluded)

Sect. No.	Sector	DFL	DBL	TLR	TLC
39	Machinery for Food & Textile Industry	0.4121	0.6516	0.6469	1.2591
40	Other Machinery	0.3015	0.5903	0.9482	1.1889
41	Electronic & Elec. Machinery	0.3663	0.5394	0.8351	1.1147
42	Railway Transport Equipment	0.6689	0.5170	0.8835	1.0813
43	Other Transport Equipment	0.3305	0.5515	0.7545	1.1378
44	Misc. Manufg. Industries	0.4007	0.4784	0.8005	1.0315
45	Construction	0.1432	0.5724	1.0875	1.1090
46	Electricity	0.8908	0.5933	2.6532	1.1204
47	Gas & Water Supply	0.3128	0.5422	0.6069	1.0540
	Average	0.6208	0.5288	0.9736	1.0476

for Coaltar Products (No.27); Inorganic Heavy Chemicals (No.28); Agricultural Machinery (No.38); etc. Thus, if we consider the question of linkages from different angles, different sectors become important in the Indian economy. In terms of the group of sectors like primary, agri-based and other manufacturing sectors, again the nature of these linkage effects may significantly differ. Table 4 presents the mean and variances of the four linkage measures for these 3 sector groups :

Table 4 : Mean and Variance of Linkage Coefficients

Sector Groups	Average\ Variance	DFL	DBL	TLR	TLC
Primary Sectors	Avg.	0.6527	0.2028	1.0639	0.7148
	Var.	0.2307	0.0144	0.1741	0.0094
Agri-based Manufacturing	Avg.	0.4179	0.6364	0.7415	1.0979
	Var.	0.1130	0.01	0.0371	0.0132
Other Manufacturing	Avg.	0.6960	0.6248	1.0359	1.1719
	Var.	0.1237	0.0100	0.3022	0.0092

Source : Table 3 above.

From Table 4, it is evident that t-ratios for differences in linkage coefficients between sector groups are statistically significant only in some cases. For instance, the direct forward linkage (DFL) coefficient is not significantly different among the three sector groups, but the direct backward linkage (DBL) coefficients are significantly higher in agri-based manufacturing and other manufacturing sectors as compared to the primary sector. So also is the case with the total linkage coefficient (TLC). However, in the case of total linkage receipts (TLR),

which emphasises forward linkages relatively more, the agri-based manufacturing sectors' average coefficient is significantly less than the primary sectors' coefficient. When we compare the results of the Tables 2 and 4, we find that the manufacturing sectors which generate significantly lower income (GVA) effects from the growth of exports, generate not only high indirect tax revenue but also very high linkages to other sectors within the economy; whereas the primary sectors which generate high income effects of the export growth have relatively poor performance in terms of both the indirect tax revenue to the government as well as linkages to other sectors in the economy. The agri-based manufacturing sectors have the major shortcoming in terms of their limited forward linkages in the system. In view of these findings, it is worth examining whether export orientation is more in the primary sectors, agri-based manufacturing sectors or other manufacturing sectors. Table 5 presents the weighted mean and variance of the export to gross output ratios in the three sector groups.

Table 5 : Weighted* Mean and Variance of Exports to Output Ratio

Sector Groups	Average/Variance	Export-Output Ratio
Primary Sector	Average	0.0264
	Variance	0.0173
Agri-based Manufacturing	Average	0.0601
	Variance	0.0044
Other Manufacturing	Average	0.0450
	Variance	0.0078

*Weights are the proportion of gross output of the sectors in total gross output.

Source : CSO (1990)

From the above table, it can be seen that the calculated t-ratios for the differences in the export-output ratios among the three sector groups are statistically insignificant. The export orientation in the Indian economy is, therefore, more or less the same across the three sector groups. Neither primary nor agri-based manufacturing nor other manufacturing sectors have significantly greater export orientation in India. It appears to be a case of market dictated development rather than that of a well planned export growth. The correlations between the linkage coefficients and the DI effects of export growth in a sector are presented in Table 6.

Table 6 : Correlation Coefficient Matrix

Variables	XTX	XGO	DFL	DBL	TLR	TLC	GO	GVA
XTX	1.000							
XGO	0.5991	1.000						
DFL	-0.018	-0.028	1.000					
DBL	-0.171	-0.352*	0.058	1.000				
TLR	0.080	-0.119	0.453*	-0.001	1.000			
TLC	-0.200	-0.350*	0.088	0.940*	0.009	1.000		
GO	-0.200	0.350*	0.088	0.940*	0.009	1.000*	1.000	
GVA	0.155	0.197	-0.152	-0.561*	-0.001	-0.712*	-0.712*	1.000
IDT	-0.155	-0.197	0.152	0.561*	0.001	0.712*	0.712*	-1.000*

(Table contd..)

Note : XTX = Exports in a sector to total exports ratio
XGO = Exports to Gross Output ratio in a sector
DFL = Coefficient of Direct Forward Linkage
DBL = Coefficient of Direct Backward Linkage
TLR = Coefficient of Total Linkage Receipts
TLC = Total Linkage Coefficient
GO = Gross Output effect
GVA = Gross Value Added Effect
IDT = Net Indirect Tax Revenue Effect
*Significant at 5% level of significance
Source : Tables 1 and 3 above and CSO (1990)

These coefficients of correlation are obtained from the cross section of 47 sectors. It can be seen from the table that the direct forward linkage (DFL) coefficient and the total linkage receipt (TLR) and the direct backward linkage (DBL) coefficient and total linkage coefficient are significantly correlated. While DFL and TLR are not correlated with any measures of the DI effects of a one rupee export increase in different sectors, DBL and TLC are significantly correlated with all the three effects considered here. The negative correlation, though highly significant, is of lower magnitude between the GVA effects and DBL than between the GVA effects and TLC. The same pattern of improvement in the correlation is also obtained between the GO & IDYT effects on one hand with DBL and TLC on the other. Thus, when we consider total linkages in the system, the gross output and the indirect tax revenue effects of export growth are positioned more strongly correlated than when we consider direct backward linkage effects. In the context of export growth, backward linkages should be given greater emphasis than the

forward linkages. However, the available empirical evidence in India suggests that extent of backward linkages and income effects of export growth are inversely related.

The table also reveals that the output effects and income effects of the export growth are also significantly and negatively correlated. On the other hand, the output effects and indirect tax revenue effects are positively correlated. The indirect tax revenue of the government which is important for the internal balance through controlling the budget deficit, shows similar effects to the ones on gross output from the export growth in different sectors. Income or the economic growth effects of increase in exports in different sectors are, however, in the opposite direction.

Table 6 also shows whether the dominance of a sector in the total exports of our country and the extent of export orientation of the sector are systematically related to the extent of GO, GVA, and IDT effects or the linkage coefficients. The degree of dominance of a sector in the total exports and the extent of the export orientation of the sector as measured by the proportion of exports in the sector's gross output are significantly and positioning correlated in India. Thus, in India, those sectors dominate in the total exports which, on an average, also have higher proportion of exports in their gross output. Growth of export oriented sectors is an important feature of the Indian economy which brings to the sharp focus the question of linkages of such export oriented sectors to the rest of the economy. In

this context, Table 6 reveals a very disturbing phenomenon of significant negative association between the linkage coefficients (DBL and TLR) and the extent of export orientation of the sectors in the Indian economy. Thus higher the export orientation of a sector in India, the smaller are likely to be its linkages within the economy. While it is possible to infer about higher import intensity of our exports from this finding, it requires more direct verification before we accept the hypothesis. This finding, however, points to the structural weakness of the Indian economy in following the export led growth strategy.

IV. Import Intensity of Export-Oriented Sectors

It would be useful to supplement the above analysis of inter-industry linkages of export oriented sectors with a further analysis of import intensity of such sectors. It is difficult to estimate import intesity of exports from the aggregative macro-economic data on exports, imports and their commodity-wise composition for two reasons : Firstly data on itemwise break-up of exports and imports do not follow a uniform system of industry-wise classification. Secondly, the data on imports relate to total import requirements regardless of whether the imports are for export manufacturing or for domestic manufacturing. Since a significant proportion of aggregate imports actually represents either raw material requirement for domestic manufacturing or final use in the domestic economy, information on item-wise break-up of aggregate imports is not directly useful for estimating import intensity of exports. It

is in this context that a recourse to I-O matrix as a major source of secondary data for estimating import intensity of sectoral exports may be considered relevant and useful. In what follows, we have made an attempt to estimate the direct and indirect import content of sectoral exports based on an analysis of the information available from I-O matrix for 1983-84 prepared by CSO.

From the basic transactions matrix for 1983-84, prepared by CSO (1990), we can identify the specific sectors which are significant net exporters. We find that there are ten sectors out of 47 commodity sectors which show net exports (exports less imports) of more than one billion Rupees. To estimate the import content of export production in these ten sectors, we have examined their input structure and the import intensity of the respective input supplying sectors in each case. For this purpose, we have defined import intensity of an input supplying sector as the ratio of total imports of that sector to the corresponding sectoral output. The estimates of direct import content of export manufacturing in a given sector are obtained by aggregating the product of sectoral input requirements and corresponding import intensities. In addition to these, it is also necessary to estimate the indirect import content indicating the requirements of import by the sectors supplying inputs to the input supplying sectors. We have derived these estimates through an elaborate iterative process. The estimates of direct and indirect import content of inputs used in export manufacturing

for the ten major export-oriented sectors are given in Table 7.

Table 7

Estimates of Import Content and Import Intensity of Export Manufacturing for Major Export Oriented Sectors

Sector	Exports (FOB Value in Rs.Lakhs)	Inputs used in Export Mfg. (at factor cost in Rs. Lakhs)	Direct and Indirect Import Content of Inputs (c.i.f. value in Rs. Lakhs)	Import Intensity of Export Manufacturing	
				Ratio of Imported Inputs to Total Inputs (Per Cent)	Ratio of Imported Inputs to Exports (per cent)
1. Cash Crops	26434	5937	710	11.96	2.69
2. Other Crops	39873	7636	622	8.09	1.56
3. Fishing	27052	1906	161	8.44	0.60
4. Iron Ore	14599	2205	192	8.71	1.32
5. Sugar	23640	18714	1295	6.92	5.48
6. Cotton Textiles	29843	18451	1449	7.85	4.86
7. Jute Textiles	13940	9388	698	7.44	5.01
8. Leather & Leather Products	40988	25543	2138	8.37	5.22
10. Misc. Mfg. Industries	111706	53441	4367	8.17	3.91
Total of 10 Sectors	430969	188579	15007	7.96	3.48
All Sectors	1365360	600702	29968	4.99	2.19

Note: The above estimates are based on the 60-sector Input-Output Matrix for 1983-84, prepared by CSO (1990).

Two alternative measures of import intensity are presented in Table 7 : (a) Proportion of imported inputs in total inputs used for export manufacturing; and (b) Imported inputs as

proportion of the value of exports for a given sector. It can be seen from the Table that the ratio of imported inputs to total inputs varies from 6.92% (sugar) to 11.96% (cash crops). The weighted average of this ratio for the ten export-oriented sectors taken together is found to be 7.96% as against the corresponding national average of 4.99%. Thus, this measure of import intensity clearly shows that the export-oriented sectors are more than import intensive than the rest of the economy.

The conventional measure of import intensity is the ratio of import inputs to value of exports. This measure also shows a higher level of import intensity for export-oriented sectors as compared to the economy as a whole. The ratio of imported inputs to exports varies from 0.6% (fishing) to 5.48% (sugar), the weighted average for 10 export-oriented sectos taken together being 3.48% as against the national average of 2.19%. However, it may be noted that three of the 10 major export-oriented sectors identified above actually show lower import intensity than the national average. These three sectors are : other crops, fishing and iron ore. It is also interesting to observe that our findings regarding import intensity of cotton textiles (4.86%) and leather & leather products (5.22%) are in broad agreement with the findings of a recent study by Exim Bank (1991). Exim Bank examined the import intensity of Indian exports in five major sectors based on the primary data collected through firm level responses. Two of these sectors were leather & leather products and ready-made garments. The import intensity of these

two sectors estmated on the basis of primary responses (relating to 1989-90) at the firm level was found to be 4.6% for leather & leather products and 5% for ready-made garments. While our estimates of import intensity based on an analysis of input output matrix (in 1983-84) are 5.22% for leather & leather products and 4.86% for cotton textiles. In the light of the above findings, we may now consider the implications of alternative strategies of export promotion available to Indian economy.

V. Alternative Strategies of Export Promotion

In the above analysis, we have assumed that export promotion would imply a net increase in the final demand of the sector's output on account of increased exports. However, it is possible to envisage a situation where exports increase only at the cost of domestic demand of the commodity. Thus, when an increase in export of a commodity is obtained either by cutting the domestic consumption expenditure or by reducing the domestic investment expenditure in real terms, the final demand of the commodity would not change. Under such circumstances, the short term and medium term direct-indirect effects of export growth on the economy would not be felt on income, output or indirect tax revenue of the government. Such strategies of export promotion only aim at improving the trade balance and can hardly be considered a part of the wider export-led growth strategy. It is, therefore, very important to distinguish between such demand substituting strategies from the demand generating strategies.

The new EXIM policy (1992) does not explicitly state anything in this context. To what extent would the export promotion lead to a net increase in the final demand for domestic commodities in the economy is not clear from the policy announcement. If the export promotion is achieved only at the cost of domestic consumption or investment - particularly inventories, there would hardly be any long term gains accruing to the economy. It would be more of a short term response of domestic producer to gain temporarily from the export market rather than inculcating a culture of stable long term export business.

The issue of import intensity of exports is another important consideration because the new exim policy has taken a very liberal view of it. Higher is the import intensity of exports, lower is the net increase in the final demand in the economy on account of increased exports and hence lower are the direct-indirect effects in terms of growth of income and output. The effects on government's indirect tax revenue do not suffer because increased imports bring increased revenue to the government through customs duty. Increased import intensity for exports also implies lower linkage effects on the domestic economy. Thus, increasing exports by importing more is also a strategy basically aiming at trade balance rather than overall development of the domestic economy. To a very limited extent, it becomes a part of the 'export-led growth' strategy.

The genuine export promotion strategy has to be an integral part of the overall growth strategy of the country because it

would generate linkage effects to the rest of the economy and direct and indirect effects on income, output and the indirect tax revenue of the government. Special attention has to be paid to specific problems of sectors and markets abroad. Similarly, efforts have to be made to induce entrepreneurs to take export business more seriously and on a long term or permanent basis rather than the current practice of generally considering it a short term and ad hoc phenomenon. Although the new EXIM policy (1992) recognizes the need for quality improvement of our commodities in order to strengthen our competitive position in the international markets, it fails to focus more directly on the specific problems of various exporting sectors. The preference is for addressing general problems where again some crucial aspects have not been given due attention. For instance, the basic issue of reducing cost through expansion of scale of production to optimum level does not get adequate attention in the policy. Similarly, the question of maintaining artificially high labour cost in a labour abundant country like ours by not allowing free exit and by imposing several less justified labour laws in the context of international competition is another aspect that deserves urgent attention. It also does not become clear from the policy as to which sectors are going to be our major export earners. The policy to promote exports by encouraging the special export houses or by creating 100% export oriented industries has to be seen in the light of our finding in the previous section that greater degree of export orientation in

the economy is inversely related to the linkages within the economy. Therefore, unless the sectors where such developments should be encouraged are not properly identified, more general policies may not succeed in giving the desired boost to the economy through even the genuine export promotion.

In terms of the sector groups, the strategy for export promotion has to be clearly defined. If primary sectors are chosen for export promotion on margin, the income effects in the economy would be much larger but the linkages as well as indirect tax revenue effects would be smaller than the ones when specific industries within the manufacturing sector are selected. Even within the manufacturing sector, the agri-based and other sectors differ sharply in terms of their linkage and income as well as tax revenue effects on the economy. These trade-offs have to be seriously considered before deciding on the sectoral thrust of our export promotion strategy. The issues would become even sharper when we consider dynamic aspects of current cost advantage vis-a-vis potential or future cost advantage on one hand and the resource cost of our exports from different sectors on the other hand. If our manufacturing is highly protected in the sense that it has very high real effective rates of protection, our earnings of foreign exchange through manufacturing exports may turn out to be a very inefficient way of using our scarce resources. All these questions need to be thoroughly investigated before we can decide on the most appropriate strategy for export promotion.

VI. Summary and Conclusion

In the present paper, we have considered the 60 sector classification of the Indian economy as available in the Input-Output tables for the year 1983-84. We have estimated direct and indirect effects of a unit increase in the demand for exports in each of the 47 commodity producing sectors in terms of gross output, gross value added at factor cost and net indirect tax revenue of the government. We have also estimated forward and backward linkage coefficients for each of the 47 sectors. It is found that the primary sectors on an average have a greater effect on income but lower effect on gross output and net indirect tax revenue as compared to the manufacturing sectors for a one rupee net increase in the exports of the sector. Similarly, the primary sectors, on an average, have lower linkage coefficients than the manufacturing sectors. The agri-based manufacturing sectors differ from the other manufacturing sectors in terms of the direct and indirect effects of a rupee increase in export demand but not in terms of their linkage coefficients. Thus, if our objective is to generate high income effects without sacrificing the linkage effects on the rest of the economy so as to achieve diversified high growth in the system, the agri-based manufacturing sectors are obvious candidates for intensive export promotion measures. However, one has to also consider other aspects like the current versus potential or future cost advantages and the actual resource cost considering the real effective rates of protection. We have not attempted to estimate

all this in the present paper largely on account of the data constraints.

Our exercise also reveals an inverse relationship between the degree of export orientation of a sector and the linkages of the sector with the rest of the economy. Moreover, it shows that the import intensity of export oriented sectors is higher than that of other sectors. This implies that market trends per se are not conducive to the diversified growth in our economy. Production for export market does not generate ripples in the economy to the same extent to which the production for domestic market generates. Extreme care and caution need to be exercised, therefore, in selecting sectors for promoting higher export orientation provided the existing trends in technology choices are not substantially altered. The questions of linkages and the income effects of the export growth in a sector cannot be ignored if the export promotion strategy has to be an integral part of the overall development strategy of the export-led growth. The new EXIM policy, however, is totally silent on these matters. If the export promotion measures are followed without the overall framework of planned development as it appears to be the case in the new EXIM policy and the 8th Plan documents, we are most likely to experience the phenomenon of 'growth-led exports' rather than 'export-led growth'. If this happens, our export markets would still remain as unreliable as ever. Our exports

would continue to decline relatively so also our share in the world market. It is high time that we devote special attention to export promotion and integrate it meticulously in our overall developmental strategy.

APPENDIX ON METHODOLOGY

Standard Input-Output framework as discussed in Kundu et al. (1978) and the definitions of linkages as used by B.H. Dholakia (1982) are used in the present study. We briefly present them here for ready reference.

Structure of Input-Output Transactions Table

Let there be n producing sectors in the economy. Let matrix Y of the dimension (n*n) represent the flow of commodities from one sector to another with each cell entry Y_{ij} of the Y matrix giving the amount of output of sector i going to sector j (the subscript i refers to rows and j to columns).

Let matrix F of the dimension (n*m) represent the final demand matrix with the cell entries F_{ik} giving the final demand for the output of sector i for the purpose k. The final demand includes Private Final Consumption Expenditure (PFCE), Government Final Consumption Expenditure, Exports, Fixed Capital Formation, changes in Stocks and Imports.

Let matrix V of the dimension (2*n) give the sector-wise gross value added and net indirect taxes in the two rows respectively. The individual cell entries of V is denoted by v_{ij}

We can construct the technology coefficient matrix A of the dimension (n*n) with cell entries denoted by a_{ij} from the matrix Y as follows :

$$a_{ij} = Y_{ij} / X_j$$

where X_j is the gross output of sector j. Further, we construct another matrix B with cell entries b_{ij} computed from elements v_{ij} of V as follows :

$$b_{ij} = v_{ij}/X_j$$

Direct and Indirect Effects

If X is the gross output (column) vector, by definition we have,

(1) $AX + F = X$,

where AX will give us intermediate input use matrix (Y). Thus, from (1) we obtain :

(2) $X = (I-A)^{-1}.F$

Let z_{ij} be the cell entries of the matrix $(I-A)^{-1}$. The elements of column j (i.e., z_{ij} i = 1,2,....,n) will give the direct and indirect (DI) effect of a unit increase in final demand (in our case exports) of sector (column) j on sectors (rows) 1,2,....,n.

To obtain the DI effects of a unit increase in exports on the gross value added (GVA) and the net indirect taxes (IDT) we post-multiply matrix B with matrix $(I-A)^{-1}$, i.e.,

$P = B.(I-A)^{-1}$

The first and second rows of the matrix P will give the DI effects on GVA and IDT respectively of a unit increase in export of corresponding sectors (columns).

Linkage Formulae

Direct Backward Linkage (DBL)

$$DBL_j = \sum_{i=1}^{n} a_{ij}$$

Where DBL_j is the DBL coefficient of sector j and a_{ij}'s are the cell entries of the technology coefficient matrix A.

Direct Forward Linkage (DFL)

$DFL_i = Y_{ij}/X_i$

Where DFL_i is the DFL coefficient of sector j, Y_{ij} are the cell entries of commodity flow for intermediate input use matrix, Y and X_i gross output of sector i.

Total Linkage Coefficient (TLC)

$$TLC_j = n*(\sum_{i=1}^{n} z_{ij}) / (\sum_{i=1}^{n} \sum_{j=1}^{n} z_{ij})$$

Where, z_{ij}'s are the cell entries of $(I-A)^{-1}$ matrix.

Total Linkage Receipt (TLR)

$$TLR_i = n*(\sum_{j=1}^{n} z_{ij}) / (\sum_{i=1}^{n} \sum_{j=1}^{n} z_{ij})$$

Where, z_{ij}'s are the cell entries of $(I-A)^{-1}$ matrix.

References

1. Central Statistical Organization (1990) : Input-Output Transactions Table 1983-84, CSO, Department of Statistics, Ministry of Planning, Government of India.

2. Dholakia, B.H. (1982) : The Economics of Housing in India, New Delhi : National Buildings Organization and U.N. Regional Housing Centre ESCAP.

3. EXIM Bank (1991) : "How Import Intensive Are Indian Exports?", Export-Import Bank of India Occasional Paper No.16, December.

4. Government of India (1992) : Export and Import Policy : 1st April 1992 - 31st March 1997, Ministry of Commerce, 31st March.

5. Government of India (1991) : Objectives, Thrusts and Macro-Dimensions of the Eighth Plan - 1992-97 (Directioncal Paper, New Delhi : Planning Commission, December.

6. Government of India (1986) : A Technical Note on Seventh Plan of India - 1985-1990, Perspective Planning Division, Planning Commission, New Delhi.

7. Kundu, A., Mathur P.N., Bhalla, G.S. and Rao, K.S.C. (1976) : Input-Output Framework and Economic Analysis, Centre for the Study of Regional Development, New Delhi, K.R. Publications.

8. Sarma, Atul (1990) : "Import Intensities of Indian Industries in the Context of New Economic Policy : An Analysis in Input-Output Framework", Man & Development, September.