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INDIA'S MANUFACTURED EXPORTS: AN ANALYSIS OF SUPPLY FACTORS

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I. INTRODUCTION

THERE have been a number of exhaustive studies designed to describe and explain the behavior of exports from India.[1] While these studies have highlighted the neglect of exports in the fifties, the major focus of attention in the sixties and seventies has been the inefficiently designed and badly implemented export promotion policies. These policies which concentrated on the non-traditional manufactured sector resulted in the export of items with high domestic resource costs. Conflicting views have been expressed on whether these promotion policies had any significant impact on the volume of manufactured exports. The purpose of this paper is to examine the determinants of the supply of manufactured exports from India. The determinants will include export subsidies. While similar studies have been done for other countries,[2] econometric analysis in the Indian case has been focussed on export demand aspects.[3] Since the share of India's manufactured exports in world manufactured exports has been low and further has declined from 0.51 per cent in 1970 to 0.34 per cent in 1980, it is reasonable to assume that Indian manufactured exports faced infinitely elastic demand curves. The framework of analysis assumes a traditional trade model with no product differentiation. Thus, given the small country assumption and no product differentiation our main concern is with export supply functions [3]. While the assumption of no product differentiation is common in the literature (see footnote 2), its incorporation would increase the empirical content of the analysis.

II. METHODOLOGY

In this paper, a number of alternative dependent variables will be used. Traditionally, total foreign exchange receipts from exports (X) has been used as the

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[1] See, for example, [22] [5] [23] [6] [18] [27] [28].

[2] See [10] [14] [25] [26] [20] [11] [29].

[3] See [17] [8] [12] [1] [19].

export variable. However, if exports require imported inputs and foreign exchange earnings are the crucial concern, an alternative export variable is net foreign exchange earnings from exports. This is defined as gross export receipts minus cost of imported inputs. Halevi [14] has termed this as value added in foreign exchange (VX). Both concepts will be used alternatively to define the dependent variables. In addition, following Halevi, the shift of resources along a transformation surface is expressed by a variable showing relative exports. The denominator to which the export variable is related depends on the substitution postulated. Two cases are considered. First, substitution is assumed between manufactured exports and non exported manufactured product (M): X/M and VX/M are now the relevant variables. Second, substitution is assumed between manufactured exports and all other goods (Y): X/Y and VX/Y become the appropriate variables.

The small country assumption implies that export prices in the world market are exogenously determined. Since export receipts are normally expressed in current prices, it becomes necessary to express total foreign exchange receipts or value added in real terms. The dependent variable will therefore be expressed in dollars at constant prices. Verghese [27] has suggested that this procedure be followed in the Indian case.[4]

Relative profitability between selling in the world and domestic markets is likely to be a key determinant of the volume of export supply. Relative profitability is judged by the ratio of export to domestic price. In his export decision, an exporter is guided by the export price in foreign exchange and the units of domestic currency per unit of foreign exchange which he actually receives. The formal exchange rate and the extent of subsidization determine the units of domestic currency which the exporter actually receives. This has led to the concept of the effective exchange rate (EER) which measures what exporters receive per unit of foreign exchange:

$$EER = R(1+S),$$

where R is the official exchange rate and S is the ad valorem rate of export subsidy.[5] Thus the product of the exogenously determined export (PX) and the effective exchange rate is the relevant variable to use in determining the price the exporter actually receives. The appropriate domestic price would depend on the substitution assumed. In the case of substitution between manufactured exports and manufactured output sold in the domestic market, the domestic price to use is the price of manufactures (PM) in the domestic market. If substitution is assumed between manufactured exports and all other goods, the domestic

[4] The rates of growth of the rupee value of manufactured exports in current prices, the dollar value of manufactured exports in current prices, and the dollar value of manufactured exports in constant 1968–69 prices for the period 1967–80 are 14.8, 13.8, and 4.5 per cent, respectively.

[5] Halevi uses this terminology. It is distinct from the EER which measures the average change of a country's exchange rate against all countries.

price will be the price of total product not exported (PY). Thus the relative price variables are given by

$$RM = \frac{R(1+S)PX}{PM}, \tag{1}$$

$$RY = \frac{R(1+S)PX}{PY}. \tag{2}$$

Clearly, the relative profitability of exports will improve if the world market price of exports, the official foreign exchange rate, or the rate of export subsidy increases, or the price in the domestic market decreases.

An interesting exercise for policy purposes would be to test the hypothesis that manufactured exports react in a different way to changes in the real exchange rate and to changes in export subsidy, thus separating the relative price variable into two components, RRM (RRY) and S. One reason for this assymmetry is that in India the export subsidy has many components. While some components like the import premium are highly volatile, other components like duty drawbacks, export credit and export subsidies are administered by different agencies with differing degrees of efficiency [6]. Consequently, the volatility of the subsidy component together with its lagged disbursement may cause exporters to view the subsidy and exchange rate elements differently. Thus differences in export supply response maybe due to the perceived transitory character of export subsidies.

For a growing economy, the export supply function itself will shift over time. To distinguish movements along a supply function from the shift of the supply function, factors augmenting the capacity to export need to be considered. Halevi uses capital stock as a proxy of the shift variable since changes in capital stock imply changes in potential output. Goldstein and Khan [13] use output as a proxy for the shift variable. In this paper capital stock will be used as the shift variable. In addition, Verghese [27] has argued that manufactured exports have done well generally in recession years. To test this hypothesis an attempt will be made to separate the effects of trends and cycles in the manufacturing sector of the domestic economy.

III. SPECIFICATION OF THE EXPORT SUPPLY FUNCTIONS

Having described the dependent and independent variables that will be used in this paper, we next specify various versions of equations that will be tried in the estimation of the export supply functions.[6] The traditional formulation of an export supply equation relates the quantity of exports supplied (X^s) to the relative price of exports (RM) and domestic productive capacity which in our

[6] The specifications for total manufactured export earnings (X) will be stated. Given the description in Section II, the specifications for value added in manufactured exports (VX) necessarily follow.

case is capital stock (K) of the manufacturing sector. In log linear terms the equation for export supply has the following form:

$$\ln X_t^s = a_0 + a_1 \ln RM_t + a_2 \ln K_t. \tag{3}$$

As the price of exports rises relative to domestic prices, production for exports become more profitable and hence exporters will supply more. Similarly, as the country's capacity to produce more increases, exports are expected to increase. Thus a_1 and a_2 are expected to be positive. Two assumptions are made when equation (3) is estimated. First, exporters are always on their supply curve so that supply always equals the actual level of exports $X^s = X$. Second, demand price elasticities of exports are infinite so that the equation can be properly estimated in a reduced form.

The method followed by Khan and Ross [16] in separating cyclical and trend movements in import demand is adopted here to test the hypothesis that India's manufactured exports did well in recessionary periods. An export supply function similar to equation (3) is specified but in terms of the trend values of the quantity of exports and manufactured output

$$\ln X^*{}_t^s = b_0 + b_1 \ln RM_t + b_2 \ln O^*{}_t, \tag{4}$$

where the star indicates the trend or potential value of the variable. The coefficients b_1 and b_2 are expected to be positive. The deviations of actual export supply from potential export supply is related to the deviation of actual from potential manufactured output by the following equation

$$\ln X_t^s - \ln X^*{}_t^s = \gamma \ (\ln O_t - \ln O^*{}_t), \tag{5}$$

where $\gamma > 0$. Substituting equation (4) in equation (5) wet get

$$\ln X_t^s = b_0 + b_1 \ln RM_t + \gamma \ (\ln O_t - \ln O^*{}_t) + b_2 \ln O^*{}_t, \tag{6}$$

while the coefficient γ will give the cyclical effect, the coefficient b_2 will give the trend or secular effect. The difference between actual and potential or trend output can be taken as a proxy for the difference between actual and planned output and is interpreted as a measure of excess capacity.

To test the hypothesis that manufactured exports react in a different way to changes in the real exchange rate and to changes in export subsidy, equations (3) and (6) are altered to

$$\ln X_t^s = a_0 + a_1 \ln RRM_t + a_2 \ln S_t + a_3 \ln K_t, \tag{7}$$

$$\ln X_t^s = b_0 + b_1 \ln RRM_t + b_2 \ln S_t + \gamma \ (\ln O_t - \ln O^*{}_t) + b_3 \ln O^*{}_t. \tag{8}$$

As already stated, the shift of resources along a transformation surface is indicated by relative exports, X/M. Movements along the transformation surface depend on relative prices RM. To distinguish movements along the surface from shifts in the surface itself, the capital variable is used as a proxy for the shift parameter. The above, in equation form is specified as

$$\ln\left(\frac{X}{M}\right)_t = d_0 + d_1 \ln RM_t + d_2 \ln K_t. \tag{9}$$

While d_1 is expected to be pisitive, the sign of d_2 is uncertain and will depend on whether growth was export biased or not.

IV. EMPIRICAL RESULTS

The models described in Sections II and III were estimated for India's manufactured exports using the ordinary least squares method. Tables I and II give the estimates. Each table shows the value of the estimated coefficients and, in parentheses below these, the t statistic. In addition the adjusted coefficient of determination $\bar{R}^2$, the Durbin-Watson (*D.W.*) statistic and the F statistic are reported. While the rationale for the variables used has been outlined in Section II, the definitions of the variables and the sources of data have been described in detail in Appendix.

Table I shows that the estimated price elasticity in the export supply equation for formulations (1) to (4) and (9) to (10) carries the expected positive sign and is significantly different from zero at the 5 per cent level. Equations (1) and (3) suggest that an increase in capital stock leads to an increase in export supply. However, equations (9) and (10) which are associated with movements along a transformation surface indicate that the coefficients associated with capital stock are negative. Since capital stock has been used as a shift variable, the negative coefficients imply that growth has been biased against manufactured exports. In the light of the import substituting policies India has followed for the manufacturing sector, this result is to be expected. Equations (2) and (4) which are used to separate the trend and cyclical effects indicate that relative prices, trend output and cyclical factors have all been significant in influencing manufactured exports. Clearly, recessionary forces at home have helped exports. This confirms Verghese's hypothesis that when domestic demand was constrained, producers of manufactured goods did seek markets abroad.

In equations (5) to (9) of Table I, the relative price variable is decomposed to separate the impact of changes in the real exchange rate and subsidy on export supply. Equations (5) and (7) suggest that while both the real exchange rate and subsidy have significant positive effects on export supply, the impact of the former is numerically larger. The elasticity of the former is greater than the latter by 88 per cent. Equations (6) and (8) which are used to separate the trend and cyclical effects show that the real exchange rate, trend output and cyclical factors have all been significant in influencing manufactured exports. In these two equations, though the signs associated with the subsidy coefficients are positive, they are not significant at the 5 per cent level.

The overall conclusion that emerges from Table I is that the relative price and capital variables together satisfactorily explain the variations in total manufactured export supply. The relative price variables (*RM, RY*) are positive and significantly different from zero implying a positively sloped function for export supply. Given

TABLE I

REGRESSIONS FOR INDIA'S MANUFACTURED EXPORT SUPPLY

Dependent Variable		Intercept	Regression Coefficients							$\bar{R}^2$	*D.W.*	*F*
			ln *RM*	ln *RY*	ln *K*	(ln *O*-ln *O**)	ln *O**	ln *S*	ln *RRM*	ln *RRY*			
(1)	ln *X*	−0.7532	0.6587		0.4598						0.9066	1.5217	$F(2,11)=64.10$
		(−1.0360)	(3.4042)		(3,7806)								
(2)	ln *X*	−0.5299	0.4143			0.8619	0.6498				0.9562	1.8748	$F(3,10)=88.42$
		(−1.0919)	(2.8105)			(3.0653)	(5.9667)						
(3)	ln *X*	0.3151		0.6765	0.3379						0.8747	1.5333	$F(2,11)=46.36$
		(0.3199)		(2.4146)	(1.6428)								
(4)	ln *X*	−0.0419		0.3598		1.1187	0.6188				0.9438	1.9516	$F(3,10)=68.17$
		(−0.0652)		(2.1768)		(4.1392)	(3.9898)						
(5)	ln *X*	−0.4234			0.2797			0.3379	0.6254		0.9307	2.1365	$F(3,10)=59.22$
		(−0.5713)			(2.0840)			(3.0062)	(3.7573)				
(6)	ln *X*	−0.7134				0.7624	0.5888	0.1409	0.4207		0.9532	1.9496	$F(4,9)=62.06$
		(−1.3655)				(2.3663)	(4.0129)	(1.3552)	(2.8600)				
(7)	ln *X*	0.4986			0.2021			0.3226		0.5992	0.8909	1.9214	$F(3,10)=36.38$
		(0.5255)			(0.9685)			(2.2885)		(2.3047)			
(8)	ln *X*	−0.2842				1.0927	0.6060	0.0836		0.3510	0.9368	1.9529	$F(4,9)=45.44$
		(−0.4291)				(3.4177)	(3.2233)	(0.7222)		(1.9717)			
(9)	ln (*X*/*M*)	1.8860	0.8246		−0.2768						0.6286	1.7915	$F(2,11)=11.16$
		(2.2704)	(4.1668)		(−2.0790)								
(10)	ln (*X*/*Y*)	−1.6715		1.3990	−0.4264						0.7285	1.7183	$F(2,11)=18.44$
		(−1.3195)		(3.8821)	(−1.6116)								

Note: The *t* statistics is given in parentheses.

TABLE II

REGRESSIONS FOR VALUE ADDED IN MANUFACTURED EXPORTS FROM INDIA

Dependent Variable	Intercept	Regression Coefficients								$\bar{R}^2$	*D.W.*	*F*
		ln *RM*	ln *RY*	ln *K*	(ln *O*–ln *O**)	ln *O**	ln *S*	ln *RRM*	ln *RRY*			
(1) ln *VX*	1.1866	0.8286		0.1709						0.8800	2.1389	$F(2,11)=48.65$
	(1.7712)	(4.6476)		(1.5250)								
(2) ln *VX*	0.9788	0.6896			0.3391	0.3024				0.8841	2.0685	$F(3,10)=34.06$
	(1.4290)	(3.0906)			(0.7930)	(1.9266)						
(3) ln *VX*	2.6319		0.9064	−0.0194						0.8248	2.1699	$F(2,11)=31.60$
	(2.7812)		(3.3668)	(−0.0984)								
(4) ln *VX*	2.5094		0.7042		0.7058	0.1072				0.8640	1.8181	$F(3,10)=26.42$
	(3.2866)		(3.3628)		(2.1608)	(0.5730)						
(5) ln *VX*	0.7501			0.1640			0.0657	0.8768		0.9146	2.0985	$F(3,10)=43.82$
	(1.4651)			(3.6887)			(0.7475)	(7.0697)				
(6) ln *VX*	0.2342				0.4189	0.3694	0.0482	0.6833		0.8821	2.0998	$F(4,9)=25.31$
	(0.2802)				(0.9076)	(1.6820)	(0.3434)	(3.0393)				
(7) ln *VX*	1.8876			−0.0024			0.1283		0.9038	0.8118	2.1599	$F(3,10)=19.69$
	(1.8826)			(−0.0107)			(0.8527)		(3.2567)			
(8) ln *VX*	1.0359				0.8865	0.3342	−0.0281		0.6431	0.8604	2.1236	$F(4,9)=21.02$
	(1.0750)				(2.0932)	(1.2723)	(−0.1943)		(2.5294)			
(9) ln (*VX*/*M*)	9.9849	0.8419		−1.1286						0.6288	1.6372	$F(2,11)=11.16$
	(3.3427)	(1.8571)		(−3.1244)								
(10) ln (*VX*/*Y*)	3.8097		1.5508	−1.0773						0.3952	1.7312	$F(2,11)=5.25$
	(2.2558)		(3.2277)	(−3.0540)								

Note: The *t* statistics is given in parentheses.

the definition of relative price, we can surmise that an increase in world market price, the exchange rate, the rate of export subsidy or a decrease in the price of manufactured goods in the domestic sector will result in increased export supply. An increase in productive capacity proxied by an increase in capital stock also leads to an increase in export supply. However, when movements along a transformation surface are considered growth has been biased against exports. When cyclical factors are separated from trend sectors, recessionary situations at home lead to higher export supply. While the importance of relative price in determining export supply has been clearly established, decomposition of relative price into the real exchange rate and subsidy elements has some interesting implications. The empirical results suggest that the real exchange rate plays a more important role than subsidy in determining the supply of manufactured exports.

In Table II value added in manufactured exports defined as gross export receipts minus cost of imported inputs, both expressed in constant prices, is used as the dependent variable. Table II follows the procedure adopted by Halevi [14] where the relative price variables are similar to those used in Table I. Here the effective exchange rate is related to the ad valorem export subsidy rate. If foreign exchange earnings from manufactured exports are the crucial concern Table II provides some useful insights.

Equations (1) to (4) in Table II show that the estimated price elasticity in the export supply equations carries the expected positive sign and is significantly different from zero at the 5 per cent level. In equations (1) and (3) the coefficient of the capital stock variable is not significantly different from zero at the 5 per cent level. The above imply that it is the relative profitability of selling in the export market versus selling in the home market rather than productive capacity which is the constraining factor in increasing export supply. In addition equation (4) suggests that slack in the domestic market also provides incentives to export. As in Table I, equations (9) and (10) associated with movements along a transformation surface suggest that an increase in relative price of exports will shift resources towards it. However, growth has been biased against exports.

In equations (5) to (8) in Table II, the relative price variable has been decomposed into the real exchange rate and subsidy elements. Both numerically and in terms of the level of significance, the real exchange rate variable dominates the subsidy variable. In equation (5) the elasticity of export supply with respect to change in the real exchange rate and subsidy rate are 0.88 and 0.07, respectively. The corresponding elasticities in equation (7) are 0.90 and 0.13. In equation (8) where the domestic demand slack variable is also significant, all the variables except the real exchange rate are not significant in equations (6) to (8). These findings indicate that export subsidies have not played a significant role in augmenting foreign exchange earnings from manufactured exports in the aggregate.

An important point that emerges from the description of Tables I to II is that both dependent and independent variables need to be specified with caution. Though the signs of the coefficients associated with the corresponding variables in the two tables are largely consistent, the level of significance varies. Hence

the degree of certainty with which the results of this paper can be used to aid the policy maker depends on the choice of the independent and dependent variables.

V. CONCLUSION

The econometric results reported need to be tempered by the fact that the number of observations was small, and the tentative nature of the subsidy estimates. In addition the traditional trade model with no product differentiation has been maintained. Given these qualifications, an important conclusion of this paper is that manufactured exports from India are governed primarily by the relative profitability between selling in the international and home markets, increased capacity to produce, and the extent of capacity underutilization caused by depressed demand at home. Relative profitability depends on the exchange rate, export subsidy rate, world price, and domestic price. The components of relative profitability were separated into two groups: the real exchange rate comprising the exchange rate, world price, and domestic price and a second group consisting of export subsidy. While the real exchange rate is a significant variable in explaining variations in total and value added in manufactured exports, the export subsidy is a significant variable in explaining total exports only. In addition the real exchange rate is quantitatively more important than export subsidy in determining exports of manufactured goods. A tentative conclusion which follows from this paper is that exchange rate policies will influence exports more than export subsidy policies.

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APPENDIX

DATA REQUIREMENT, DEFINITIONS, AND SOURCES

The discussion in Section II clearly indicates the data requirements of this paper. Time series data is used from 1967–68 to 1980–81. The data for total manufactured export earnings expressed in rupees, index of manufactured exports prices (*PX*), index of import prices, and value of import licenses issued to registered exporters are taken from various issues of the *Report on Currency and Finance* (hereafter abbreviated as *RCF*) of the Reserve Bank of India. The definition of manufactured exports used here includes manufactured goods classified chiefly by material; machinery and transport equipment, clothing, and footwear reported

in the *RCF*. Foreign exchange rates are obtained from the *International Financial Statistics* and adjusted for the Indian financial year. The data on total manufactured output excluding manufactured exports (M) and net domestic product excluding manufactured exports (Y) are derived from the *National Accounts Statistics* (hereafter abbreviated as *NAS*), Government of India. These are expressed in constant 1967–68 prices.

Total manufactured export earnings expressed in rupees, index of export prices, and foreign exchange rates are used to express total manufactured export earnings (X) in constant 1967–68 prices. The net foreign exchange earnings from manufactured exports or value added in foreign exchange is estimated by subtracting from total manufactured export earnings the value of the import content which is provided by the value of import licenses issued to registered exporters. The assumption being made is that these registered exporters export manufactured goods only. Value added in real terms (VX) is obtained by deflating the total manufactured export earnings and value of imported inputs by the indices of manufactured export and import prices respectively.

To estimate the relative price index, data is needed on the foreign exchange rates, the export subsidy rate, index of manufactured export price (PX), the price index of manufactured goods (PM) in the home market, and the NDP deflator (PY). Data for the latter two are obtained from the *RCF* and *NAS*, respectively.

The complexity of the Indian export incentive schemes has been described in detail in the Alexander Report [2], Bhagwati and Srinivasan [6], Bagchi [4], Dagli Report [7], Verghese [27], Sen [21], and Wolf [28], and the difficulties associated with quantifying the extent of subsidy have been spelt out therein. The discussion that follows needs to be viewed in the light that any attempt at quantification of export subsidy in India is hazardous and at best could be described as "guess estimates." Following Verghese and Wolf the major components of export subsidy considered are foreign trade and export promotion, duty drawbacks, premium on replenishment licenses, and subsidy from export credit. It is assumed in this paper that all the export subsidy accrue to manufactured exports only. The data provided by Wolf justify this assumption. The Explanatory Memorandum on the Budget of the Central Government gives the data on foreign trade and export promotion while the annual reports of the Ministry of Commerce and Ministry of Finance provide the data on duty drawbacks. Data for export credit outstanding is taken from the *RCF*. The upper estimate of Verghese [27] and the Tandon Committee's [24] note of dissent is used to obtain a figure for the extent of concessionary finance given to exporters. This is 4.5 per cent.

The estimation of the extent of premium on replenishment licenses was most difficult. The report on the export performance of Indian companies by ICICI [15] gives estimates of the premium on import licenses for 1972–75. Data on premium on import licenses is provided in the Gujarati weekly, *Vyapar*. Averages for the years 1967–68 to 1976–77 were estimated. It was found that the ratio of these averages to the premium on replenishment licenses obtained

by the ICICI study for each of the three years was 0.54. The premium on import licenses obtained from the *Vyapar* were multiplied by 0.54 to derive the premium rate on import replenishment licenses for the previous years. Following Wolf [28], the premium on import replenishment for 1976–77 onwards is assumed to be 10 per cent.

The sum of foreign trade and export promotion, duty drawbacks, premium on replenishment licenses gives the total incentive for exports or export subsidy. This as a proportion of the total value of manufactured exports expressed in rupees at current prices gives the ad valorem export subsidy rate (S).

Once we have the data on the foreign exchange rate, the ad valorem subsidy rate, the export price index, we use the indices of home goods prices (PM, PY) to derive the relative price indices defined in equations (1) and (2) given in the text.

The data for manufactured output (O) at constant 1967–68 prices is taken from the *RCF*. Potential or trend output (O^*) is obtained by fitting a trend line, $\ln O = a + bt$, where t refers to time. $(\ln O - \ln O^*)$ is the proxy for cyclical variations in the domestic manufactured goods sector.

The data for capital stock has been taken from Dholakia [9]. He has employed the perpetual inventory method to measure the value of capital stock at constant prices by major sectors of the Indian economy from 1948–49 to 1980–81. This data has been used to estimate capital stock of the manufacturing sector (K) at 1967–68 prices.

APPENDIX TABLE I

DERIVATION OF DEPENDENT VARIABLES

Year	Current Prices (Rs. Cr)					Constant Prices (U.S.$ million)						
	Total Manufacturing Exports	Import Replenishment Licenses	Index of Import Prices	Index of Export Prices (PX)	Exchange Rate (Rs/U.S. $) ($R$)	Total Mfg. Exports (X)	Import Replenishment Licenses	Value Added in Mfg. Exports (VX)	$(X/M)\times 100$	$(VX/M)\times 100$	$(X/Y)\times 100$	$(VX/Y)\times 100$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1967	533	25.0	95	100	7.500	710 7	35.1	675.6	17.8	15.9	1.94	1.73
1968	646	35.7	100	100	7.500	861 3	47.6	813.7	20.8	18.5	2.25	2.04
1969	686	57.7	100	106	7.500	862 9	76.9	786.0	19.9	17.1	2.15	1.94
1970	699	68.4	100	110	7.500	847 3	91.2	756.1	18.8	15.7	2.04	1.73
1971	741	63.4	93	115	7.444	865 6	91.6	774.0	18.5	15.2	1.83	1.52
1972	903	86.3	97	131	7.706	894 5	115.5	779.1	20.2	15.6	1.73	1.42
1973	1,119	89.4	138	154	7.791	932.6	83.2	849.5	20.2	16.3	1.87	1.52
1974	1,385	108.6	239	191	7.796	930 1	58.3	871.8	18.6	15.7	2.15	1.94
1975	1,649	192.4	280	198	8.653	962.5	79.4	883.1	21.1	17.9	2.35	2.04
1976	2,423	241.0	272	226	8.939	1,199.4	99.1	1,100.3	26.0	20.6	2.99	2.46
1977	2,531	409.3	249	226	8.563	1,307 8	192.0	1,115.9	24.7	15.9	2.88	1.94
1978	2,743	490.6	260	246	8.206	1,358.8	229.9	1,128.9	21.0	11.5	2.67	1.63
1979	2,849	643.4	360	273	8.076	1,292.2	221.3	1,070.9	20.1	11.9	2.77	1.70
1980	2,840	898.7	387	297	7.893	1,211 5	294.2	917.3	20.2	10.6	2.35	1.42

Notes: 1. 1 Cr=10 million.

2. $(6)=[(1)/(5)]/(4)\times 100\times 10$, $(7)=[(2)/(5)]/(3)\times 100\times 10$, $(8)=(6)-(7)$.

3. M is defined as manufactured output net of manufactured exports in constant 1968 prices. Data for total manufactured output is given in Appendix Table IV. Y is defined as net domestic product minus manufactured exports in constant 1968 prices. Data for NDP is given in Appendix Table IV.

APPENDIX TABLE II

DERIVATION OF EXPORT SUBSIDY RATE FOR MANUFACTURING EXPORTS

(Rs.Cr)

Year	Foreign Trade and Export Promotion (1)	Duty Drawbacks for Mfg. Exports (2)	Premium on Replenishment Licenses (3)	Subsidy from Export Credit (4)	Total Export Subsidy (5)	Rate of Export Subsidy S (6)	Index of Export Subsidy 1968=100 (7)
1967	22.68	32.53	8.26	—	63.47	0.119	79.83
1968	34.00	43.60	18.76	—	96.36	0.149	100.00
1969	42.35	37.39	34.41	12.16	126.31	0.184	123.44
1970	41.80	33.00	32.33	14.69	121.82	0.174	116.84
1971	54.35	35.50	36.96	17.13	143.94	0.194	130.23
1972	62.29	47.00	34.70	19.61	163.60	0.181	121.46
1973	77.08	41.70	28.50	25.52	172.80	0.154	103.53
1974	85.83	60.92	28.99	28.58	204.32	0.148	98.90
1975	171.77	80.04	19.24	32.76	303.81	0.184	123.51
1976	295.93	120.20	24.10	43.97	484.20	0.200	133.97
1977	363.47	135.70	40.93	52.47	592.57	0.234	156.96
1978	434.87	149.76	49.06	58.55	692.24	0.252	169.19
1979	382.49	164.80	64.35	65.57	677.21	0.238	159.36
1980	425.26	209.07	89.87	73.21	797.41	0.281	188.23

Notes: (5) = (1) + (2) + (3) + (4). (6) = (5)/Column 1 of Appendix Table I.

APPENDIX TABLE III

DERIVATION OF RELATIVE PRICE VARIABLES

Year	Effective Exchange Rate $EER = R(1+S)$ (1)	Effective Exchange Rate 1968=100 (2)	Index of Implicit NDP Deflator (PY) (3)	Index of Manufacturing Prices (PM) (4)	1968=100			
					RM (5)	RY (6)	RRM (7)	RRY (8)
1967	8.392	97	100	99	98	97	101	100
1968	8.618	100	100	100	100	100	100	100
1969	8.880	103	104	107	102	105	99	102
1970	8.805	102	108	115	98	104	96	102
1971	8.888	103	113	126	94	105	91	101
1972	9.101	106	126	140	99	110	96	107
1973	8.991	104	150	160	100	107	100	107
1974	8.942	104	176	194	102	113	102	113
1975	10.245	119	171	197	119	138	116	134
1976	10.727	124	183	201	140	154	134	147
1977	10.567	123	189	206	135	147	125	137
1978	10.274	119	193	207	142	152	130	139
1979	9.998	116	223	248	128	142	119	132
1980	10.111	117	249	296	118	140	106	126

Notes: 1. In (1), R is taken from column 5 of Appendix Table I and S from column 6 of Appendix Table II.

2. $(5) = [(2) \cdot PX]/(4)$, $(6) = [(2) \cdot PX]/(3)$, $(7) = (R/7.500)(PX/PM) \times 100$, $(8) = (R/7.500)(PX/PY) \times 100$, PX is taken from column 4 of Appendix Table I.

APPENDIX TABLE IV

INDEPENDENT VARIABLES

(Constant 1968 Rs. Cr)

Year	Total Manufacturing Output (O) (1)	Net Domestic Product (2)	Capital Stock (K) (3)
1967	3,536	28,633	14,271
1968	3,748	28,936	14,772
1969	3,904	30,223	15,635
1970	4,016	31,962	16,523
1971	4,128	36,011	17,395
1972	4,126	40,334	17,868
1973	4,328	39,797	18,959
1974	4,629	33,941	20,727
1975	4,772	36,447	22,259
1976	5,201	36,785	23,122
1977	5,646	40,300	24,111
1978	6,428	42,046	25,734
1979	6,249	39,096	27,373
1980	6,015	41,820	29,389

APPENDIX TABLE V

ACTUAL AND ESTIMATED VALUES CORRESPONDING TO EQUATIONS (1) TO (8) IN TABLE I.

Year	*X*	*XFIT* 1	*XFIT* 2	*XFIT* 3	*XFIT* 4	*XFIT* 5	*XFIT* 6	*XFIT* 7	*XFIT* 8
1967	710.7	784.800	774.288	766.999	768.536	747.580	753.202	732.765	752.457
1968	861.3	808.032	815.471	792.149	811.974	811.171	815.169	795.243	811.491
1969	862.9	840.295	846.398	834.593	847.477	879.705	868.910	871.079	863.465
1970	847.3	839.495	850.699	844.832	856.263	859.241	859.992	864.231	864.159
1971	865.6	836.309	853.951	865.226	869.950	871.971	871.687	900.648	885.539
1972	894.5	876.092	866.615	901.019	868.917	892.440	879.011	916.426	878.046
1973	932.7	906.274	901.514	902.213	890.687	877.510	884.956	878.318	879.510
1974	930.1	956.596	956.437	964.768	957.592	900.044	921.156	913.518	933.972
1975	962.5	1,100.173	1,036.802	1,131.379	1,039.581	1,074.962	1,037.393	1,101.993	1,037.215
1976	1,199.4	1,233.401	1,170.302	1,228.870	1,158.531	1,214.683	1,174.821	1,203.643	1,155.853
1977	1,307.8	1,233.432	1,234.718	1,213.108	1,225.959	1,250.128	1,245.087	1,225.663	1,230.756
1978	1,358.8	1,307.867	1,391.478	1,268.491	1,397.367	1,329.104	1,384.332	1,286.309	1,393.215
1979	1,292.2	1,262.471	1,307.259	1,236.958	1,305.062	1,257.920	1,293.704	1,236.411	1,297.626
1980	1,211.5	1,229.438	1,221.141	1,254.923	1,228.038	1,255.662	1,239.615	1,285.244	1,243.652

APPENDIX TABLE VI

ACTUAL AND ESTIMATED VALUES CORRESPONDING TO EQUATIONS (9) AND (10) IN TABLE I.

Year	*RXM*	*RXMFIT*	*RXY*	*RXYFIT*
1967	17.8	19.736	1.94	1.915
1968	20.8	19.921	2.25	1.969
1969	19.9	20.021	2.15	2.058
1970	18.8	19.226	2.04	1.983
1971	18.5	18.452	1.83	1.966
1972	20.2	19.107	1.73	2.074
1973	20.2	19.051	1.83	1.946
1974	18.6	19.036	2.15	2.022
1975	21.1	21.284	2.35	2.594
1976	26.0	23.656	2.99	2.949
1977	24.7	22.961	2.88	2.739
1978	21.0	23.463	2.67	2.791
1979	20.1	21.550	2.77	2.472
1980	20.2	19.864	2.35	2.351

APPENDIX TABLE VII

ACTUAL AND ESTIMATED VALUES CORRESPONDING TO EQUATIONS (1) TO (8) IN TABLE II.

Year	*VX*	*VXFIT* 1	*VXFIT* 2	*VXFIT* 3	*VXFIT* 4	*VXFIT* 5	*VXFIT* 6	*VXFIT* 7	*VXFIT* 8
1967	675.6	750.360	744.317	729.393	733.924	742.875	746.684	724.354	745.559
1968	813.7	767.539	768.505	749.306	762.270	767.208	768.443	748.225	762.441
1969	786.0	787.845	788.581	782.322	790.518	791.335	782.636	782.136	775.528
1970	756.1	769.386	773.202	774.733	782.717	771.221	770.875	775.215	775.481
1971	774.0	749.833	757.052	780.701	783.976	752.339	751.630	781.090	768.772
1972	779.0	786.331	783.140	813.897	787.083	788.319	779.848	815.189	778.606
1973	849.6	800.979	800.113	792.839	781.828	800.196	805.982	795.478	793.346
1974	871.7	826.732	828.412	831.587	830.097	824.143	839.930	835.050	854.530
1975	883.1	957.508	934.682	995.354	939.852	959.994	938.298	1,000.439	947.563
1976	1,100.3	1,088.578	1,063.224	1,092.126	1,043.724	1,092.521	1,067.479	1,096.438	1,053.617
1977	1,115.8	1,070.189	1,069.627	1,052.378	1,055.531	1,071.981	1,067.857	1,051.622	1,052.412
1978	1,129.2	1,121.875	1,149.795	1,083.398	1,158.966	1,121.395	1,151.301	1,079.576	1,162.333
1979	1,070.9	1,046.447	1,063.543	1,017.370	1,059.880	1,046.934	1,068.346	1,018.591	1,067.570
1980	917.6	983.229	985.115	1,002.987	995.418	977.337	971.180	995.440	970.336

APPENDIX TABLE VIII

ACTUAL AND ESTIMATED VALUES CORRESPONDING TO EQUATIONS (9) AND (10) IN TABLE II.

Year	*RVM*	*RVMFIT*	*RVY*	*RVYFIT*
1967	15.9	18.640	1.73	1.820
1968	18.5	18.388	2.04	1.838
1969	17.1	17.786	1.94	1.865
1970	15.7	16.417	1.73	1.731
1971	15.2	15.184	1.52	1.663
1972	15.6	15.467	1.42	1.736
1973	16.3	14.812	1.52	1.560
1974	15.7	13.930	1.94	1.542
1975	17.9	14.924	2.04	1.947
1976	20.6	16.253	2.46	2.194
1977	15.9	15.309	1.94	1.971
1978	11.5	14.984	1.63	1.935
1979	11.9	13.140	1.73	1.629
1980	10.6	11.494	1.42	1.476