

## ELASTICITIES OF DEMAND FOR CERTAIN INDIAN IMPORTS AND EXPORTS

By V. NARASIMHA MURTI and V. KASI SASTRI

*Statistical Laboratory, Calcutta and Department of Research and Statistics,  
Reserve Bank of India, Bombay.*

### 1. INTRODUCTION

1. The object of this article is to derive causal relationships between Indian imports (exports) and the factors influencing the demand for these. From these relationships are evaluated the elasticities of demand with reference to the factors taken as influencing the demand (domestic as well as foreign). In addition to the common factor, viz. price, some special factors are considered depending upon the commodity under consideration.

This project was first taken up for study in the department of Research and Statistics during the early part of the year 1949 with a view to get a rough idea of the probable effects of 'Devaluation' on India's trade and economy. In this connection the discussions with Mr. V. G. Pendharkar and Dr. N. S. R. Sastry have been very much helpful to us while finding out the economic relationships. Later on, towards the end of the year 1949, this study was taken up for discussion as one of the research projects in Prof. Herman Wold's Research Seminars conducted in the Indian Statistical Institute, Calcutta, for which one of the authors of the present article, has been deputed by the Reserve Bank. Thereupon, at the suggestion of Prof. Wold, it was decided to continue this study as one of the projects of these seminars, and the present article, therefore, is the outcome of these attempts. It is needless to say that we are very much indebted to Prof. Wold for his helpful comments which gave us an opportunity to prepare this revised version of our article. In particular, the suggestion given by him to introduce the expressions 'short run elasticities' and 'long run elasticities' for elasticities calculated from the two regressions with and without 't' (time) as an explanatory variate, lead to much improvement in the results. It may also be mentioned that most of the difficulties that arise in connection with the methods to be used in the analysis were discussed extensively in his research seminars conducted at Calcutta.

### 2. METHOD OF ANALYSIS

2. The regression that is used in the analysis of this paper is of the following type, fitted to the data by means of least squares method:

$$X_1 = \alpha + \beta X_2 + \gamma X_3 + \delta X_4 + \dots \quad \dots (1)$$

where  $X_1$ ,  $X_2$ ,  $X_3$  and  $X_4$  are the variables used in finding the relation. There is much vagueness and controversy about the interpretation of these regression

relations in demand analysis. The methods to be used in such cases have been discussed by Schultz (1938), Frisch (1934), and Wold (1940). However, it would be helpful to add a few comments on the significance of the above relation (1) used in our present demand analysis.

2.1. *Interpretation of regression relation:* In the application of such a regression relation, we may distinguish between two purposes. One is as an *estimation* and the other as a (*causal*) *relationship*. In the former case it is purely a matter of estimation of  $X_1$  for given  $X_2, X_3, X_4$  etc. The problem here would be one of statistically estimating the value of  $X_1$  for a set of values representing  $X_2, X_3, X_4$  etc. which are taken as independent variates. The second purpose would be to derive a causal relationship of the same type as exists in regression relations based on experimental data between the variable  $X_1$  on the one hand, and  $X_2, X_3, X_4$  etc. on the other. Regression relations that allow such a causal interpretation are desirable in demand analysis. It may be disputed whether the regression relation of the type (1) allows of such a causal interpretation or not. This however, is an economic question and not a statistical one, and the above relation may serve, for all practical considerations, as a first approximation of a causal relation between the value of imports (exports) and the explanatory factors (prices, income etc.)

2.2. *Elimination of trend:* The introduction of time ( $t$ ) as an explanatory variable in the demand relation is again a disputable point. Though the time ( $t$ ) by itself cannot explain anything about demand, the main argument in favour of removing trends is that the variations in demand may be the result of a good many factors which cannot be statistically measured and incorporated explicitly in the demand relation. At the same time it is to be noted that the elimination of trend makes it impossible for the analysis to explain long run movements that may be present in the demand; for, when removing trend the analysis instead concentrates on the short run fluctuations in the data. In such a situation, we may—when studying how demand reacts upon price changes and income changes—attempt to reconcile both these view points by distinguishing between the two terms, namely *short run elasticity* and *long run elasticity*. With this distinction we have in the following calculated both the short run and long run elasticities—the former category being from those relations in which time is introduced as a variable and the latter from those in which time is not introduced as a variable. In some cases, however, it has become difficult to obtain plausible results and the corresponding results for them are not given in this article. Both these categories of elasticities are evaluated and given in each case.

2.3. *Elasticity of demand:* From the above relation given in (1), the elasticity of demand in the case of each explanatory factor is given as a ratio in the following manner:

\*On a suggestion from Prof. Wold during his Research Seminars at Calcutta, a detailed discussion of this point is taken up by constructing model series, and we hope to publish this in due course as a separate paper.

## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

Elasticity of demand for  $X_1$  with respect to the factor  $X_2 = E(X_1)$

$$\begin{aligned} &= \frac{\bar{X}_1}{dX_1} \bigg/ \frac{\bar{X}_2}{dX_2} \\ &= \frac{\bar{X}_1}{\bar{X}_2} \cdot \frac{dX_2}{dX_1} \\ &= \frac{\bar{X}_1}{\bar{X}_2} \times \beta \quad \dots (2) \end{aligned}$$

Similar is the case for the other elasticities of demand with respect to the remaining explanatory variables. (The bars denote the average values during the period under consideration). These are the proportionate changes in the volume of imports or exports ( $X_1$ ) relative to the proportionate changes in each of the variables like prices, income etc. (i.e.  $X_2, X_3$  etc.)

### 3. INDIAN DEMAND FOR IMPORTS

Before finding out any relation in respect of Indian imports as a whole, it may be useful to note the contribution of different countries to Indian imports. Percent value of imports (into India) contributed by individual countries of the world are given below.

countries	percent value of Indian imports during 1934-39
U.K.	35.2
Japan	14.1
Germany	8.6
Burma	7.0
U.S.A.	6.7
Kenya Colony	2.6
Holland	1.9
Italy	1.6
Rest	22.1
total	100.0

It will be noticed from the above that more than one-third of Indian imports, during the pre-war period considered, are from the United Kingdom. Next in importance comes Japan, followed by Germany, Burma and the U.S.A.

3.1. *Demands for imports as a whole* : The important factors which may be considered in this connection are national income, industrial activity and import price. During the pre-war year 1938-39, producers' goods including imported machinery accounted for nearly 41 per cent of India's imports and consumers' goods including luxury goods for 38 percent. The variations in demand for the former category of goods would be explained partially by the domestic industrial activity while those in demand for the latter category of goods would be explained by the National Income of India. But due to lack of National Income estimates for India, this explaining variate could not be taken into consideration, and the index of industrial activity is used instead to meet both the purposes. It may, however, be noted that most of the Indian industrial demand is derived from income only, as Indian industries produce mainly consumers' goods. In order, therefore, to find out a demand function in respect of Indian imports as a whole,

we have related the changes in the volume of imports to both the industrial activity and the import prices in India.

3.2. *Data utilised* : The data utilised for this purpose are the quantum and price index numbers of imports (with 1927-28=100, as base) published by the D.G.C.I. & S., Calcutta, and the index numbers of industrial activity published by the 'Capital'. One adjustment has been made in respect of the import price index as the year to year variations in tariff were not taken into account while constructing that index. In order, therefore, to get a price index adjusted for these changes, the total due collected on imports is added to the gross value of imports during the corresponding years and so a value index is obtained with the year 1927-28=100 as base. This value index has been divided by the quantity index in order to get the price index. These indices are then corrected for the home price level by using the Bombay cost of living index. The series thus obtained and the series of industrial activity indices earlier mentioned are used as explaining variates while the quantity index has been taken as the dependent variable. All these series have been reduced to index numbers with 1927-28=100 as base; the period covered being 1927-28 to 1937-38. The following table gives the index numbers utilised for the relation.

STATEMENT SHOWING INDEX NUMBERS OF IMPORT QUANTITY, IMPORT PRICE AND INDUSTRIAL ACTIVITY IN INDIA

year	index of import quantity	index of import prices adjusted for duty & home price level			index of industrial activity
		import price index	home cost of living	relative price index	
t	X <sub>1</sub>			X <sub>2</sub>	X <sub>3</sub>
1927-28	100.0	100.0	100.0	100.0	100.0
1928-29	110.9	91.4	96.8	94.7	99.9
1929-30	109.0	89.0	90.9	91.8	100.0
1930-31	87.0	80.0	84.9	84.2	104.8
1931-32	74.4	75.3	71.8	104.9	104.3
1932-33	85.7	70.1	71.2	98.8	104.5
1933-34	76.3	68.2	65.6	104.0	112.6
1934-35	88.3	64.7	64.2	103.0	124.9
1935-36	91.3	65.4	65.0	90.2	129.3
1936-37	86.1	64.7	68.3	97.6	134.8
1937-38	95.7	70.1	69.8	109.6	143.2

3.3. *Indian demand for imports in general* : Calculations based on the above figures give us the regressions of annual variations in the volume of imports (X<sub>1</sub>) and annual variations in the adjusted import price (X<sub>2</sub>) and the domestic industrial activity (X<sub>3</sub>) during the period 1927-28—1937-38, with and without a time factor (t) to eliminate trend, as:

$$X_1 = -10.42 - 0.35 X_2 + 1.55 X_3 - 8.34 t \quad \dots (3a)$$

(R = 0.88)

$$X_1 = 207.71 - 1.46 X_2 + 0.24 X_3 \quad \dots (3b)$$

(R = 0.58)

## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

The multiple correlation ' $R$ ' in the former case (3a), namely, in the relation where the trend has been eliminated by introducing the variable  $t$ , indicates that the variables used in the relations explain nearly three-fourths of the variations in the volume of imports, while the multiple correlation in the latter case (b) does not give such a satisfactory explanation of the variations in imports (explaining only one-third of the variations). We obtain from the relation (3a) the mean short run elasticities with reference to price and industrial activity as  $-.38$  and  $+2.01$  respectively. From this we conclude that 10 per cent rise in the index of domestic industrial activity at its average level, during the period, is accompanied by an increase in the imports by nearly 20 per cent. In other words the demand with respect to industrial activity is 'elastic' while it is inelastic (moderately) with respect to import price, thereby meaning that any rise in import price of foreign goods will not decrease our imports in the same proportion. The long run elasticities obtained from the relation (3b) do not, however seem to be satisfactory [ $(X_1) = -1.61$ ,  $(X_2) = +0.31$ ].

3.4. *Comparison with other countries*: It may be of interest to note, at this stage, the employment elasticity and price-elasticity for British imports (Chang, 1946) which are more or less, of the same order as those obtained for short run elasticities in the case of Indian imports. It is also desirable to compare the elasticities obtained in the case of India with other agricultural countries of the World. In a study (Chang, 1945-46) on "International comparison of various elasticities of demand for imports, during the inter-war period 1924-1938", Chang evaluated the income and the price elasticities in respect of almost all prominent countries of the world, grouping them as (i) industrial, (ii) agricultural and (iii) mining. Viewed from this classification one would expect that in the case of an agricultural country like India (in this case he has not calculated any elasticities) the income-elasticity would be lying between 2 and 3, while actually the short run elasticity with respect to industrial activity is 2.01 following very satisfactorily the classification of countries made according to the income-elasticities by Chang. The price-elasticity also (obtained in the present paper for Indian imports as equal to  $-.38$ ) compares very favourably with those of its sister-countries.

### 4. DEMAND FOR CERTAIN INDIAN IMPORTS

We may now turn our attention to individual items of imports with a view to study the demand with reference to some special factors that also influence the demand in addition to the import price. Accordingly a few important items, taken from the two categories of imports viz. producer and consumer goods have been considered here individually in order to see the major factors that influence the demand for them in India. The percentage coverage of these commodities during the three years, viz. 1923-24, 1937-38 and 1949-50 are given below to have a general idea about the extent of their importance in India's import trade.

PERCENT VALUE OF IMPORTS OF CERTAIN COMMODITIES TO TOTAL IMPORT VALUE

commodity	1923-24	1937-38	1949-50	category
(i) cotton piecegoods	26.2	7.8	2.3	consumer goods
(ii) cotton raw	1.1	7.0	11.3	producer goods
(iii) motor vehicles	1.6	3.0	1.7	consumer goods
(iv) chemicals	0.9	1.9	1.4	producer goods
(v) hardware	1.0	1.0	1.1	producer goods
(vi) tobacco	1.0	0.5	0.4	mainly producer and partly consumer goods
(vii) dyes	1.3	2.3	1.7	producer goods
(viii) machinery of all kinds	8.9	9.9	18.8	producer goods

4.1. *Indian demand for imports of cotton piecegoods*: The imports of cotton piecegoods constitute a very important item being about 15 to 20 per cent of the total import trade of India during the period 1935-40. Though the domestic cotton mill industry expanded rapidly under tariff protection in the thirties, it was not able to satisfy completely the home demand. The Swadeshi movement was also partly responsible for reducing the consumption of foreign textiles. As a result of these, imports of foreign cotton piecegoods have shown a declining tendency.

India's imports under this item have their origin mainly in two countries, viz. the United Kingdom and Japan, the proportions distributed between these two countries being 57.6 per cent and 40 per cent respectively during the five year period 1934-39, before war. The following demand relations refer to the over-all demand by India from these two countries pooled together during the period 1923-24 to 1937-38.

$$X_1 = 189.55 - 0.20 X_2 - 0.30 X_3 - 5.53 t \quad \dots (4a)$$

( $R = 0.83$ )

$$X_1 = 404.53 - 1.77 X_2 - 1.09 X_3 \quad \dots (4b)$$

( $R = 0.79$ )

where  $X_1$  = index of volume of cotton piecegoods imports;

$X_2$  = index of import price (including customs duty) adjusted for home price level of cotton piecegoods;

$X_3$  = consumption of raw cotton by Indian mills (a special factor).

average elasticity with respect to price	<i>short run elasticity</i>	<i>long run elasticity</i>
" " " consumption of raw cotton by Indian mills	-0.32	-2.10
	-0.46	-1.60

The value of the square of the multiple correlation coefficient shows that more than two-thirds in the case of (4a) and slightly less than two-thirds in (4b) of the variation in the volume of imports of this item is explained by the factors considered here. The short run elasticities in both these cases turn out to be very much below unity, indicating thereby that during the period considered the demand for the

## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

goods under this item was 'inelastic' with respect to both the import of these and the consumption of raw cotton in Indian mills. This indicates that, irrespective of whether there was rise or fall in the case of these two factors, the demand for foreign cotton manufactures continued unabated. The high coefficient in the case of the factor  $t$  (time) may be due to the combined effect of the development of the textile industry under tariff protection, the boycott of foreign cloth during the period, the residual demand for special varieties of cloth not produced in India, and also agreements with Lancashire and Japan to import certain quantity of their cotton piecegoods in return for the off-take of raw cotton. On the other hand, from the relation (4b) we obtain the corresponding long run elasticities to be  $-2.10$  and  $-1.66$  indicating that the demand is 'elastic' with reference to both these factors. This, however, does not seem to be plausible as there is a marked fall in imports since 1930 without a corresponding rise in the import prices which is mainly due to the Swadeshi movement and other causes mentioned above.

4.2. *Elasticity of substitution* : It will be of interest to calculate the price elasticity of substitution between imported and home produced cotton piecegoods in India. For this purpose, we have obtained a simple regression equation of the type.

$$\frac{q_1}{q_2} = \alpha + \frac{p_1}{p_2} \beta + \gamma t \quad \dots (5)$$

where  $q_1$  and  $q_2$  are indices of volume of imported and home produced cotton piecegoods respectively;  $p_1$  and  $p_2$  are the corresponding price indices, and  $t$  denotes time. The regression equation obtained is (period considered being 1923-24 to 1937-38)

$$\frac{q_1}{q_2} = 142.47 - 0.243 \frac{p_1}{p_2} - 7.206 t \quad \dots (6)$$

$$(R = 0.86)$$

Price elasticity of substitution =  $-0.38$

The low price elasticity of substitution might be due to the fact that goods produced in India have not formed a good substitute for imported goods, as they are in general of superior variety. It is interesting to have separate demand relations with respect to each of these two countries (viz. U.K. and Japan) of origin since the U. K. enjoyed many concessions as against the heavy restrictions (in the way of tariffs) imposed on Japanese cotton piecegoods imports. In this connection T.C. Chang's result (1948) regarding the elasticity of substitution between the imports of cotton piecegoods from Japan and U.K. into the Indian market gives us useful details. He obtains this elasticity as  $-1.04$  (with correlation coefficient  $= -0.81$ ), which means "that a change in the relative prices induces a more than proportionate change in the relative quantities."

4.2. *Indian demand for imports of raw cotton* : India occupies an important place among the cotton-growing countries of the world; but the cotton grown here is

not of the long staple variety needed for production of higher counts of yarn. Indian mills, which have specialised in the production of these higher counts of yarn, have therefore to import a large portion of the cotton from foreign countries. Nearly four-fifths of the imports of this item comes from Kenya Colony, Egypt and Anglo-Egyptian-Sudan while ten per cent of the imports are covered by the U.S.A. cotton, during the five-year period 1934-39. Due to intense demand for locally-made cotton piecegoods of all descriptions, large quantities of cotton for production of goods of higher counts have been imported since 1930. Below are given the demand relations obtained for the period 1923-24 to 1937-38.

$$X_1 = 501.33 - 2.70 X_2 + 0.44 X_3 - 18.63 t \quad \dots (7a)$$

$$(R = 0.87)$$

$$X_1 = 516.30 - 3.24 X_2 + 0.35 X_3 \quad \dots (7b)$$

$$(R = 0.87)$$

where  $X_1$  = index of volume of raw cotton imports;

$X_2$  = index of import price (including customs duty) adjusted for home price level of raw cotton;

$X_3$  = production of cotton yarn of counts higher than forty (a special factor).

	<i>short run</i> <i>elasticity</i>	<i>long run</i> <i>elasticity</i>
average elasticity with respect to price	-0.74	-0.80
"    "    production of yarn of fine counts	+0.04	+0.75

Nearly three-fourths of the variation in the volume of imports of this item during the period under review is explained by the factors considered in both the cases. The demand happens to be 'inelastic' with respect to both the factors, in the case of the short run as well as long run elasticities. Both the relations seem to give plausible results, time ( $t$ ) playing a negligible part here. The correlation coefficient between the index of import quantity and the production of higher counts of yarn is also as high as 0.8. It is, however, interesting to note the similarity in the (short run) demand elasticities of cotton piecegoods and raw cotton.

4.4. *Indian demand for imports of motor vehicles*: Though the United Kingdom has been the main supplier of articles under this item, the U.S.A. and Canada (combined) form the major suppliers of motor vehicles capturing nearly fifty per cent of India's imports of these upto the end of the year 1930-31. During the period after 1930-31, the imports from U.S.A. and Canada have declined while those from the U.K. have increased to more than fifty per cent. The demand relations obtained for the period 1923-24 to 1937-38 are given below.

$$X_1 = 533.18 - 4.48 X_2 + 0.94 X_3 + 3.60 t \quad \dots (8a)$$

$$(R = 0.69)$$

$$X_1 = 489.60 - 3.09 X_2 + 1.00 X_3 \quad \dots (8b)$$

$$(R = 0.67)$$



## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

where  $X_1$  = index of volume of imports of motor vehicles;  
 $X_2$  = index of import price adjusted for home price level;  
 $X_3$  = net taxable income in real terms (a special factor).

	<i>short run elasticity</i>	<i>long run elasticity</i>
average elasticity with respect to price	-2.63	-2.25
"    "    net taxable income	+0.87	+0.93

The relations in this case turn out to be not so satisfactory as in the previous cases, the square of  $R$  being 0.48 and 0.45 in the two cases, showing thereby that not even half of the variation in the import quantities of the item of demand under consideration has been explained by the above two explaining factors. It is however possible to improve this total correlation by introducing two important factors, viz. (a) the number of vehicles already in use and (b) the mileage of newly constructed roads during each year. But unfortunately these statistics are not available in India. The high elasticity with respect to price, as obtained here, may be expected since the majority of these vehicles can be taken as luxury goods. It is highly interesting to note that the short and the long run elasticities (with respect to both the factors) are of the same order.

4.5. *Indian demand for imports of chemicals* : The major portion (nearly 65 per cent of total import value during 1934-39) of Indian imports under this item are from the United Kingdom. Sodium Carbonate features prominently among the various kinds of chemicals that are imported. The demand for the imports of these chemicals was dependent more or less on the import price of these alone, as the home production could not stand the foreign competition due to the non-existence of any tariff wall until 1931. Especially in the case of chemical salts, home industry could not stand foreign competition in spite of the many advantages given to the domestic industry. The demand relations for the period 1923-24 to 1932-1933 obtained in the case of India's imports of this article is given below.

$$X_1 = 167.52 - 1.80 X_2 + 0.89 X_3 + 1.68 t \quad \dots (9a)$$

$(R = 0.96)$

$$X_1 = 187.14 - 2.29 X_2 + 1.12 X_3 \quad \dots (9b)$$

$(R = 0.95)$

where  $X_1$  = index of volume of imports of chemicals;  
 $X_2$  = index of import price (including customs duty) adjusted for home price level;  
 $X_3$  = index of industrial production (a special factor)

	<i>short run elasticity</i>	<i>long run elasticity</i>
average elasticity with respect to price	-1.06	-1.34
"    "    industrial production	+0.80	+1.00

The multiple correlation indicates a satisfactory explanation (in both the cases) by means of the two factors considered here. Between these two factors

again, price seems to be the chief influence as the correlation coefficient between the volume of imports and the price is as high as  $-0.83$ . The mean elasticity of demand in this case may be taken to be 'elastic' which is prominently clear from the long run elasticity. In the case of the elasticity demand with respect to industrial production, however, the demand may be considered to be 'inelastic' as in both the cases the elasticities do not exceed unity. This seems to be reasonable as some of the imported chemicals are used in laboratories and some as agricultural manure, the effects of the demand for which cannot be assessed so very easily. It may be observed that the long run elasticities with respect to both the factors are slightly higher than the short run elasticities.

4.6. The imports under this item comprise agricultural implements, builders' hardware, lamps' metal and other miscellaneous articles of common use. About one-third of India's imports of these were supplied by the U. K., whereas Germany also contributed an equal portion. The demand relations for the period 1923-24 to 1937-38 are given below.

$$X_1 = 465.35 - 3.80 X_2 + 12.04 t \quad \dots (10a)$$

$$(R = 0.95)$$

$$X_1 = 511.50 - 3.28 X_2 \quad \dots (10b)$$

$$(R = -0.68)$$

where

$X_1$  = index of volume of imports of hardware;

$X_2$  = import price (plus duty) adjusted for home price level.

	<i>short run elasticity</i>	<i>long run elasticity</i>
average elasticity with respect to price	- 1.35	- 1.16

Both the elasticities indicate that the demand with respect to import price in this case is elastic, which is plausible, and judging from the correlation also the results are satisfactory.

4.7. *Indian demand for imports of tobacco:* The United Kingdom and the United States seemed to have shared in almost equal proportions the supplies of tobacco to India each contributing nearly 50 per cent of India's imports under this item. The only explaining variable considered in this case is the import price of tobacco, after deflating it by home price level and the demand relations are given below.

$$X_1 = 207.52 - 0.09 X_2 - 3.09 t \quad \dots (11a)$$

$$(R = 0.03)$$

$$X_1 = 234.06 - 1.09 X_2 \quad \dots (11b)$$

$$(R = -0.70)$$

where  $X_1$  = index of volume of imports of tobacco ;

$X_2$  = import price (including duty) index deflated by home price level of tobacco.

	<i>short run elasticity</i>	<i>long run elasticity</i>
average elasticity with respect to price	- 1.20	- 2.03

## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

The demand relation (11a) shows that more than four-fifths of the variation in the volume of imports under this item is accounted for by the import price and time,  $t$ . This must have been due to the fact that most of this imported tobacco is unmanufactured and so is utilized in making cigarettes etc. The demand naturally is dependent mostly upon price and is elastic in both the cases. The two results, the long run elasticity as well as the short-run, are plausible.

4.8. *Indian demand for imports of dyes:* More than three fourths of the imports under this item during 1934-39 are from Germany, which is well-known for supply of high quality dyes. The demand relations during the period 1923-24 to 1932-33 are given below.

$$X_1 = 124.39 - 0.47 X_2 + 7.19 t \quad \dots (12a)$$

$$(R = 0.72)$$

$$X_1 = 115.02 - 0.12 X_2 \quad \dots (12b)$$

$$(R = -0.31)$$

where

$X_1$  = index of volume of imports of dyes;

$X_2$  = import price index adjusted for home price level.

	<i>short run elasticity</i>	<i>long run elasticity</i>
average elasticity w.r.t. price	- 0.62	- 0.16

The demand with respect to price is moderately inelastic in the first case giving the short-run elasticity as -0.62. This seems to be reasonable as the German dyes are famous for their quality, with the result that many countries import these irrespective of the price demanded for them. But the very low figure in the case of the long run elasticity will have to be accepted with some caution, especially due to indigenous materials being used during the Swadeshi movement in the new mills started in the South. Even the correlation coefficient in this case is not significant.

4.9. *Indian demand for imports of machinery of all kinds:* This is a big item of our import trade as nearly one-sixth of India's imports are covered by this item during recent years. The percentage shares during the five-year period ending 1938-39 show that nearly two-thirds of the value of these goods are imported from the U. K. itself, while Germany and the U. S. A. together cover as much as 23 per cent only. The demand relation in this case for the period 1927-28 to 1937-38 are given below.

$$X_1 = -144.83 - 0.14 X_2 + 2.73 X_3 - 13.35 t \quad \dots (13a)$$

$$(R = 0.95)$$

where

$X_1$  = quantity index of imports of machinery;

$X_2$  = price " " adjusted for home price level,

$X_3$  = index of industrial activity in India (a special factor).

	<i>short run</i> <i>elasticity</i>
average elasticity with respect to price	- 0.38
" " industrial activity	+ 4.44

As is evident from the mean elasticity of demand obtained above with respect to Indian industrial activity the demand for imports under this item are highly elastic with respect to the industrial production in India. Price-elasticity, however, is very low as is to be expected indicating the 'inelastic demand' for machinery of all kinds into India.

For the sake of easy reference and comparison the above demand relations are all given in the following table with the standard errors shown in brackets.

SUMMARY TABLE SHOWING THE SHORT RUN AND LONG RUN ELASTICITIES OF DEMAND FOR INDIAN IMPORTS

commodity	regression coefficients with standard errors in brackets			elasticities mean elasticity w.r.t.				correlation coefficients
	A	$X_2$	$t$	price ( $E_p$ )		special factor ( $E_s$ )		
				short run	long run	short run	long run	
1. general imports	A	-0.35 (.649)	+1.55 (.402)	-8.23 (2.295)	-0.38		+2.01†	0.88
	B	-1.46 (.720)	+0.24 (.267)	—		-1.61	+0.31†	0.58
2. cotton piece-goods	A	-0.26 (1.734)	-0.30 (0.710)	-5.64 (3.799)	-0.32		-0.46*	0.83
	B	-1.77 (1.399)	-1.09 (0.478)	—		-2.19	-1.60*	
3. raw cotton	A	-2.70 (2.283)	+0.44 (0.077)	-18.63 (34.51)	-0.74		+0.94**	0.87
	B	-3.24 (1.851)	+0.35 (0.005)	—		-0.89	+0.76**	0.87
4. vehicles	A	-4.49 (1.687)	+0.94 (0.478)	+3.60 (7.132)	-2.53		+0.87††	0.69
	B	-3.99 (1.259)	+1.00 (0.424)	—		-2.25	+0.93††	0.67
5. chemicals	A	-1.80 (0.737)	0.89 (0.371)	1.68 (1.667)	-1.06		+0.8†	0.90
	B	-2.29 (0.628)	1.12 (0.273)	—		-1.34	+1.00†	0.93
6. hardware	A	-3.80 (0.531)		12.04 (1.353)	-1.35			0.85
	B	-3.28 (1.290)		—		-1.10		-0.58
7. tobacco	A	-0.70 (0.230)		3.00 (1.939)	-1.20			0.93
	B	-1.09 (0.289)		—		-2.03		-0.70
8. dyes	A	-0.47 (0.073)		7.19 (2.029)	-0.62			-0.72
	B	-0.12 (0.413)		—		-0.10		-0.31
9. machinery	A	-0.14 (0.184)	+2.73 (1.379)	-13.35 (8.826)	-0.38		4.44	0.03
	B	not a plausible result						

$X_1$  = quantity index of imports.  $X_2$  = price index.  $X_3$  = special factor.  $t$  = linear trend.

† Industrial activity. †† Not taxable income.

\* Consumption of raw cotton in Indian mills.

\*\* Production of yarn (of counts greater than 40) by Indian mills.

## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

### 5. FOREIGN DEMAND FOR INDIAN EXPORTS

In the case of Indian exports as a whole we notice, again, that the United Kingdom topped the list of important markets for Indian goods, taking as much as one-third the total value of Indian exports.

#### PERCENT VALUES OF INDIAN EXPORTS DURING 1934-39

U.K.	32.3
Japan	12.7
U.S.A.	9.3
Germany	4.8
France	3.7
Ceylon	3.6
Belgium	3.3
Italy	2.6
Netherlands	2.4
Burma	2.4
Rest	22.9

100.0

Japan followed the U.K. just as in the case of imports. The third place however was taken by the U.S.A. whereas in the case of imports, this country occupied a fifth place.

5.1. *Foreign demand for Indian exports as a whole*: Changes in various factors may be responsible for variations in the exports of a country. In the following an attempt is made to derive demand relations with a view to find out the effect of the most important factors on the foreign demand for India's exports in general. Two major factors may be considered for this purpose, viz. the changes in the real income of the importing countries and the changes in the price level of Indian exports deflated by the general price level of the importing countries.

5.2. *Data utilized*: As the eight countries, U.K., Japan, U.S.A., Germany, France, Netherlands, Australia and Canada account for nearly 68% of the total export of India during the quinquennium ending 1938-39, the figures of real income per head of working population (in international units) which are given by Colin Clark\* for the period 1924-37, are combined to form an index of real income for these eight countries with 1927-28=100 as base and the index that obtained has been used as the income factor. In the case of prices also we have constructed a combined price index for the above eight countries by taking a weighted average of the price indices\*\* for these countries, the weights being given on the basis of the contribution of each country to total world real income during the period 1925-34. The price index of Indian exports† is then deflated by the above price index.†† The series of relative price indices obtained in such a manner are utilised for finding the demand relation. The relevant data are given in the following table.

\*Conditions of Economic Progress. \*\*Published in the 'Statistical Year Book' 1939—League of Nations. †Constructed by D.G.C.I. & S. Calcutta with 1927-28=100 as base. ††Relative to the eight countries, U. K., U.S.A., Japan, France, Germany, Australia, Netherlands and Canada.

STATEMENT SHOWING INDEX NUMBERS OF EXPORT QUANTITY, EXPORT PRICE AND WORLD REAL INCOME

year	index of export quantity	index of export prices adjusted for world price level			index of real income of importing countries	index of industrial activity
		export price index	world price index	relative price index		
t	X <sub>1</sub>			X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>
1927-28	100.0	100.0	100.0	100.0	100.0	100.0
1928-29	107.3	97.1	100.9	96.2	104.1	99.9
1929-30	109.2	93.9	98.8	95.0	102.0	109.0
1930-31	97.7	80.6	88.5	91.1	94.1	104.8
1931-32	83.4	72.2	76.4	94.5	87.4	104.3
1932-33	75.7	65.7	69.5	94.8	80.0	104.5
1933-34	87.2	83.0	69.8	91.5	82.4	112.5
1934-35	88.8	63.4	74.9	84.0	90.3	124.9
1935-36	89.4	67.3	77.4	74.3	94.4	129.3
1936-37	100.9	67.7	80.4	71.8	99.3	134.8
1937-38	103.1	60.1	95.8	62.7	102.6	143.2

5.3. *Foreign demand for India's exports in general:* On the basis of the figures the following demand relations are found out using the usual regression analysis as in the case of imports. In addition to the export price (X<sub>2</sub>) and world real income (X<sub>3</sub>), another factor, namely, industrial activity in India (X<sub>4</sub>) is also taken as an explanatory variable in finding these demand relations.

$$X_1 = 133.87 - 0.87 X_2 + 1.21 X_3 - 0.66 X_4 - 0.10 t \quad \dots (14a)$$

(R = .05)

$$X_1 = 132.82 - 0.86 X_2 + 1.21 X_3 - 0.66 X_4 \quad \dots (14b)$$

(R = .95)

where X<sub>1</sub> = index of quantity of exports from India ;  
 X<sub>2</sub> = index of exports price adjusted;  
 X<sub>3</sub> = index of world real income;  
 X<sub>4</sub> = index of industrial activity in India (a special factor),

	<i>short run elasticity</i>	<i>long run elasticity</i>
average elasticity with respect to price	-0.78	-0.78
„ „ world real income	+1.19	-1.19
„ „ Indian industrial activity	-0.81	-0.81

## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

In both these cases the results seem to be satisfactory judging both from the multiple correlation  $R$  and from the short run and long run elasticities with respect to each of the explaining factors. It is interesting to note that the effect of  $t$ , the time factor, is negligible especially when we see that the short run elasticities are all equal to the long run elasticities. The demand with respect to export price as also with respect to Indian industrial activity is 'moderately inelastic' while that in respect of world income is slightly elastic.

6.4. *Comparison with other countries* : It may be interesting at this stage to compare the present income elasticity of demand with those obtained by Chang (1948) in his 'A Statistical Note on World Demand for Exports'. The countries whose elastic demand with respect to world real income compares very favourably with India are Japan and Switzerland under the group of 'relatively less industrialised type' countries and British Malaya and South Africa under the group of 'mining and raw-material producing type' countries. This seems to give us a plausible comparison and it is true also that India has been gradually changing over from 'raw material producing type' to 'less industrialised type'. The price elasticity, however, is slightly higher than the ones noticed in the case of the countries of the above two types.

### 6. FOREIGN DEMAND FOR CERTAIN EXPORTS

We shall now study in detail the nature of the foreign demand for certain individual commodities of export. The percentages of the total value of exports covered by each of these commodities during the three years, 1923-24, 1937-38 and 1949-50 are given in the following table, in order to have an idea of the importance of these commodities in India's export trade.

PERCENT VALUE OF EXPORTS OF CERTAIN COMMODITIES TO TOTAL EXPORT VALUE

commodity	1923-24	1937-38	1949-50	category
i. groundnut	2.1	4.9	2.0	producer goods
ii. skins (raw) and iii. hides (raw)	2.0	2.7	1.4	producer goods
iv. hides & skins (dressed)	1.7	4.0	4.0	consumer goods
v. tea	9.1	13.5	15.8	consumer goods
vi. jute manufactures	12.1	10.1	20.6	consumer goods (packing purposes)
vii. linseed, and	2.8	2.0	1.0	producer goods
viii. paper	0.1	—	3.0	consumer goods

6.1. *Europe's demand for India's exports of groundnut* : India ranked first in the exports of groundnut. France, Germany, Netherlands, U.K. and Italy are

the chief importers of groundnut. The export demand is primarily dependent on the demand for groundnut oil in the consuming countries. In Europe, groundnut oil is used both for edible and industrial purposes. In India it is consumed as an edible oil for cooking purposes and a main constituent of Vanaapati. This may be another factor affecting the exports but it could not be taken into account due to lack of data. The prices of groundnut quoted at London are taken to be representative of the world prices. The following are the demand relations obtained for the period 1929-30 to 1939-40.

$$X_1 = 43.20 - 0.87 X_2 + 1.24 X_3 - 2.00 t \quad \dots (15a)$$

$$(R = 0.75)$$

$$X_1 = 67.68 - 0.75 X_2 + 0.85 X_3 \quad \dots (15b)$$

$$(R = 0.72)$$

where

$X_1$  = index of quantity of groundnut exported;

$X_2$  = index of prices quoted at London;

$X_3$  = index of industrial production in Europe excluding U.S.S.R.  
(a special factor)

	<i>short run elasticity</i>	<i>long run elasticity</i>
average elasticity with respect to price	-0.72	-0.62
,, industrial production in Europe	+1.36	+0.03

Both the short run and long run elasticity show an inelastic demand for the exports of groundnut with respect to prices quoted at London, whereas in the case of those with respect to industrial activity in Europe there is a difference, the former indicating an elastic demand and the latter moderately inelastic.

0.2. *United States' demand for India's exports of raw skins* : India was the leading producer and exporter of sheep and goat skins accounting for nearly 19 per cent of the total world production during 1935-36 followed by the U.S.A., Australia and New Zealand which contributed 11 per cent, 9 per cent and 7 per cent respectively. India's position was unique in the international market as it was both the largest producer and exporter of raw skins in the world. During the interwar period, the direction of trade under this item was mainly towards the U.K. and the U.S.A., the latter being India's principal customer absorbing 40 to 60 per cent of its total exports. The demand relations in the case of the U.S.A. during the period 1929-30 to 1938-39 are given below.

$$X_1 = 2.43 - 3.40 X_2 + 4.17 X_3 - 10.29 t \quad \dots (16a)$$

$$(R = 0.83)$$

$$X_1 = 15.35 - 0.49 X_2 + 2.46 X_3 \quad \dots (16b)$$

$$(R = 0.73)$$



### ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

where  $X_1$  = quantity of exports of raw skins;  
 $X_2$  = import price of goat skins in the U.S.A. adjusted for the  
 general price level in U.S.A.;  
 $X_3$  = index of production of leather goods in U.S.A. (a special factor)

	<i>short run elasticity</i>	<i>long run elasticity</i>
average elasticity with respect to price	-0.40	-0.07
„ in production of leather goods in U.S.A.	+1.71	+1.01

The demand with respect to price is inelastic while it is elastic with respect to leather goods production in the U.S.A. Though there is not much difference in the nature of demand shown by the short run and long run elasticities, the latter elasticities indicate a highly inelastic demand with respect to price and a just elastic demand with respect to leather goods production in U.S.A.

6.3. *Europe's demand for India's exports of raw hides*: Central European countries, particularly Germany had been important buyers of raw hides from India during the inter-war period. During the year 1936-37 India accounted for 18.8% of the total world hide production, and was followed closely by the U.S.S.R. and the U.S.A. Argentina and Brazil are the chief exporters while India ranks fifth. Indian hides are lighter and exported in dry condition while Argentina hides are heavy and are exported in wet-salted condition. The demand relation obtained for the period 1928-29 to 1937-38 is shown below.

$$X_1 = -26.10 - 1.72 X_2 + 3.79 X_3 - 10.23 t \quad \dots (17a)$$

( $R = 0.87$ )

where  $X_1$  = quantity of raw hides exported;  
 $X_2$  = price index of raw hides;  
 $X_3$  = index of industrial production in Europe excluding U.S.S.R.  
 (a special factor).

	<i>short run elasticity</i>
average elasticity with respect to price	-1.10
„ production in Europe	+3.64

With respect to both the factors, namely, price and industrial activity, the demand abroad for India's exports of raw hides seems to be elastic, it being highly elastic in the case of the latter factor.

6.4. *United Kingdom's demand for India's exports of dressed hides & skins*: The U.K. has been the single largest buyer of these goods from India accounting for nearly 90% of the total exports of these. It is also interesting to note that India

accounts for more than 80% of the total imports of tanned hides and skins into the U.K. So India virtually enjoyed a monopoly in the U.K. market as regards dressed hides and skins. The demand relation for the period 1929-30 to 1938-39 is given below.

$$X_1 = 811.04 - 1.12 X_2 + 1.45 X_3 - 5.95 t \quad \dots (18a)$$

$$(R = 0.89)$$

where  $X_1$  = quantity index of exports of tanned hides and skins;  
 $X_2$  = price index of exports;  
 $X_3$  = index of industrial production in the U.K. (a special factor).

	<i>short run elasticity</i>
average elasticity with respect to price	-1.03
“ industrial production in U.K.	+1.75

The U.K.'s demand with respect to industrial production is fairly elastic from the above result while the price elasticity, which is nearly unity, indicates that the demand may be just elastic with respect to price.

6.5. *United Kingdom's demand for India's exports of tea* : U.K. is the chief market importing nearly 70 to 80 per cent of our total exports of tea. It is also important to note that tea is one of India's major export commodities. The demand relation for the period 1923-24 to 1936-37 is given below.

$$X_1 = 101.26 - 0.11 X_2 + 0.19 X_3 - 1.68 t \quad \dots (19a)$$

$$(R = 0.70)$$

where  $X_1$  = quantity index of exports of tea;  
 $X_2$  = index of import price of tea in U.K.  
 $X_3$  = index of real income in U.K.

	<i>short run elasticity</i>
average elasticity with respect to price	-0.23
“ “ real income in U.K.	+0.21

In both cases the demand seems to be 'fairly inelastic' which is plausible on account of the fact that tea is a necessity in U.K. (and it may be noted that India produces this commodity in large quantities).

6.6. *United States' demand for India's exports of jute manufactures* : The chief market for Indian exports under this item is the United States of America,

### ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

accounting for nearly 27 to 35 per cent of India's total exports during the period under consideration. The demand relation obtained in this case for the period 1923-24 to 1930-37 is given below.

$$X_1 = 20.21 - 0.45 X_2 + 0.09 X_3 + 0.37 X_4 - 4.54 t \quad \dots (20a)$$

( $R = 0.95$ )

where  $X_1$  = index of volume of Indian exports under jute manufactures to the U.S.A.;

$X_2$  = export price index of jute manufactures;

$X_3$  = index of industrial production in the U.S.A.;

$X_4$  = price index of burlap in U.S.A. (a special factor).

	short run elasticity
average elasticity with respect to price	-0.47
"    "    industrial production	+0.70

The demand in both these cases (with respect to price and industrial production) seems to be inelastic which is plausible on account of the virtual monopoly enjoyed by India in the world market in respect of exports of jute manufactures.

0.7. *Europe's demand for India's exports of linseed* : U.K. and continental Europe are the chief markets for Indian linseed and Argentina is the chief competitor. Indian linseed is distinctly better than Argentine seed with regard to its oil-content (being about 4% higher) and Indian seed is quoted on a clean basis whereas Argentine allows for 4% refraction. The demand relation obtained for the period 1927-28 to 1937-38 is given below.

$$X_1 = 642.80 - 0.14 X_2 - 12.06 X_3 + 3.56 t \quad \dots (21a)$$

( $R = 0.92$ )

where  $X_1$  = exports of linseed from India;

$X_2$  = production of linseed in Argentina;

$X_3$  = percentage premium of the price of Calcutta seed over that of Argentine seed in London.

	short run elasticity
average elasticity with respect to price	-0.91
"    "    production in Argentina	-1.14

The demand with respect to price is moderately inelastic. The inseed production in Argentina (which is a competitor to India in exporting this commodity), it may be pointed out, has a powerful influence over the foreign demand for

SUMMARY TABLE SHOWING THE SHORT RUN AND LONG RUN ELASTICITIES OF DEMAND FOR INDIAN EXPORTS

commodity	regression coefficients with standard errors in brackets				mean elasticity w.r.t.				special factor		industrial activity		multiple correlation
	$X_1$	$X_2$	$X_3$	$X_4$	$t$	short run	long run	short run	long run	short run	long run		
	price		price		price		price		price		price		
1. general	A (-0.87) (.583)	-1.21 (.701)	-0.68 (.477)	-0.10 (.625)	-	-0.78	-	+1.10†	-	-0.81	-	-	0.95
B	(-0.80) (.625)	+1.21 (.186)	-0.68 (.464)	-	-	-	0.78‡	-	+1.10†	-	-	-0.81	0.95
2. groundnut	A (-0.87) (.583)	1.24 (.69)	-	-	-2.60 (3.308)	-0.72	-	1.36@	-	-	-	-	0.75
B	(-0.75) (.645)	0.84 (.307)	-	-	-	-	0.82	-	0.93@	-	-	-	0.72
3. raw skins	A (-3.40) (1.845)	4.17 (1.140)	-	-	-10.29 (5.420)	-0.40	-	1.71@	-	-	-	-	0.83
B	(-1.72) (1.172)	3.76 (.820)	-	-	-	-	-0.07	-	1.01@	-	-	-	0.73
4. raw hides	A (-1.72) (0.881)	3.76 (1.200)	-	-	-16.23 (4.921)	-1.19	-	3.64@	-	-	-	-	0.87
5. tanned hides and skins	A (-1.12) (1.148)	1.45 (0.507)	-	-	-5.05 (4.940)	-1.03	-	1.76@	-	-	-	-	0.89
6. tea	A (-0.11) (0.051)	0.19 (0.623)	-	-	-1.08 (1.667)	-0.23	-	0.21†††	-	-	-	-	0.70
7. jute manufactures	A (-0.45) (0.17)	0.60 (0.108)	-	-	-4.54 (1.725)	-0.47	-	0.76*	-	-	-	-	0.95
8. linseed	A (0.14) (0.020)	-0.2 (0.910)	-	-	(4.205)	-0.91	-	-1.14††	-	-	-	-	0.92
9. pepper	A (-1.67) (1.167)	0.910 (1.387)	-	-	-20.42 (14.387)	-1.3	-	-	-	-	-	-	0.94

$X_1$  = quantity index of exports.  $X_2$  = price index.  $X_3$  = special factor.  $X_4$  = linear trend.  $t$  = deflated price index. † Index of world real income. @ Index of industrial production in Europe (excluding U.S.S.R.). @ Index of production of leather goods in U.S.A. \* Index of industrial production in U.S.A. †† Index of industrial production in U.K. ††† Index of production of Linseed in Argentina. †††† Index of income in U.K. \* Index of industrial production in U.S.A.

## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

Indian linseed and this is reflected by the elasticity of demand with respect to production of linseed in Argentina.

6.8. *Foreign demand for India's exports of pepper:* Italy and the U.S.A. were the chief importers of pepper, accounting for nearly 43 per cent and 18 per cent of India's total exports under this item. Indonesia is the chief competitor. We could not obtain the price data of Indonesian pepper in order to study its effect on the demand for India's exports. As regards the price factor, we have taken the prices quoted at New York as representative of the world prices. It may be noted that of late, there is a very great demand from the U.S.A. for India's exports of pepper, thus enabling India to get more of dollar currency. The demand relation obtained for the period 1927-28 to 1936-37 is given below.

$$X_1 = 332.47 - 1.07 X_2 - 20.42 t \quad \dots (22a)$$

$$(R = 0.94)$$

where  $X_1$  = quantity of pepper exported;

$X_2$  = prices of pepper quoted at New York.

average elasticity w. r. t. price	<i>short run elasticity</i>
	-1.30

There is thus an elastic demand with respect to price in the case of this item of India's exports.

To sum up, in the table on page 328 are given all the demand relations with the standard errors shown in brackets.

### SUMMARY AND CONCLUSIONS

(1) During the inter-war period Indian demand for imports in general, was 'elastic' with respect to domestic industrial production and 'inelastic' with respect to import price, the U. K. contributing more than one-third of India's requirements, closely followed by Japan, a powerful competitor to the U. K. This result compares well and fits closely into the classification according to income-elasticities made by Chang in his 'international comparison of various elasticities of demand for imports during the inter-war period'.

(2) In the case of individual articles under imports, a few of which are considered here, the demand seems to be elastic (with respect to price) in respect of motor vehicles, chemicals, hardware, and tobacco, in the case of both the short run as well as long run elasticities. Demand for raw cotton, dyes and machinery of all kinds is, however, inelastic. The short run and the long run elasticities in the demand for imports of cotton piecegoods show divergent results, the former indicating inelastic demand while the latter shows elastic demand, the elimination

---

\*The observations are in this case dependent only on short run elasticities.

of trend playing a vital role. The price elasticity of substitution in the case of cotton piece-goods is also very low. The demands in the case of motor vehicles with respect to net taxable income and of chemicals with respect to domestic industrial production are moderately inelastic. Taking certain special factors into consideration it is found that the average elasticity of demand for cotton piece-goods with respect to mill consumption of raw cotton is very much below unity and that for cotton raw with respect to production of higher counts of yarn is slightly below unity (in the case of short run elasticities).

(3) Foreign demand for Indian exports in general is inelastic with respect to price, while that with respect to world real income is elastic. This result is borne out well both by the short run and long run elasticities of demand. The introduction of Indian industrial activity into the relation resulted in giving a good relation, the demand in this case being moderately inelastic. The income-elasticity obtained in the case of the demand for India's exports compares favourably with those countries falling into the types 'less industrialised' and 'mining and raw material producing'.

(4) Some of the articles of export like groundnut, raw skins, linseed, tea and jute manufactures, studied here, show an inelastic foreign demand with respect to price, while in the case of raw hides, tanned hides and skins, and pepper there is elastic demand. The two cases in which long run elasticities give satisfactory results are groundnuts and raw skins. Jute manufactures and tea are prime necessities in the U.S.A. and U.K. and India enjoy a virtual monopoly in one of these. It is significant to note that there is highly inelastic demand for exports of tea with respect to world real income.

(5) From the mathematical expression, viz.  $KEq (\epsilon_f + \epsilon_x - 1)$ , derived by Mrs. Robinson (on page 143 of 'Essays on the Theory of Employment') for the increase in the balance of trade, we know that the effect of exchange depreciation on the balance of trade of a country tends to be neutral when the sum of the two elasticities, namely, the price elasticity of home demand for imports ( $\epsilon_x$ ) and the price elasticity of foreign demand for exports ( $\epsilon_f$ ) equals unity provided that (a) initially the trade balances (i.e.  $E_q = I_p$ ) and (b) the home and foreign elasticities of supply are infinite. In addition, under the above conditions, the balance of trade turns out to be favourable or unfavourable according as  $(\epsilon_x + \epsilon_f)$  is greater or less than unity. It is, therefore, of interest to note, in the case of India, that the sum of these two elasticities which turned out to be greater than unity ( $\epsilon_x = 0.38$ ,  $\epsilon_f = 0.78$ ) during the inter-war period under consideration. These results no doubt indicate that had the demand elasticities continued to be of the same nature even afterwards, 'exchange depreciation' would be advantageous to India provided that the above conditions about supply elasticities hold good. This conclusion, however, may be considered to be only tentative as it may not apply to the present-day India due to the various changes (and very important too) that took place in the

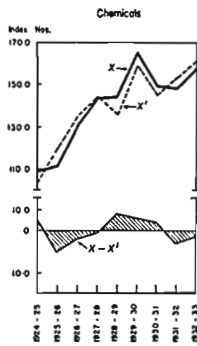
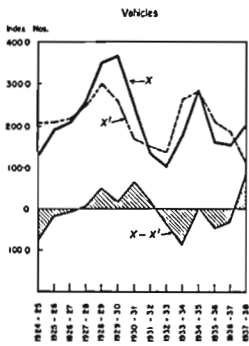
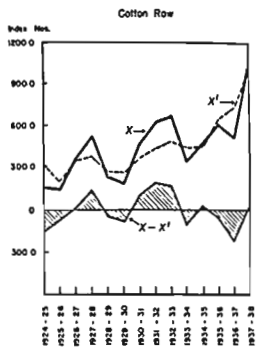
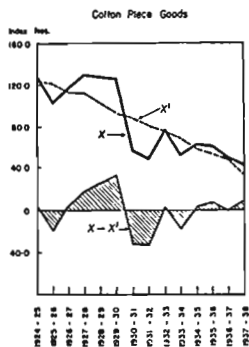
## ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

pattern of her trade during the post-war period, the chief among these changes being Partition.

### REFERENCES

- CHANG, T. C. (1915-40): International comparison of Demand for Imports. *Review of Economic Studies* 13, 63-67.
- (1940): The British demand for Imports in the inter-war period. *Economic Journal* 50, 189-207.
- (1948): A statistical note on world demand for exports. *Review of Economic and Statistics*, 30, 100-116.
- (1949): The demand for imports of United States in the inter-war period. *I. M. F., R. D.*, 611.
- FRISCH, R. (1934): Statistical confluence analysis by means of complete regression systems. Oslo Universitets Økonomiske Institutt.
- HOLEMAN, M. (1919): The U.S. demand for imports of certain individual commodities in the inter-war period. *I. M. F., R. D.*, 811.
- MURTI, V. N. AND SASTRI, V. K. (1950): Foreign demand for certain Indian exports. *Reserve Bank of India Bulletin*, 4, (May Number).
- MURTI, V. N. (1950): Foreign demand for Indian hides and skins. *Reserve Bank of India Bulletin*, 4, (October Number).
- ROBINSON, JOAN (1947): *Essays in the Theory of Employment*. MacMillan, London.
- SCHULTZ, H. (1938): *The Theory and Measurement of Demand*. Chicago University Press, Chicago.
- SINGHA, A. R. AND CHATTERJEE, T. P. (1940): A statistical study of foreign demand of raw jute. *Sankhyā*, 5, 422.
- WOLD, H. (1940): Efförfragen på jordbruksprodukter och dess känslighet för pris- och inkomstförändringar. *Status Off. Utr.*, No. 16.
- WOLD, H. (1945): A theorem on regression coefficients obtained from successively extended sets of variables. *Scandinavisk Aktuarietidskrift*, 1945, 181.

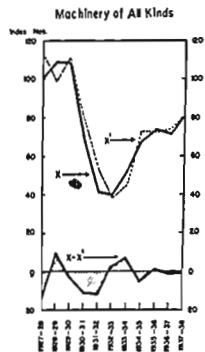
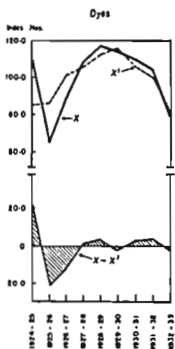
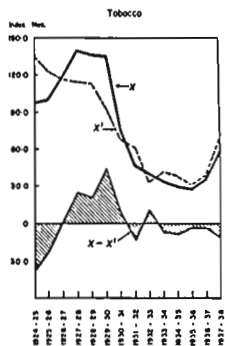
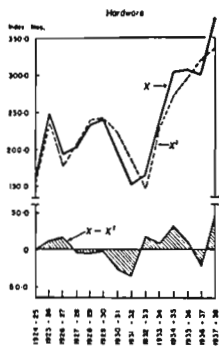
## IMPORTS





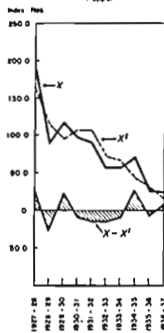
ELASTICITIES OF DEMAND FOR INDIAN IMPORTS AND EXPORTS

IMPORTS

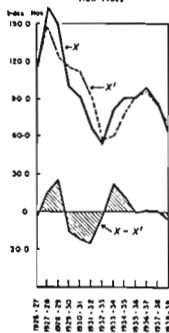


## EXPORTS

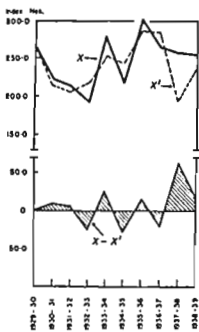
**Pepper**



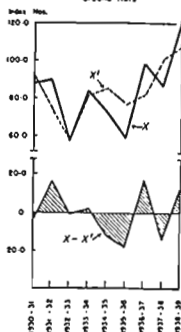
**Raw Hides**



**Raw Skins**

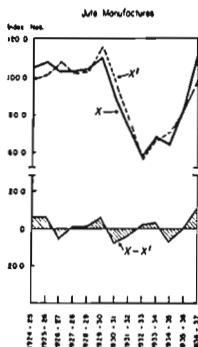
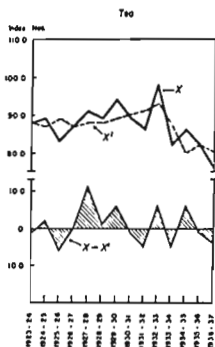
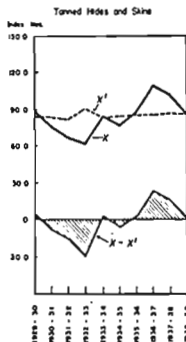
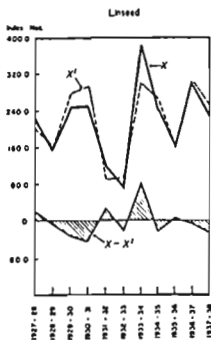


**Ground Nuts**



ELASTICITIES OF DEMANDS FOR INDIAN IMPORTS AND EXPORTS

EXPORTS



## Total Imports and Exports

