CHAPTER 2

CONCEPTUAL FRAMEWORK AND MEASURES OF IMPORT SUBSTITUTION

2.1 Definition

The phrase 'Import Substitution' has been subject to alternative meanings. One such is the definition adopted by neo- classical writers. They define IS strategy as the adoption of an effective exchange rate for the country's exports (EER_x) which is less than that for imports (EER_m). EER_x would include not just the rupees earned at parity from a unit dollar's worth of export, but also the export subsidy, tax credits and special credits and subsidies on inputs. (Similar to the concept of effective rate of assistance). Similarly EER_m would add to the parity any import duty, import premium resulting from quantitative restrictions and other incentives. If an import tariff is charged then the price of importables is raised relative to exportables. This results in a shift to domestically produced goods, exporting is discouraged by both the increased cost of imported inputs and the increased cost of domestic inputs due to domestic inflation or appreciation of the exchange rate, relative to the prices received by exporters. An overvalued exchange rate constitutes "bias against exports" (refer Appendix-I), concept that has been described in Bhagwati (1988) Little, Scott and Scitovsky (1970) and Balassa (1971).

Chenery (1960) defines IS in a different manner. He defines import substitution with reference to the proportion of imports in total supply. If domestic production rises faster than imports, import substitution is taking place and if imports rise more rapidly than, perhaps domestic output, then import liberalization is occuring. Chenery apportions the growth in domestic output (i) to growth in demand (on the assumption that a constant proportion of total supply is imported) and (ii) to the change in the ratio of imports to total supply, which he calls Import Substitution. Chenery (1987) has used identities to decompose observed growth of output in an industry into components attributed to export promotion, import substitution and intermediate use. The decomposition is a statistical description and does not relate to the incentive based definition of the trade strategy described earlier.

He views economic growth as one aspect of transformation of the structure of production that is required to meet the changing demands. He has used both the supply and demand conditions to determine the changes in industry. He has used the Walrasian model with modifications by including international trade and intermediate goods to analyse the growth pattern.

The sources of growth on the supply side are based on the basic neo-classical growth equation, $G_v = G_a+b_kG_k+b_lG_l$, where G_V, G_a, G_k and G_l are growth rates of aggregate output (value added), total factor productivity, capital and labour respectively. b_k and b_l are elasticities of output with respect to capital and labour input. G_a is measured as the elasticity of output with respect to time.

He then uses the corresponding break-down on the demand. The result of this is that there is now a demand side view, of factors, leading to the structural change and growth that is consistent with supply side analysis.

The corresponding system of growth accounting from the demand side is made as follows.

X_i	=	$D_i + (E_i—M_i) + \sum_j X_{ij}$
X_i	=	gross output of sector i,
$\dot{D}_i$	=	Domestic final demand (consumption plus investment)
$E_i—M_i$	=	Net trade (Exports-Imports)
X_{ij}	=	$a_{ij}X_j$ = intermediate use of commodity i by sector j. (aij is assumed to vary with the level of per capita income).

Using the properties of the input-output system, he eliminates, intermediate demand as a separate source of growth by attributing it to the elements of final demand. In this way, the increase in production of sector 'i' is equated to the sum of following factors:- the expansion of domestic demand which includes the direct demand for commodity 'i' plus the indirect effects in sector 'i' of the expansion of domestic demand in other sectors, export expansion or the total effect on output from sector 'i' of increasing exports; import substitution or the total effect on output of demand in each sector that is supplied from domestic production; and technological change or the total effect on sector 'i' of changing input-output co-efficients throughout the economy as wages and income-levels rise.

2.2 Measures of Import Substitution

According to Desai (1969) there are basically two alternative types of measures of import substitution: (i) those involving some notion of optimality (ii) those which are purely descriptive, noting changes in the actual pattern of imports and domestic production, regardless of any reference to whether the actual situation is optimal or not.[1]

In this section, the measures are based on the actual pattern of imports and production. We shall, however, treat them as separate measures if there are major modifications and as variants, if there are minor modifications in the existing measure.

(a) Measures of import substitution applicable at the micro level

Measure - 1: A crude measure of import substitution is to examine the growth rates of imports and domestic production. If domestic production increases at a faster rate than imports, then import substitution is taking place. Sastry (1988) has used the semi-log trend growth rates to estimate import substitution for different periods using time series data. The major limitation of this measure is that it is affected by the initial values. Imports may show high growth rates because of low initial values and production may show low growth rates because of high initial values.

Measure - 2: Another measure that has been used by Desai (1970), Bokil et al (1981) and Sastry (1988) to determine import substitution is the import availability ratio. This measure computes the difference between the ratios of import availability during different periods of time and if the change is positive, then there is import substitution taking place. Thus if M^1 and M^o are the imports during the current and base year and if S^1 and S^o are the total availability and X^1 and X^o are domestic output, $S^1 = M^1+X^1$ then if

$$\frac{M^o}{S^o} - \frac{M^1}{S^1} > 0,$$

there is import substitution to the extent of the change in the value of the ratio. This is an absolute measure.

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1. *She has distinguished these two types of measures through the standard two-commodity trade theoretic diagram, illustrating general equilibrium for an open economy. For further details see "Alternative measures of import substitution" by Padma Desai, Oxford Economic Papers, July, 1969.*

Variant of Measure -2: This measure has been used by Desai and Sastry; termed as the relative measure, it expresses the magnitude of import substitution yielded by Measure-2 as a proportion i.e., if

$$\frac{\frac{M^o}{S^o} - \frac{M^1}{S^1}}{\frac{M^o}{S^o}} > O,$$

there is import substitution to the extent of the relative change in the ratio. Bokil et al, also use

$$\frac{\frac{X^1}{S^1} - \frac{X^o}{S^o}}{\frac{X^o}{S^o}}$$ as the relative measure.

Measure - 3: The most widely used measure is that of Chenery. This measure[2] has been adopted by Desai (1969), Lewis and Soligo (1965), Bokil et al (1981) and Sastry (1988). According to this measure, import substitution is defined as 'the difference between growth in output with no change in the import ratio and the actual growth'. Chenery apportions the growth in domestic output (a) to growth in demand, on the assumption that a constant proportion of total supply is imported and (b) to the change in the ratio of imports to the total

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2. *This measure could be considered as a variant of Measure-2. The Chenery measure divided by ΔX could be written as*

$$1/\Delta X\{X^1-(S^1/S^o)X^o\} \qquad \text{— (a)}$$

2a, Variant of Measure - 2 is equal to

$$\frac{\frac{M^o}{S^o} - \frac{M^1}{S^1}}{\frac{M^o}{S^o}} \text{ which is equal to } - \frac{1}{M^o} \cdot \frac{S^o}{S^1} \{X^1 - X^o(S^1/S^o)\} \qquad \text{—(b)}$$

Import substitution occurs if $X^1 < Xo(S^1/S^o)$. Negative (b) implies a positive (a). Direction under both measures will be identical, but the magnitudes will not be so. Since in equation (a), $\{X^1 - (S^1/S^o)X^o\}$ is weighted by $1/\Delta X$ whereas in equation (b) its weight is $-\frac{1}{M^o} \cdot \frac{So}{S^1}$

supply, which he calls import substitution.

Beginning from the basic identity, we get

$$S = X + M \quad \text{..... (1)}$$

Where,

S	=	Availability
X	=	Domestic production
M	=	D + E + W
D	=	Domestic demand (including inventory accumulation)
E	=	Export demand
W	=	Intermediate demand

Giving incremental values, we get

$$\Delta X + \Delta M = \Delta D + \Delta E + \Delta W \quad \text{..... (2)}$$

$$\Delta S = S^1 - S^o \quad \text{..... (3)}$$

$$\text{Let } U^o = \frac{X^o}{S^o} \text{ and } U^1 = \frac{X^1}{S^1} \quad \text{..... (4)}$$

$$\text{Then } \Delta X = S^1U^1 - S^oU^o \quad \text{..... (5)}$$

Substituting S^o by $S^1 - \Delta S$, (refer equation (3)) in equation (5) we get

$$\Delta X = S^1U^1 - (S^1 - \Delta S)U^o \quad \text{.... (6)}$$
$$\Delta X = S^1(U^1-U^o)+U^o\,\Delta S \quad \text{..... (7)}$$

The change in domestic output ascribed to import substitution is measured by the change in the proportion of total supply imported, when total demand is held constant. (U^1-U^o) S^1 is taken as the measure of import substitution, $U^o\Delta S$ is the change in output caused by change in demand. According to Chenery, the change in output could be either ascribed to changes in demand (i.e. final demand, intermediate demand or export demand) or due to import substitution

$$\Delta X = U^o(\Delta D + \Delta W) + U^o\Delta E + (U^1-U^o)S^1$$

$(U^1-U^o)S^1$, as has been already pointed out, is the measure of import substitution but this term includes the interaction element (1965). This has been pointed out by Eysenbach (1969) to Lewis and Soligo, who have used the measure to study growth and structural change in Pakistan's manufacturing sector.

He pointed out that

$$
\begin{aligned}
(U^1 - U^o)S^1 &= (U^1 - U^o)(S^o + \Delta S) \\
&= \Delta U(D^o + W^o + E^o) + U(\Delta D + \Delta W + \Delta E)
\end{aligned}
$$

It is only the first term i.e. $\Delta U\,(D^o + W^o + E^o)$, that is to be attributed to import substitution. The second term is the interaction term, the product of two finite changes, which results from the co-existence of both import substitution and demand growth. So, the use of $(U^1 - U^o)S^1$ to measure import substitution could result in over estimation.

Variant of Measure-3 : Bokil et al (1981), look upon import substitution as the change in import availability ratios over time, multiplied by the total supply at the end of the year.

$$
\Delta M = \left(\frac{M^1}{S^1} - \frac{M^o}{S^o} \right) S^1 + (S^1 - S^o) \frac{M^o}{S^o}
$$

The difference, in this variant of Measure-3, is with regard to the residual term-2. In Measure-3, the residual effect is the estimate of domestic demand that would prevail under constant production-availability ratio and in 3a, the variant, the residual is the estimate of import demand under constant import availability ratio.

Variant of Measure-3 : A modification of the Chenery measure has been made by Gupta (1987) to incorporate changes in the supply at the end period, this is to take into account the temporary dislocations that may occur in the domestic or international market. In this version $(U^1 - U^o)$ is weighted by S^o instead of S^1 as followed by Chenery.

$$
\frac{(U^1 - U^o)S^o}{\Delta X} + \frac{U^1 (S^1 - S^o)}{\Delta X}
$$

The term $(U^1 - U^o)S^o$, gives the change in output due to import substitution. The expression $U^1\,(S^1 - S^o)$ is the output due to change in the supply situation and could be termed as the size effect (Sastry, 1988).

Variant of Measure-3 : Sastry (1988) has used a composite measure, which takes into account the initial and the terminal year supply. The composite measure is given as

$$\frac{(U^1 - U^o)S^o / \Delta X \; + \; (U^1 - U^o)S^1 / \Delta X}{2}$$

In Measure -3 and its variants, (except in Variant 3a), a positive magnitude indicates import substitution and a negative magnitude indicates import dependence. If the change in production is zero, then import substitution does not exist.

Chenery, Shishido and Watanabe (CSW), (1962) were the first to introduce the intermediates to determine import substitution but they did not adhere to the original definition of import substitution as a decline in the ratio of imports to total supply of its products and hence the CSW method has not been followed in subsequent studies.

Measure - 4: Morley and Smith (1970) have incorporated the implicit or indirect imports to study import substitution. According to Morley and Smith, an import ultimately substitutes or supplements the output of many domestic sectors. So, if an import is to be replaced without induced rises in imported inputs or reductions in the supplies available for final demand in other sectors, production must increase not only in the industry finally processing the good but also in its supplier industries. The inclusion of the implicit imports according to them would give an accurate assessment of the total supply of each sector's products. This would enable the two components of total supply i.e. imports and domestic production to be measured on the same basis. Morley and Smith incorporate implicit or indirect imports in an input- output table.

A = input—output table
a_{ij} = Technical co-efficients

<u>Assumptions:</u>

(i) If import substitution of any product occurs, the technology employed is accurately described by a_{ij}.

(ii) Import substitution is viewed as domestic production necessary to substitute completely for imports, holding all final demand constant.

Then

$$(1\text{-}A) \quad X + m = f \qquad \text{..... (1)}$$

X = gross production

m = imports

f = final demand both domestic and foreign
Multiplying both sides by $(1\text{-}A)^{-1}$, we get

$$X + (1 - A)^{-1}m = (1 - A)^{-1}f \qquad \text{..... (2)}$$

$$m^* = (1 - A)^{-1}m \qquad \text{..... (3)}$$
(The vector of new defined imports)

$$S^* = X + m^* \qquad \text{..... (4)}$$
(The new vector of total supply)

$$IS^*_i = \left[\frac{m^0_i}{S^0_i} - \frac{m_i^{t*}}{S_i^{t*}}\right] S_i^{t*} \qquad \text{..... (5)}$$

m* is the domestic production necessary to substitute completely for imports, holding all final demand constant.

The difference between Chenery and Morley and Smith's measures are as follows :

Let IS = Chenery's measure of import substitution and

Let IS* = Morley and Smith's measure of import substitution

$$\frac{m_i^o}{S_i^0} - \frac{m_i^t}{S_i^t} = \frac{X_i^t}{S_i^t} - \frac{X_i^0}{S_i^0} \qquad \text{..... (6)}$$

m_i^0 and m_i^t = Imports at the base and current period respectively

X_i^0 and X_i^t = Production at the base and current period respectively.
S_i^0 and S_i^t = Supply at the base and current period respectively.
$IS_i - IS_i^* > O$, if and only if S_i, the direct supply grows more rapidly than

$(m_i^* - m_i)$ the indirect supply embodied in imports. The greater the difference in these growth rates, the greater the bias implied by the Chenery approach. Limitations of Morley and Smith's measures is that they do not incorporate changes in the final demand of one sector which ultimately affects all other sectors. The effect of structural changes in final demand are not incorporated. Moreover, there is no a priori theoretical interpretation of declines in the import shares. A significant statistical problem arises when the import substitution measure is calculated at the aggregate level.

(b) Measures of import substitution applicable at the macro level

A major statistical problem arises when the micro level measures are applied to the macro level. Application of microlevel measures to macro level yields inconsistent results. Two possibilities are there to estimate import substitution at the global level. In a group consisting of several industries, one could either compute import substitution by taking into account aggregated imports, domestic production and supply or obtain import substitution for each industry and then aggregate for the whole group.

Symbolically, these two methods could be expressed as follows:

Macro measure 1(a)

$$\frac{\sum_{i=1}^{n} X_i^{1}/\sum_{i=1}^{n} S_i^{1} - \sum_{i=1}^{n} X_i^{i}/\sum_{i=1}^{n} S_i^{i}}{\sum_{i=1}^{n} \Delta X_i} \sum_{i=1}^{n} S_i^{1}$$

Macro measure 1(b)

$$\sum_{i=1}^{n} \frac{[\{(X_i^{1}/S_i^{1}) - (X_i^{0}/S_i^{0})\} S_i^{1}]}{\sum_{i=1}^{n} \Delta X_i}$$

Desai (1970) has employed both these measures[3] to estimate substitution in the Indian economy for consumption, intermediate and investment group of industries. Whereas Lewis and Soligo (1965) have used only the macro measure 1b to estimate the extent of import substitution in their study of structural change in Pakistan. The results from these two measures could differ, and the ranking of different groups could be reversed by employing any of the two measures.

Macro measure -2: Fane tried to reconcile results which could be obtained using aggregated and disaggregated data. He uses the Chenery measure of IS to demonstrate this. Import substitution is to be measured in two parts: IS within the industry denoted by Ii and the extra contribution, Ii* of growth in industry 'i' to IS in all other industries.

$$I_iT \quad = \quad I_i \quad + \quad I_i^* \qquad \text{..... (1)}$$

Using formulae appropriate for small changes, he defines dIi and dIi* by

$$dI_i \quad = S_i dU_i \qquad \text{..... (2)}$$

$$dI_i^* \quad = (U_i - U)dS_i \qquad \text{..... (3)}$$

$$X = \Sigma X_i$$
$$S = \Sigma S$$
$$u = X/S$$

I_i and I_i^* are obtained from dI_i and dI_i^* by integration. The rationale for the definition of dS_i^* is that growth in an industry with a higher than average ratio of domestic production to total supply leads to an increase in this ratio for the entire group.

The contribution of import substitution to the growth of all industries is

$$
\begin{aligned}
dI &= SdU \\
\text{and} \quad dI &= \Sigma dI_iT \\
\text{Since } \Sigma dI_iT &= \Sigma S_i dU_i + \Sigma(U_i - U)dS_i \\
&= \Sigma(S_i dU_i + U_i dS_i) - U\Sigma dS_i \\
&= \Sigma dX_i - \Sigma U\, dS_i \\
&= dX - UdS \\
&= SdU
\end{aligned}
$$

Even for two or more levels of aggregation based on the three equations, it yields consistent measures of import substitution.

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3. *In the Indian case where Desai has studied IS in the manufacturing sector, there was no coherence between the sectoral and global results.*

These formulae for measuring import substitution are consistent in the sense that:

(a) Import substitution for the aggregate of all industries is equal to the sum of the total contributions to import substitution in each individual industry;

$$dI = SdU = \sum_j \sum_i dI_{ij}^T$$

(b) The total contribution by group j to import substitution for all industries (dI_jT) is the same as the value that would have been obtained by treating group j as a single industry and using equations (1), (2) & (3). The measure proposed by Fane is defined for small changes, the corresponding measure for finite changes is to be obtained by integration.

Macro measure-3: Guillaumont (1979) has defined a sectoral measure that is globally consistent. He differentiates two elements often amalgamated at the global level i.e. the substitution of local production for imports of each demanded good and the substitution between demands with different import contents. He defines import substitution in relative value as the variation of import co-efficients and in absolute value as the decrease of imports resulting from a lower co-efficient. At the global level, import substitution in the relative value is the difference between the value of the average import co-efficient which would have prevailed if import co-efficient of the products remain unchanged and the total actual value of the import co-efficient. In the absolute value the difference between the value of imports which would have prevailed if the import co-efficient by product had been unchanged and the actual value of imports. This is done so as to differentiate what is due to import substitution and what is due to the structure of demand in the variation of average import co-efficients or of the global value of imports.

In this analysis, the import content of final demand of each sector is weighted by the relative shares of final demand. A is the square matrix of technical co-efficients and M is the diagonal matrix, in which the elements are $mi = Mi/X_i$ starting from the balancing equation,

$$X + M = F + AX$$

$$(1 - A) X + M = F$$

$$(1 - A + M)X = F$$

$$X = (1-A+M)^{-1} F$$

Let d_{ij} be the elements of the inverse matrix $(1\text{-}A+M)^{-1}$, we have $Xi = \sum_{j=i} d_{ij} F_i$

and the import content co-efficients are

$$m_i'' = \sum_{j=1} d_{ij} \cdot M_j \quad \text{where} \quad m_i'' = \frac{M_i''}{X_i}$$

The actual import substitution, measured in relative value, for a given pr is then

$$r_i'' = m_i''$$

For the economy as a whole it is:

$$r'' = -\Sigma \; \Delta m_i''\alpha'' = r_i''\alpha_i''$$

With a weighting co-efficient $\alpha_i'' = F_i/S$, which is the relative share of the final demand of the product 'i' in the total final demand or net global supply, $\Sigma\alpha_i = 1$. In absolute value, import substitution is equal to

$$R'' = r''S' = \Sigma r_i''F_i$$

The variation in the average import co-efficient as per this formulation can be decomposed into two components namely (1) change in the structure of demand and (2) import substitution.

$$\Delta M \quad = \quad \sum^{i} (m_i^{\circ} \; \alpha_i) \qquad - r$$

Variation of the average import co-efficient	Change in the structure of demand	Import substitution

(m_i° is the import co-efficient of the ith sector in the base period).

The main difficulty with this measure is that the changes in the import/total final demand ratio of a given sector affect only that sector whereas in reality it affects all the other sectors.

Variant of macro measure -3 : Pitre and Argade (1988), have tried to solve the problem in the composition of final demand, by isolating the total import substitution in two parts, namely (1) import substitution with the same final demand composition (2) import substitution due to changes in final demand composition. The former gives the real magnitude of import substitution.

Their evaluation involves the distribution of the total final demand of the second period over the sectors with the base year composition. The imports of the second period are subtracted from the total final demand to arrive at the estimates of domestic final demands. The sectoral production values are based on the technical co-efficient matrix (A). Thus they generate a new set of sectoral output with the unchanged final demand composition. The import substitution estimates are then calculated on these new supply and output values. This modified measure is free of structure effect.

Despite the serious limitations in the measurement of import substitution, an attempt has been made to estimate the extent of import substitution with the help of the Indian data for the period 1970-85. In the next section, we briefly enumerate the method to be adopted to determine the extent of import substitution, keeping in view the obvious problems posed conceptually.

2.3 Measures of Import Substitution for the Indian Economy

We propose to estimate the extent of import substitution in the manufacturing sector for the period 1969-70 to 1984-85. The absolute, relative and the Chenery measures of import substitution would be adopted to determine the extent of import substitution for the years 1969-70, 1974-75, 1979-80 and 1984-85.

A variant of the Measure-3, incorporating change in the structure of final demand would be used to estimate the extent of import substitution for the years 1973-74 and 1979-80. The change in imports (a) due to change in import substitution, (b) due to growth in final demand and (c) due to the change in composition of final demand would be estimated.

The measure to be adopted would be as follows:

$X_i d$ = Domestic production of the ith item

M_i = Import of the ith item

S_i = Supply = $X_i + M_i$

A = Technical coefficient matrix

m_i = Proportion of imports i.e. M_i/S_i

F = Final demand

The balance equation for the ith sector would be

$$X_i^d + M_i = X_i \quad \text{..... (1)}$$
$$X_i^d + M_i = AX_i^d + F \quad \text{..... (2)}$$

and if we assume a constant import coefficient, m, then

$$M_i = m_i X_i \quad \text{..... (3)}$$

So that, using (3) we get

$$M_i = m_i(X_i^d + M_i) \quad \text{..... (4)}$$

or $\qquad M_i - M_i m_i = m_i X_i^d,$

or $\qquad M_i(1-m_i) = m_i X_i^d,$

or finally

$$M_i = \frac{m_i}{1-m_i} X_i^d \quad \text{..... (5)}$$

Let us define $\hat{M}$ as a diagonal matrix, with ith element in the diagonal equal to (mi/1-mi), then

$$\hat{M} = MS^d$$

restating it as follows,

$$X^d + \hat{M}X^d = AX^D + F$$

or $\qquad X^D = (1-A+\hat{M})^{-1}F \quad \text{..... (6)}$

Equation (6) would give us the value of total domestic output required to meet the final demand F (in value terms). The import requirement of this output would be equal to i M X^d where i is a unit row vector. Import requirement per unit of final demand would be in MX^d/F.

In measuring IS between two points of time, we concentrate on the base of an unchanged technology matrix, given the data restriction. Extension to the case of different technology matrices is straightfoward. In our estimates of IS, we consider only the changes in import coefficients and the final demand. If the import requirements are obtained by taking into account the changes in the import coefficients between the terminal year and base year, holding the final demand constant, then this part of change in imports could be attributed to IS. If the import requirements are obtained by taking into account the changes in the final demand between the terminal year and base year holding the import coefficients constant, then this could be attributed to changes in final demand. For the aggregate measure the change in imports, attributed to final demand, is split into two parts that due (i) to growth in final demand, and (ii) to the composition of final demand. This could be symbolically expressed as follows:

$$\text{Let} \quad i[I\text{-}A)^{o} + \hat{M}^{o}]^{-1} = T$$

$$\text{and} \quad i[I\text{-}A)^{o} + \hat{M}^{1}]^{-1} = Q$$

$$\text{then} \quad M^{1}(QF^{1}) - M^{o}(TF^{o}) = [M^{1}(QF^{1}) - M^{o}(TF^{1})]$$

$$\{\text{changes in imports}) = \{\text{changes due to IS}\}$$

$$+ \quad [M^{o}(TF^{1})\text{-}M^{o}(TF^{o})] \qquad \text{..... (7)}$$
$$(\text{changes due to final demand})$$

The aggregate measure is obtained by the summation of estimates of IS for each industry. For the manufacturing sector as a whole, the change in final demand is split into (i) growth due to final demand on the assumption that a uniform growth rate (w) obtained from the terminal year final demand over base year final demand is applicable to all industries, and (ii) changes due to composition of final demand. This could be symbolically expressed as follows:

$$\underset{\{\text{changes in imports}\}}{\Sigma M^{1}(QF^{1}) - M^{o}(TF^{o})} = \underset{\{\text{changes due to IS})}{\Sigma M^{1}(QF^{1}) - M^{o}(TF^{1})}$$
$$+ \underset{\{\text{changes due to composition effect}\}}{\Sigma M^{o}(TF^{1}) - M^{o}(T\delta F^{o})}$$
$$+ \underset{\{\text{changes due to growth effect}\}}{\Sigma M^{o}(T\delta F^{o}) - M^{o}(TF^{o})} \qquad \text{..... (8)}$$

Thus from equation (8) we could estimate the extent of IS in the manufacturing sector and the extent of change in final demand.