

# GENERAL AGREEMENT ON TARIFFS AND TRADE

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Working Party on Trade in Certain  
Natural Resource Products

IMPORT DEMAND ELASTICITIES IN INTERNATIONAL TRADE:  
A REVIEW OF SELECTED BIBLIOGRAPHY

Note by the Secretariat

1. At the meeting of the Working Party on 27 June 1984, it was suggested, inter alia, that a comprehensive assessment of the protective effects of tariffs in the product area under examination would necessitate, in addition to factual information on nominal tariffs and their degree of escalation with respect to further processing, data on import values, domestic production and consumption and on the changes in demand in response to price variations, (i.e. import demand elasticities). On the basis of some empirical research on this subject, it was felt that this type of information would constitute "a relevant factor if the trade impact of a tariff reduction is to be measured" (MDF/W/1, page 3).
2. Some members of the Working Party therefore requested the secretariat to explore this question in greater detail by reviewing some of the available literature on the subject and to prepare a note outlining the results of this review.
3. A similar request was also made some years ago in the course of the proceedings of the Working Party on the Tariff Study, pursuant to the third part of its terms of reference which read to "examine the feasibility of analyzing and developing better measures of the effects on trade of tariffs and tariffs changes". In response to that request, the secretariat prepared at that time a comprehensive survey of possible approaches to a study of trade effects of tariff changes, reviewing the basic literature on the subject and indicating the main methodological approaches to the problem and the nature of the data required for each approach.
4. This survey, which deals extensively with the issue of import demand elasticity and contains the secretariat views on the matter, was circulated as document Spec(72)40 and Add.1. As most of the available literature on the subject predated the issuing of this survey and was reviewed therein, document Spec(72)40 and Add.1 has been reprinted and circulated for the use of this Working Party.

5. The present note only attempts, therefore, to briefly survey the basic concepts of import demand elasticities and to review some of the relevant literature produced after the issuing of the previous survey by the secretariat.

(i) The economic and statistical concepts

6. The economic concept of "import demand elasticity" can refer either to income or to price elasticities. The first establishes a causal relationship between variations (% changes in quantities) in import demand and variations (% changes) in income. The second between variations in import demand and variations in import prices relative to domestic prices. As the casual link between tariffs and trade is mainly operating through prices, the price elasticity of demand is the most relevant concept in this context. It could be expressed as follows:

where:  $\eta_m = \eta_{C/M} + \epsilon_{P/M}$

$\eta_m$  = import elasticity of demand  
C = domestic consumption  
P = domestic production  
M = imports  
 $\eta_C$  = domestic elasticity of demand  
 $\epsilon$  = domestic elasticity of supply

7. The above formula applies to either a single product, a group of products, or all imports lumped together<sup>1</sup>. Therefore, statistically the price elasticity of import demand could therefore be estimated either for particular commodities or for all or large groups of imports.

(ii) Some most recent literature on price elasticity in international trade

8. In recent years empirical estimates of import demand elasticities by commodity or commodity groups and/or by country have been increasingly used in the econometric analysis of international trade as explanatory factors for evaluating, in quantitative terms, the direct effects on trade flows of relative price movements, notably those derived from tariff reductions<sup>2</sup>.

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<sup>1</sup>It could be interesting to note that, according to this formula, the import demand elasticity and the domestic elasticity of demand might considerably differ from each other. For instance, assuming  $\eta_C = 1$  and  $\epsilon = 1$  and that 5 per cent of the domestic consumption is imported, we have:

$$\eta_m = (1) \frac{100}{5} + (1) \frac{95}{5}$$

or  $\eta_m = (1) 20 + (1) 19$

$$\eta_m = 39$$

<sup>2</sup>It should be noted, however, that the methodological difficulties inherent in computing these estimates have been generally recognized. These require, inter alia, that goods be clearly identified according to their different stages of processing and that the particular circumstances of price changes be sufficiently defined. Moreover, a quantitative assessment of the impact on trade of reductions of tariffs and other barriers would also require that the tariff equivalent of all measures affecting trade be computed.

9. Trade policy considerations have therefore fostered the research and literature on this subject. A synthesis of selected elasticity results has been presented by Stern<sup>1</sup> on the basis of a most extensive review of selected bibliography on price elasticity in international trade. Using the various estimates available for the 18 countries for which trade and tariff data has been compiled by GATT in the Basic Documentation for the Tariff Study, the following results were synthesized:

<u>Commodity group</u>	<u>Import demand elasticity</u>	
	<u>Range</u> <sup>2</sup>	<u>Median</u>
SITC 0 + 1 Food, beverages and tobacco	- 0.09 to - 1.59	- 0.78
SITC 2 + 4 Crude materials; oils and fats	- 0.17 to - 1.15	- 0.50
SITC 3 Mineral fuels	- 0.01 to - 2.78	- 0.96
SITC 5-9 Manufactural goods	- 0.74 to - 2.64	- 1.34
SITC 0-9 Total imports	- 0.42 to - 1.37	- 1.06

10. Since empirical studies of import demand elasticities generally indicate that these parameters increase as further processing stage are reached, Yeats<sup>3</sup> has recently suggested that the changing conditions of demand that occur at each processing stage should be taken into account in any meaningful analysis of the impact of tariff barriers on trade flows, as even constant nominal tariff may automatically imply a bias against processed goods exports. He has noted that, in this sense, import demand elasticities constituted an indispensable measure of trade response to tariff changes.

11. In turn, Yeats<sup>4</sup> further argues that the tendency of tariffs to increase over stages of a processing chain is neither a necessary nor sufficient condition to establish a bias against processed goods. To be valid, such an association would again require that the underlying demand factors for components of the processing chain be considered. This methodology, and the empirical evidence of the increase of import demand elasticity with the degree of processing, would indicate that processed products are generally more responsive to any given change in trade barriers than primary products.

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<sup>1</sup>Stern, R.M. et al., "Price Elasticities in International Trade: an Annotated Bibliography". London, The Macmillan Press Ltd. 1976.

<sup>2</sup>The ranges shown are not meant to be interpreted as confidence intervals. Rather, they refer to point estimates.

<sup>3</sup>Yeats, A.J. "The Influence of Trade and Commercial Barriers on the Industrial Processing of Natural Resources", World Development, vol. 9 (5), 1981.

<sup>4</sup>Yeats, A.J. "On the Analysis of Tariff Escalation: Is There a Methodological Bias Against The Interest of Developing Countries?", Mimeo, 1983