On Tariffs and Optimal Taxation Policy in Developing Countries

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Taxes on the foreign-trade sector are substantial sources of government revenue in almost all developing countries. Thus in a number of countries — including Pakistan, Indonesia, Burma, Ceylon, Malaysia, Thailand, Nigeria, Ghana and Colombia — such taxes account for more than 40 percent of the government revenue.¹ The main type of trade tax has been tariffs, but in addition there have been export taxes and profits from export marketing boards, the latter being really forms of export taxes.

For developed countries, by contrast, taxes on trade are generally not now significant sources of revenue, and usually account for less than 5 percent of government revenue, and frequently much less. However, this has not always been so. In the early history of the now-developed countries, trade taxes have usually been quite important, and the principal purpose of tariffs has been to raise revenue. In the United States, customs duties accounted for over 25 percent of revenues at all levels of governments in 1880, though for only 0.8 percent in 1960. In Germany they accounted for 16 percent of revenue in 1914, though for only 4 percent in 1960 [4, pp. 138-39] and [1, pp. 58-59].

A well-known conclusion in the theory of international trade is that having tariffs is not an optimal policy for a small country unable to influence terms of trade if collection costs of taxes can be disregarded and lump-sum taxes or indirect taxes

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¹See [3]. (Indonesia and Pakistan have been added to the list here.) There is no reason to believe that trade taxes have become significantly less important in the two last decades.
on all commodities are possible.\(^2\) Perhaps inspired by this kind of conclusions, international organizations argue in favour of free trade in developing countries. Thus *The Development Report 1983* by the World Bank clearly says that.

Although gains in price and efficiency from freer international trade are still widely appreciated, developing countries are often victims of short-sighted government action. The political challenge is first to halt and then to reverse the drift towards protectionism. The ministerial meeting of GATT held in November 1982 set the stage for liberalization. Greater participation by developing countries in GATT would help strengthen its role as the most appropriate forum for continued negotiations to reduce trade barriers. [7, p. 3].

Thus one may get the impression that in the view of both economic science and international economic organizations, the developing countries may not be pursuing an optimal foreign-trade policy. It is the purpose of this paper to show that if sufficient government revenue can not be raised through lump-sum taxation and if indirect taxes can not be imposed on all commodities, tariffs may be part of an optimal taxation policy. Many economists have in general questioned the possibility of having all government revenue raised through lump-sum taxation - see, e.g., Sandmo [6] - and having indirect taxation on all commodities in developing countries would require that such taxes be acceptable to the policy-maker and that all firms have an accounting system reporting their sales and expenditures, hardly a very realistic assumption in many developing countries. We therefore start here with the extreme alternative assumption that lump-sum taxation and indirect taxes on commodities are not possible and that the government, therefore, will have to raise revenue through tariffs. These extreme assumptions will then be modified to see how sensitive our conclusions are to less restrictive assumptions, including that of imposability of indirect taxes on some, but not all, commodities.

\(^2\) See, e.g., [2, pp. 165-75].
\[
\begin{align*}
\frac{\partial V}{\partial P_K} &= -\lambda C_K & K = 1, \ldots, m. \quad \ldots \quad (6)
\end{align*}
\]

Note that, since international prices are given, we must have \(\frac{\partial V}{\partial P_K} = \frac{\partial V}{\partial t_K}\).

Suppose that the government wants to raise a fixed amount of revenue, \(T\), by import duties. The maximization problem of the public sector in terms of the Lagrangian then becomes

\[
L = V(P) + \mu \sum_{i=n}^{m} t_i M_i - T \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (7)
\]

where imports \(M_i = C_i - X_i\), \(X_i\) = domestic production.

Maximizing the above function with respect to \(t_K\) gives

\[
\frac{\partial V}{\partial P_K} + \mu \sum_{i=n}^{m} t_i \frac{\partial M_i}{\partial P_K} + M_K = 0 \quad K = n, \ldots, m \quad \ldots \quad \ldots \quad \ldots \quad (8)
\]

Inserting equation (6) into equation (8) gives

\[
\lambda C_K = \mu \sum_{i=n}^{m} t_i \frac{\partial M_i}{\partial P_K} + M_K \quad K = n, \ldots, m \quad \ldots \quad \ldots \quad \ldots \quad (9)
\]

\[
\sum_{i=n}^{m} t_i \frac{\partial M_i}{\partial P_K} = -M_K + \frac{\lambda}{\mu} C_K \quad K = n, \ldots, m \quad \ldots \quad \ldots \quad \ldots \quad (10)
\]

From (10) the structure of optimal trade taxes can be estimated.

If we, instead of tariffs, have indirect taxes on all import commodities (i.e. \(X_i = 0\) and \(t_i = \) indirect taxes), equation (10) becomes

\[
\sum_{i=n}^{m} t_i \frac{\partial C_i}{\partial P_K} = \frac{\lambda - \mu}{\mu} C_K \quad K = n, \ldots, m \quad \ldots \quad \ldots \quad \ldots \quad (11)
\]

which is similar to Sandmo equation 7 [6].

If indirect taxes can be imposed on commodities \(n, \ldots, z\) in equation (10), then \(n < z < m\) and equation (10) can be written as

\[
\begin{align*}
\sum_{i=n}^{z} t_i \frac{\partial C_i}{\partial P_K} + \sum_{i=z+1}^{m} t_i \frac{\partial M_i}{\partial P_K} &= \frac{\lambda - \mu}{\mu} C_K \quad K = n, \ldots, z \quad \ldots \quad (12a)
\end{align*}
\]

\[
\begin{align*}
\sum_{i=n}^{z} t_i \frac{\partial C_i}{\partial P_K} + \sum_{i=z+1}^{m} t_i \frac{\partial M_i}{\partial P_K} &= -M_K + \frac{\lambda}{\mu} C_K \quad K = z+1, \ldots, m \quad \ldots \quad (12b)
\end{align*}
\]

In general, we can not, from equations (12a) and (12b) conclude that optimal tariffs will be zero for a small country unable to influence terms of trade. Only in very special cases can it be shown that optimal tariffs will be zero. One such special case will be when all cross derivatives are zero and the demand for imports is infinitely elastic.

II

We now turn to the empirical aspects of the problem. Since the import demand functions in the previous analysis should be interpreted as those existing within a general-equilibrium framework, they are hardly very relevant for a more practical approach to dealing with taxation problems. In order to show how the optimal taxation problems can be dealt with within an empirical framework, I therefore rely on a partial-equilibrium approach. The problem can be illustrated in the Figure 1. It refers to an importable commodity. \(DD'\) is the domestic demand curve, \(SS'\) the import-competing supply curve and \(HH'\) the foreign import supply curve.

![Figure 1. Quantity of the Importable](image-url)
An indirect tax $HT$ would raise revenue $HTN'N$ and cause a consumption distortion cost $NN'G$. A tariff to raise the same revenue, however, would have to be $HT$ raising revenue $KK'L'L$ (=HTN'N). It would cause a production distortion cost $KK'L'L$ and a consumption distortion cost $L'LG$. Thus, not only would a tariff add a production distortion cost, but the consumption distortion cost would be greater than in the case of indirect taxes. Therefore, it would only be in the case in which indirect taxes can not be imposed on all commodities that tariffs can be part of an optimal taxation policy.

In the following we will show how optimal tariffs and indirect taxes can be estimated in the case of two commodities where for institutional or political reasons indirect taxes can only be imposed on one of the commodities. It can easily be shown that the results would also apply to a more general case. Units of quantities are chosen so that the domestic market price including the tariffs or indirect taxes is unity. In the case of imports the total costs are

$$\frac{1}{2} \tau (dX + dC) = \frac{1}{2} \tau^2 \frac{d}{dp} (X - C) = \frac{1}{2} \tau^2 \eta M$$

where $\tau$ is the proportion of the tariff in the final domestic price $P$, which is unity, $C$ and $X$ are quantities initially consumed and produced domestically, $M = P(C-X)$ is the initial domestic market value of import, and

$$\eta = -\frac{P}{C-X} \frac{d}{dp} (C - X)$$

is the elasticity of demand for imports.

In the case of indirect taxes, the total costs are

$$\frac{1}{2} t dC = -\frac{1}{2} t^2 \frac{dC}{dp} = \frac{1}{2} t^2 e C$$

where $t$ is the proportion of indirect taxes in the final domestic price $P$, which is unity, $C$ the quantity initially consumed, and

$$e = -\frac{P}{C} \frac{dC}{dp}$$

is the elasticity of demand for consumption goods.

Suppose now that a fixed amount of revenue $T$ is to be raised by tariffs and indirect taxes. The problem of the public sector is to raise this revenue subject to minimizing the dead-weight loss. The problem in terms of the Lagrangian becomes

$$L = \frac{1}{2} \tau^2 \eta M + \frac{1}{2} t^2 e C - \lambda (\tau M + t C - T)$$

Minimizing the above function with respect to $\tau$ and $t$ gives

$$\tau \eta M - \lambda M = 0$$
$$t e C - \lambda C = 0$$

$$\tau = \frac{\lambda}{\eta} \quad \text{and} \quad t = \frac{\lambda}{e}$$

These formulas of optimal tariffs and optimal indirect taxation are similar to the formulas of inverse elasticities in the theory of optimal taxation.

To give an example of how the optimal indirect taxes and tariffs can be estimated, suppose $\eta = 4$, $e = 1$, $M = 100$, $C = 200$, and $T = 100$. Then

$$\lambda \cdot 100 + \frac{\lambda}{1} \cdot 200 = 100$$

$$\lambda = \frac{400}{900} = \frac{4}{9}$$

$$\tau = \frac{\lambda}{\eta} = \frac{4/9}{4} = \frac{1}{9} \quad \text{and} \quad t = \frac{\lambda}{e} = \frac{4/9}{1} = \frac{4}{9}$$

In the theory of international trade, it is generally concluded that the optimal tariffs for a small country unable to influence terms of trade are zero. This conclusion assumes that lump-sum taxation or indirect taxes on all commodities are feasible. However, in many developing countries lump-sum taxes or indirect taxes on all commodities may not be feasible for political and institutional reasons. For those commodities for which indirect taxes are not possible, tariffs may instead be used as part of an optimal taxation policy. Within the partial-equilibrium approach presented in this paper, it has been shown that the optimal tariffs will be inversely proportional to the elasticity of demand for imports. However, this analysis has ignored the income distribution aspects of optimal taxation. In designing any optimal taxation system for a developing country, the results in this paper should, therefore, be interpreted carefully.
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REFERENCES


Comments on
“On Tariffs and Optimal Taxation Policy in Developing Countries”

At a time when international economists are extolling the many virtues of free flow of foreign trade, Fløystad’s paper argues that imposing tariffs may in fact be an “optimal” policy for certain developing countries. This is clearly a counter-intuitive conclusion, but Fløystad arrives at it by focusing solely on the fiscal aspects of tariffs and liberalization. If governments cannot raise revenues through either lump-sum or indirect taxation, then tariffs may be an optimal taxation policy. At the same time, however, tariffs are not necessarily an optimal trade policy, and this distinction must be kept in mind when reading this paper.

The arguments of international organizations pushing for removal of tariffs and other distortions in foreign trade do not typically relate to the narrow revenue-related aspects. In fact, the policy advice of such organizations is based on the wider issues of gains from trade and improvements of efficiency that result from tariff liberalization. Briefly, according to the standard theory, international trade is believed to contribute to development in the following ways: trade allows a country to follow the route indicated by the theory of comparative advantage; it offers greater opportunities to exploit economies of scale; it increases the supply capacity of the economy through imports of capital goods, raw materials, and other inputs in production; and, finally, by providing competition for tradable goods, it is a source of stimulus and pressure for domestic production. These theoretical arguments are supported by a number of case studies that have shown that, at the broadest level, the countries adopting outward-looking development strategies have fared better in terms of growth, employment, economic efficiency, and adjustment to external shocks than those that have engaged in more inward-looking strategies. The outward-oriented policies have been typically characterized, *inter alia*, by the provision of incentives for exports, and the encouragement of import competition for domestically produced goods.

All this is well known, but is ignored by Fløystad. As a consequence, the paper is much too narrowly focused and I am not sure what message it has for the policy-maker in a developing country. Clearly, it cannot be interpreted as a rationale for
increases in tariffs. What really has to be done is to combine the resource allocation and efficiency arguments with the revenue-based issues, and then calculate the optimum tariff. I recognize that this would make the analysis much more complex, but without such an attempt the paper remains an exercise devoid of any policy significance. Perhaps this paper should be viewed as a first step in the direction of incorporating revenue aspects into a comprehensive analysis of tariffs.

Aside from the above general issues, there are a few specific points in the paper that deserve comment. Firstly, since it is assumed that all goods are homogeneous I am not sure what the terms of trade (defined as the relative price of exports to imports) mean in this context. There is only one price in the model. Presumably all that Flåystad wants to say is that in a small open economy the foreign price level is given, and the law of one price holds. If one shifts to a situation of non-homogeneous goods, and certainly one can make a case that imports are imperfect substitutes for domestic goods in developing countries, then the analysis would have to be altered. For example, one could easily get a case in which the cross-price derivatives between imports and domestic goods were zero.

Secondly, while the partial-equilibrium model is useful as a pedagogical device, it tends to be somewhat restrictive. Employing the concept of "Harberger triangles" to measure welfare gains and losses is a standard procedure when one is concerned with small changes. However, this approach becomes increasingly unrealistic when large tariff changes are considered, and this has to be acknowledged in judging the numerical example.

Finally, while the numerical simulations are interesting, I would have preferred to see some type of table that gave the results for different values of the relevant parameters. In other words, some type of sensitivity analysis would have been very useful. For example, if one reverses the values for the price elasticity of the demand for imports (η) and the price elasticity of the demand for domestic goods (ε), one gets quite different conclusions. Suppose η = 1 and ε = 4, then we find that τ = 2/3 and t = 1/6. One could also consider other intermediate values, and perhaps even η = 0. As η → 0, we would get τ → oo. Since we know of a number of imported commodities that have a zero (or close-to-zero) price elasticity, would this mean that one would recommend an infinite tariff?

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Price and Income Elasticities of Consumer Goods Imports of Pakistan
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I. INTRODUCTION

Estimation of disaggregated import elasticities for developing countries presents a formidable data-handling problem. The available studies on the subject are concerned mostly with the estimation of income and price elasticities of imports at a disaggregated level corresponding to the one-digit level of the Standard International Trade Classification (SITC), see, e.g., Khan [1], Melo and Vogt [4], Nguyen and Bhuyan [5]. Consequently, they apply a common elasticity estimate to all commodity sub-groups.

The lack of disaggregated estimates of import elasticities is a serious constraint on the efforts to quantify the effects of policy measures on the volume of imports and economic welfare in general. In this study an attempt has been made to overcome this limitation by estimating price and income elasticities of the consumer goods imports of Pakistan at the three-digit level of the SITC. Consumer goods imports have also been distinguished by functional classes, viz. consumer goods and raw materials for consumer goods.

In this study the importance of changes in relative prices, customs duties and an income variable as explanatory variables determining the quantity of consumer goods imports of Pakistan, has been investigated for the period from 1969-70 to 1979-80. During this time there was a growing structural concentration of imports in favour of consumer goods, which, by the end of the Seventies, accounted for around 60 percent of the total imports. There is also evidence of concentration between different products of the same industry, which suggests that some benefit can be gained by studying imports on a disaggregative basis, in particular by using information at the three-digit SITC level as the basic data. The fact that this is also the decision level for tariff policy provides additional cause for a disaggregative approach.

The required data on quantity and value of imports were generated by aggregating the six-digit series available in the Foreign Trade Statistics [6]. Prices for