NBER WORKING PAPERS SERIES

POLITICAL-ECONOMY ARGUMENTS FOR A UNIFORM TARIFF

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Working Paper No. 3661

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
March 1991

NBER Working Paper #3661
March 1991

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ABSTRACT

Uniform tariffs have become increasingly popular in recent years, yet their economic rationale is not strong. We identify and evaluate three sets of reasons as to why governments may prefer tariff uniformity as a means of alleviating political motives for excessive protection. First, a free-rider effect may be conducive to less lobbying under a uniform tariff regime than under a regime in which tariffs are allowed to differ. Second, an input-price effect may dampen the enthusiasm of final-goods producers for import protection. Third, a precommitment effect may increase the cost to a future government of protecting favored sectors. None of these arguments provides an unambiguous, airtight case for tariff uniformity. The decision on uniformity has to be made on a case-by-case basis.

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For some time now, the uniform-tariff rule has fascinated both economists and policy makers. More than three decades ago, Corden (1958) suggested that Australia replace its complex system of quantitative import restrictions and tariffs by a uniform tariff. Corden's proposal generated a lot of controversy and eventually led to some movement towards tariff uniformity in Australia.[1] A case for uniform effective protection was also made by Macario (1964) in the debate on industrialization in Latin America. More recently, Balassa (1989) and Harberger (1990) have argued in favor of a uniform tariff in the context of trade reform in developing countries.

During the 1980s, the World Bank has aggressively promoted a greater uniformity in tariff rates in developing countries. The structural adjustment and trade reform programs of the World Bank have often recommended the abolition of quantitative import restrictions and increased uniformity in tariffs. Partially as a result of these programs, Bolivia has adopted a more or less uniform tariff rate of 17%.[2] Chile has maintained a single tariff rate across all imports since the late 1970s. Mexico has also moved towards a greater uniformity by adopting three tariff rates. All of these countries have abolished quantitative import restrictions entirely.

The intuitive appeal of uniform tariffs derives from the belief that they minimize the efficiency cost of protection. Conventionally, policy advisors have argued that uniform nominal tariffs equalize the effective rates of protection across sectors. Therefore, if protection of the entire industrial sector is the objective, uniform nominal tariffs will be the least costly means of achieving the objective.

Economists have pointed out continually, however, that uniform tariffs neither minimize the cost of protection, nor do they necessarily equalize effective rates of protection across sectors. In a paper written almost three decades ago, Johnson (1964) noted that the argument for tariff uniformity fails to take into account the distortion in consumption which inevitably accompanies tariffs. He went on to

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[1] See Corden (1968) for details.

[2] A small number of tariff rates remain different from this rate.

demonstrate that once the distortion in consumption is taken into account, the tariff structure which minimizes the social cost of providing a given level protection is nonuniform.

Corden (1971) provided the first systematic analysis of the uniform tariff rule. In addition to noting the implications of distortions in consumption à la Johnson, he provided a number of reasons for why a uniform tariff will fail to yield the desired objective of a uniform effective tariff. For example, he demonstrated that if importables use exportable inputs or some exportables use imported inputs, uniform nominal tariffs will actually yield non-uniform effective protection. In a later contribution, Corden (1974) concluded,

> ...any fanaticism about effective rate uniformity should be avoided... It may sometimes be best to have a small stock of three or four basic nominal rates out of which all effective rates are constructed, the aim being to only avoid excessive nonuniformity in effective rates without any pretence that complete uniformity in effective rates can or should be achieved.

This view is reinforced by considerations such as smuggling, economies of scale, and imperfect competition. As noted in Panagariya (1990), not all goods can be smuggled with uniform ease. Automobiles are far more difficult to smuggle than wrist watches. Therefore, even if nominal tariffs are set at equal rates, their impact on different industries will be nonuniform. Similarly, the presence of economies of scale and/or imperfect competition will rule out the equalization of effective protection via equalization of nominal tariff rates.

The case for a uniform nominal tariff is further weakened if the objective behind tariffs is revenue rather than protection. We know from Ramsey (1927) that optimal revenue raising taxes bear an inverse relationship to elasticities of demand. Thus, ceteris paribus, the higher the elasticity of demand for imports of a good, the lower the optimal rate of tariff on it. Tariff uniformity can be justified only if import demand elasticities are more or less uniform across commodities and cross-price effects are unimportant.

As a result of these criticisms, policy advisors have lately begun to rely more heavily on administrative simplicity and the political context as arguments for tariff uniformity.[3] According to the administrative simplicity argument, uniform tariffs make trade regime more transparent and relatively easy to administer. There is little room for confusion with respect to the tariff rate to be paid hy the importer. Also, potential investors do not have to engage in wasteful employment of resources in order to understand a complex tariff code. Although tariff simplicity is likely to confer these gains on the economy, their quantitative significance is in some doubt. It is possible, indeed plausible, that such gains will be more than offset by the losses arising out of departures from optimal tariff rates. For this reason, the case for tariff uniformity must rest largely on political-economy arguments.

What are the political-economy arguments for a uniform tariff? To date, this question has not been answered satisfactorily. With the exception of brief, verbal discussions (e.g., Panagariya (1990)), political-economy arguments for a uniform tariff have simply not been spelled out. This is all the more surprising since in recent years the literature on the political economy of trade policy has grown rapidly.

In this paper, we provide a formal analysis of some political-economy arguments for uniform tariffs. The paper follows the tradition of Brock and Magee (1979), Findlay and Wellisz (1982), Feenstra and Bhagwati (1982), Mayer (1984) and Rodrik (1986) where the authors have sought to model the formation of tariffs and other trade policies.[4] An important novel feature of our paper is that whereas the existing literature has focussed on tariff formation in a single sector, we consider the endogenous determination of the entire tariff structure.

We present three different models in which a uniform tariff rule may be adopted as a way of minimizing the welfare costs of endogenously-determined tariffs. In the first two models, considered in

[3] For example, see Thomas et al. (1991).

[4] The empirical literature in this tradition includes Pincus (1975), Caves (1976) and Anderson and Baldwin (1981).

Sections 1 and 2, respectively, tariffs are demand determined. The government is essentially unable to resist the lobbying pressure. In the third model, discussed in Section 3, tariffs are supply determined in the sense that they result from the government's preference for certain sectors over the others.

In Section 1, we consider a model with n importables. We assume that each importable can obtain protection via lobbying. If the government adopts a uniform tariff rule, whatever protection is granted to one sector is automatically extended to all importables. In this setting, a free-rider problem emerges and, rather remarkably, only one sector lobbies for protection in equilibrium. The sector which lobbies devotes less resources to lobbying under the uniform tariff rule than when tariff rates are allowed to diverge. If the number of sectors in the economy is large, welfare is higher under the uniform tariff.

This model is closely related to that in Rodrik (1986). The latter provides an explanation of why a welfare maximizing government may choose tariffs rather than subsidies even though tariffs distort consumption. Rodrik considers a model with one importable where lobbying takes place at the level of the firm. A free-rider problem exists at the firm level under a tariff regime but not under a subsidy scheme. In this setting, production subsidies are not always welfare superior. We will point out the main differences between our model and that of Rodrik later, although it may be noted here that in the latter, lobbying is done by all firms even when the free-rider problem is present.

Our second model considers a situation where imports also include intermediate inputs. We deliberately rule out any free rider problem here and focus on penalties on final importables arising out of tariffs on imported inputs. We show that if imported inputs are neither produced at home nor used in exportables, welfare is unambiguously higher under a uniform tariff rule. If any of these conditions is violated, the welfare ranking is ambiguous in general.

Our third model is based on the assumption that the government is itself interested in promoting certain sectors. Under such circumstances, the adoption of a uniform tariff rule may tie the government's hands to some extent. We show once again that the tariff on the preferred sector is lower under a

uniform tariff regime than when tariffs are allowed to diverge. The welfare ranking is ambiguous in general. If the share of the preferred sectors in GDP is low, welfare is higher under the uniform tariff regime.

The paper is organized as follows. In sections 1 to 3, we discuss the three models outlined above. In Section 4, we provide some concluding remarks.

1. Model I: The Free-Rider Effect

Throughout this paper, we assume that the country under consideration is small in that it takes the world commodity terms of trade as given. By appropriate choice of units, we set the world prices of all goods equal to unity. Domestic prices differ from the world prices by the amount of trade taxes paid per unit.

Formally, our analysis may be cast in terms of a two stage model. In the first stage, the government chooses the tariff regime. In the second stage, all economic activity takes place and producers decide how much political activity to undertake. By assumption, only two options are available to the government in the first stage: a uniform tariff regime and a regime where tariff rates are allowed to diverge. Under the former regime, the government guarantees the same tariff rate for all sectors but is unable to choose its level. The level of tariffs is determined by political activity by producers (lobbying, for short) which the government is unable to resist. Under the alternative regime, both the level and structure of tariffs are determined by lobbying pressures.

We begin with a deliberately simple model. A key feature of this model is that protection to an importable will come entirely at the expense of the exportable. Stated differently, increased protection to one importable will have no effect whatsoever on the output of other importables. This feature of the model helps us distinguish the effects arising purely due to the free-rider problem under a uniform-tariff regime from those attributable to the interdependence of the degree of protection across different

importables. Later in the paper, we consider situations where the degree of protection in one sector depends on the rates of tariff in other sectors.

Let us begin by assuming that there are n+1 goods labeled 0, 1,... n. Good 0 is a composite exportable and goods 1,... n are importables. There are no taxes on the exportable so that its domestic price equals the world price, 1. The domestic price of the i^{th} importable equals $1+t_i$ where t_i is the ad valorem tariff on the good.

As noted earlier, we want to rule out the effects of a change in the tariff on one good on the degree of protection available to other importables. This feature is built into the model by assuming that each importable uses labor and a sector-specific capital while the exportable uses only labor. The latter assumption implies that the wage rate will equal the price of the exportable, which is, in turn, fixed in the world market at 1. Thus, importables and lobbyists will face an infinitely elastic supply of labor at wage rate 1. This ensures that a change in labor employment in an importable will be accompanied by an equal and opposite change in the exportable sector but no change in the quantity of labor and output in other importable sectors.

Letting X_i, L_i and $\bar{K}_i$, respectively, be the output, labor and capital in sector i, the production function for good i may be written

$$(1) \qquad X_i = F^i(L_i, \bar{K}_i) \qquad F^i_L(\cdot) > 0, \quad F^i_{LL}(\cdot) < 0; \quad i = 1, \ldots n$$

where $F^i(\cdot)$ is linear homogeneous in L_i and $\bar{K}_i$ and $F^i_L(\cdot)$ and $F^i_{LL}(\cdot)$ are, respectively, the first and second partials of $F^i(\cdot)$ with respect to L_i. Remembering that capital is sector specific, $\bar{K}_i$ is exogenously fixed. We assume that the $F^i(.)$ are distinct across sectors in the sense that $F^i(\cdot) \neq F^j(\cdot)$ for $L_i = L_j$ $(i, j = 1,\ldots,n)$.

Each sector consists of several identical, perfectly competitive firms. We assume that in making their hiring decisions, all firms act as perfect competitors in factor markets. Thus, they equate the value of marginal product of each factor to its price.

Taking the tariff rate as given for the moment, we can summarize the outcome of the firms' production decisions in sector i in a restricted profit function, $\pi^i(1+t_i, w; \bar{K}_i)$. Here $\pi^i(\cdot)$ is convex in $1+t_i$ and w. As usual, equilibrium levels of X_i and L_i may be written

$$X_i = \pi_1^i(1+t_i, w; \bar{K}_i) \tag{2}$$

$$L_i = -\pi_2^i(1+t_i, w; \bar{K}_i) \tag{3}$$

where $\pi_j^i(\cdot)$ $(j=1,2)$ is the first partial of $\pi^i(\cdot)$ with respect to the j^{th} argument.

We assume that lobbying is undertaken by sector-specific factors only. This assumption is consistent with the structure of the economy outlined above. Being employed in n+1 different sectors, labor is highly diffused. By contrast, sector-specific factors are concentrated.

We make three additional assumptions. First, capitalists in sector i do not consume good i.[5] This assumption simplifies the algebra and does not affect any of our qualitative conclusions. Second, lobbying is done at the sectoral level rather than at the level of the firm. Once again, this assumption simplifies the notation considerably without undue influence on the results. Finally, we assume that the lobbyists do not exert any monopsony power in labor market. Under the assumptions made so far, the wage rate is determined entirely in the exportable sector. Therefore, lobbyists, like firms, face a perfectly elastic supply of labor and do not have any monopsony power.

We are now in a position to specify the lobbying process.[6] By assumption, lobbying requires only labor. For brevity, we will refer to the uniform-tariff regime as UTR and to the regime which permits tariff divergence across sectors as non-uniform tariff regime or NTR. Under NTR, the relationship between the tariff and lobbying is summarized in the "production function" $g(\cdot)$ exhibiting decreasing returns to scale. Thus,

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[5] In terms of an old saying in India, "The baker never eats his own cake."

[6] The lobbying process described below is a modification of Rodrik (1986).

(4a) *NTR*: $t_i = g(l_i)$ $\quad g(0) = 0,\ g'(l_i) > 0,\ g''(l_i) < 0;\quad i = 1,...n$

where l_i is the amount of labor employed in lobbying in sector i. Observe that we are assuming that all sectors face the same g(.) function. This assumption implies that all sectors have "equal access" to protection and is intended to neutralize a potential source of asymmetry across sectors. We shall consider below an alternative model wherein the government is partial to some sectors.

Under the uniform-tariff regime, the tariff is determined by total lobbying effort in the economy. The technology is defined in a way that it is equivalent to the technology under NTR. We write,

(4b) *UTR*: $t = h(\sum_1^n l_j) = h(l)$ $\quad h(0) = 0,\ h'(\cdot) > 0,\ h''(\cdot) < 0$

where l_j is the amount of labor employed in lobbying by capitalists in sector j and l is the total, economy-wide labor employed in lobbying. Function h(.) is related to function g(.) as follows.

(5a) $h(l)|_{l=l_i} \equiv g\left(\frac{l_i}{n}\right);$

(5b) $h'(l)|_{l=l_i} < g'(l_i)$

The identity in (5a) may be interpreted as follows. Suppose that under UTR, lobbying is done by sector i only. Then the level of tariff generated for sector i (and other sectors) by employing l_i amount of labor under UTR is $h(l_i)$. Under NTR, sector i can obtain the same tariff by employing l_i/n amount of labor. Thus, from an individual sector's viewpoint, the productivity of labor in lobbying under UTR is 1/n times that under NTR. If under NTR each sector employs 1/n time the total amount of labor used in lobbying under UTR, the level and structure of protection will be the same under the two regimes. Put differently, to obtain a sector-specific t_i under NTR equal to t under UTR, producers in sector i have to lobby only 1/n times as hard. Note that we could have formalized the equivalence between the two

regimes differently, by assuming that to obtain an economy-wide t under UTR, n times as much lobbying in aggregate would be needed as required to obtain a t_i under NTR equal to t.[7] These two ways of stating the equivalence are not identical due to diminishing returns to lobbying. None of our qualitative results relies on our choice of the first form of equivalence. The key point is that under NTR all benefits of lobbying are internalized, whereas under UTR lobbying in one sector provides spillover benefits to other import-competing sectors.

According to the inequality in (5b), for equal amounts of labor employed in lobbying, the marginal product of lobbying is higher under NTR than under UTR. This assumption is plausible, and would hold for example under the specific, familiar function $g(l_i) = l_i^{\alpha}$ with $\alpha < 1$.[8] But the relationship in (5a) is not sufficient for its validity. In general, since the identity in (5a) yields $h'(l_i) = (1/n)g'(l_i/n)$ and since we assume $g''(\cdot) < 0$, (5b) does not follow from (5a).

Figure 1 relates $g(\cdot)$ and $h(\cdot)$ functions diagrammatically. We measure l_i and l on the horizontal axis and $g(l_i)$ and $h(l)$ on the vertical axis. Given the specification in (4a), $g(l_i)$ has the shape shown by curve Og. To derive $h(\cdot)$ from this curve, consider a specific value of l_i, say, $\bar{l}_i$. The value of $g(\cdot)$ corresponding to this value of l_i is given by point A on curve Og. Now suppose that we want to determine the value of $h(l)$ at $\bar{l} \equiv \bar{l}_i$. In view of (5a), this value of $h(l)$ will equal $g(\bar{l}_i/n)$ which, in turn, equals the height of point B. We can conclude that point C which lies horizontally to the right of B and vertically above $\bar{l}_i = \bar{l}$ must give $h(\bar{l})$. Proceeding in a similar fashion, we can determine all the other points on curve Oh which represents $h(l)$. The slope of Oh at C equals 1/n times the slope of Og at B. The inequality in (5) says that the slope of Oh at C is less than the slope of Og at A.

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[7] The relationship bewteen $h(\cdot)$ and $g(\cdot)$ would then be stated as follows: $g(l_i) = h(l)|_{l=nl_i}$.

[8] Given this form of $g(l_i)$ and the equality in (5a), $h(l)_{l=l_i} = (l_i/n)^{\alpha}$. Differentiating each of these functions with respect to l_i, we can verify that $g'(l_i) < h'(l_i)$. Moreover, since $\alpha < 1$, we also obtain $g''(.), h''(.) < 0$.

At this point, differences between the model in Rodrik (1986) and the present model may be noted. At first, it may seem that if we label sectors as firms in our model, we will obtain Rodrik's model. This is not true, however, for at least two reasons. First, in Rodrik (1986), firms within the importable sector share the same technology. In our model, various importable sectors necessarily have different technologies. Second, in Rodrik (1986), lobbying takes place at the level of the firm. In our model, lobbying takes place at the level of the industry. Both differences influence our results. The first difference leads to the result that under UTR, only one sector lobbies in equilibrium. By contrast, in Rodrik (1986), all firms lobby. The second difference leads to less restrictive second-order conditions than in Rodrik (1986). As a result, a small increase in the number of sectors under UTR in our model may lead to a rise in the amount of resources devoted to lobbying. In Rodrik (1986), an increase in the number of firms necessarily reduces the amount of resources employed in lobbying. These assertions are substantiated below.

The lobbying equilibrium is derived by maximizing profits generated by lobbying. Thus, under NTR, the capitalists' problem is

$$(6) \qquad NTR: \max_{l_i} \; g(l_i) X_i - w l_i$$

where $g(l_i)X_i = t_i X_i$ is the revenue generated by lobbying and wl_i is the cost of lobbying. We assume that lobbying decisions are coordinated at the industry level, but that production decisions are not. Therefore, lobbyists take industry-level output as given. Solution to (6) is given by

$$(7) \qquad g'(l_i^N) X_i^N = w$$

where superscript N is used to denote the equilibrium values of endogenous variables under NTR. Our assumption that capitalists take X_i as given while choosing l_i is consistent with full profit maximization in sector i and can also be derived from a model where lobbying takes place at the level of the firm.[9]

Making use of (2) after substituting $t_i = g(l_i)$, we can rewrite (7) as

(7') $$g'(l_i^N)\ \pi_1^i\ (1 + g(l_i^N),\ w;\ \bar{K}_i) = w$$

Remembering that the wage rate is already determined in the exportable sector (recall that w=1), this equation allows us to determine the equilibrium level of l_i^N and hence t_i. The assumption that the production functions, $F^i(.)$, are distinct across sectors ensures that the $\pi^i(.)$ are also distinct. Therefore, the tax rates implied by (7') will be different across sectors.

We can think of the left hand side of (7') as the marginal benefit from lobbying in sector i (mb^i) and the right-hand side as the marginal cost of lobbying. Using this interpretation, (7') simply says that l_i should be chosen so as to equate the marginal benefit of lobbying to the marginal cost.

Differentiating the left-hand side of (7') with respect to l_i^N, we obtain

(8) $$\frac{d(mb^i(l_i^N))}{dl_i^N} = g''(l_i^N)\ \pi_1^i(\cdot) + [g'(l_i^N)]^2\ \pi_{11}^i(\cdot)$$

The first term on the right-hand side is negative while the second one is positive. The second-order conditions of maximization require, however, that the $mb^i(l_i^N)$ be a negative function of l_i^N. Thus, the lobbying equilibrium may be depicted as in Figure 2.

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[9] Total profits in sector i are given by $[1+g(l_i)]\ F^i(L_i, \bar{K}_i) - w(L_i+l_i)$ where $g(l_i) = t_i$. Maximization of this expression with respect to l_i and L_i yields (7) and $(1+t_i^N)(\partial F^i/\partial L_i^N) = w$, respectively. We use the latter condition to obtain the profit function $\pi^i(1+t_i, w; \bar{K}_i)$ introduced earlier.

Next, let us consider the lobbying equilibrium under UTR. Given the lobbying function in (4b), the capitalists in sector i must now solve the problem

$$(9) \qquad \textit{UTR:} \quad \max_{l_i} \; h(\sum_{1}^{n} l_j) X_i - w l_i$$

We now demonstrate that given the assumption that the production functions $F^i(L_i, \bar{K}_i)$ are distinct across sectors, only one sector will actually lobby under the UTR. Observe that since the first term in the expression in (9) gives the total benefit from lobbying in sector i, the corresponding marginal benefit may be written

$$(10) \qquad MB^i(l^U) = h'(l^U)\, \pi_1^i(1 + h(l^U), w; \bar{K}_i) \qquad i = 1, \ldots n$$

where superscript U is used to distinguish the equilibrium under UTR. Also, in view of (4), $l^U = \sum_{1}^{n} l_j^U$ and $h(l^U) = t^U$.

Observe that under UTR, the MB^i depend solely on total, economy-wide lobbying. As this variable must be the same for all sectors, the only term which distinguishes the $MB^i(l^U)$ across sectors is $\pi_1^i(\cdot)$. Given that the $F^i(L_i, \bar{K}_i)$ are distinct across sectors, $\pi_1^i(\cdot)$ will also be distinct. For convenience, let us index goods in such a way that for a given value of l^U, $\pi_1^1(\cdot) > \pi_1^2(\cdot) \ldots > \pi_1^n(\cdot)$.

We depict the $MB^i(l^U)$ curves for all n sectors in Figure 3. Given the indexing just introduced, MB^1 lies above MB^2 which, in turn, lies above MB^3 (not shown), and so on. This ranking implies that if there is any lobbying at all, sector 1 will necessarily lobby. To make the analysis meaningful, assume that the first-order condition associated with (10) is satisfied as a strict equality for sector 1. To wit,

$$(11) \qquad h'(l^U)\, \pi_1^1(1 + h(l^U), w; \bar{K}_1) = w$$

Therefore, sector 1 capitalists do lobby. Solution to (11) gives us $\overline{l}^U$ as shown in Figure 2.

What can we say about sectors 2, 3, ...n? For these sectors, we note that the $MB^i(l^U)$ at $l^U = \overline{l}^U$ are below the marginal cost of lobbying, w. Therefore, given that sector 1's capitalists choose $l_1^U =$

$\overline{t}^U$, these sectors have no incentive to lobby. In effect, the tariff they will lobby for (as given by the intersection of the MB^i curves (i=1, ...n-1) with the ww line) is less than what they are able to get from the lobbying choice made by sector 1!

We can now state

Proposition 1: Within the model outlined above, only one sector will lobby for tariff under a uniform tariff regime. By contrast, if tariff uniformity is not imposed, all sectors will lobby.

We now proceed to compare the levels of lobbying under UTR and NTR. The first point to note is that if n = 1, the equilibria will be identical under the two regimes. This is obvious because with n = 1, the free rider problem which distinguishes the two regimes disappears. In terms of (5a), functions $h(\cdot)$ and $g(\cdot)$ coincide.

If n > 1, the amount of resources devoted to lobbying is less under UTR than under NTR not only on the economy-wide basis but even within the sector which does all the lobbying under UTR. Although this result is intuitively plausible, it is useful to prove it formally.

In Figure 4, mb^1 depicts the marginal benefit curve of lobbying in sector 1 under NTR. The curve represents the left-hand side of (7') for i = 1. We denote the equilibrium level of lobbying in sector 1 under NTR by $\overline{l}_1^N$. Now let us evaluate MB^1 under UTR, given by the left-hand side of (11), at $l^U = \overline{l}_1^N$. Given (4) and (5), we see that $g(\overline{l}_1^N) > h(l^U)$ and $g'(\overline{l}_1^N) > h'(l^U)$ at $l^U = \overline{l}_1^N$. Making use of these inequalities and the fact that $\pi_1^1(.)$ is a monotonically increasing function of its first argument, we see that the left-hand side of (11) must be smaller than the left-hand side of (7'). That is to say, $MB^1 < mb^1$ at $l^U = \overline{l}_1^N$. Thus, the marginal-benefit-of-lobbying curve under UTR lies below that under NTR

as shown by MB^1 in Figure 4. Remembering that these curves are negatively sloped, we immediately obtain $\bar{T}^U < \bar{T}^N_1$. We have

Proposition 2. The level of lobbying in the sector which does all the lobbying under UTR is less than that in the same sector under NTR. By extension, the total amount of resources devoted to lobbying will be less under UTR than under NTR.

What is the effect of increasing the number of sectors on lobbying? Under NTR, addition of new sectors has no effect on the pre-existing sectors. New sectors draw resources exclusively from the exportable sector. But under UTR, the addition of new sectors exacerbates the free rider problem and does alter the levels of lobbying and tariff. To determine the relationship between lobbying and n, we use (5a) and rewrite (11) as

$$(11') \quad (1/n)\left[g'\left(\frac{l^U}{n}\right)\pi_1^1\left(1+g\left(\frac{l^U}{n}\right), w; \bar{K}_1\right)\right] = w$$

The second-order condition ensure that the term in square brackets is a negative function of l^U/n. Therefore, an increase in n increases this term. At the same time, 1/n declines with n. Therefore, on balance, the left-hand side of (11') which represents the marginal benefit of l^U may rise or fall with n. In terms of Figure 4, the MB^1 curve may shift up or down with an increase in n. Thus, the effect of the increase in n on the resources devoted to lobbying is ambiguous in general.

Intuitively, an increase in n affects MB^1 in two ways. First, it reduces the MB^1 by exacerbating the free-rider problem. This effect is captured by the term 1/n in (11'). Second, as indicated by the term in square brackets, the increase in n increases the economy-wide marginal benefit from lobbying. Sector 1 also shares in this increase in marginal benefit. Thus, the two effects operate in opposite directions and

the MB^1 curve in Figure 4 may shift up or down with an increase in n; the effect on $\bar{t}^U$ is ambiguous in general.

The possibility that an increase in n can lead to an increase in t^U raises the interesting question: Can the increase in n also lead to an increase in the equilibrium level of tariff. The answer to this question turns out to be negative. In view of (5a), a rise in t^U requires a rise in I^U/n. Suppose that I^U/n does rise. The increase in I^U/n implies that the term in the square brackets of (11') must fall. This fact combined with the information that 1/n also declines with an increase in n implies that the MB^1 curve in Figure 4 must shift down. But a downward shift in the MB^1 curve implies that I^U must fall. Thus, the initial supposition of a rise in I^U/n is contradicted; I^U/n must fall with a rise in n. In the limit, as n approaches infinity, I^U/n and hence t^U must approach 0. We have

> Proposition 3. Under NTR, an increase in the number of sectors has no effect on the extent of lobbying and the degree of protection accompanying such lobbying in the pre-existing sectors. By contrast, under UTR, the addition of new sectors reduces the level of tariff but its effect on the level of resources devoted to lobbying is ambiguous. In the limit, as n becomes large, the endogenously-determined uniform tariff approaches 0.

Finally, let us compare the welfare levels under UTR and NTR.[10] We have shown that the level of the highest tariff under NTR (good 1 in our analysis above) is higher than the uniform tariff rate under UTR. In addition, more resources are devoted to lobbying under NTR than under UTR. Both of these factors work in favor of UTR being characterized by a higher welfare. However, tariffs on goods with next to the highest tariff under NTR may be higher or lower than the uniform tariff under UTR. For

[10] The notion of social welfare is somewhat ambiguous in the present context since the government is implicitly denied the power to redistribute income. This problem can be overcome, however, as in Rodrik (1986).

example, if the MB^2, MB^3,...,MB^n curves lie far apart from the MB^1 curve, tariffs on goods 2,3,...n under NTR will lie below the uniform tariff under UTR. However, for a sufficiently large number of sectors in the economy, the uniform tariff will be below all tariff rates under NTR. Thus, if n is large or potential lobbying under NTR is widespread, a UTR regime will yield a higher level of welfare. We summarize these results in

> Proposition 4. In general, the welfare ranking of UTR and NTR is ambiguous. If the number of importable sectors is large or potential benefits from lobbying are evenly spread across sectors, UTR will generate a higher level of welfare.

Before presenting the next model, we note that the present model can be modified to allow for a wage rate that is variable in terms of the price of the exportable, although such a modification complicates the analysis substantially. Thus, if we assume that the exportable also uses a specific factor, the wage rate will no longer be determined entirely in that sector. Instead, the wage rate will depend on labor demands from all sectors and lobbyists. The implication is that equations of the type shown in (7') cannot be solved for l_i^N independently of other equations of the model. Put differently, the wage rate in these equations is not a given constant but a function of different labor demands. This means that the tariff rates in different sectors become interdependent through the wage rate; higher protection for one import-competing sector implies a lower protection for the other sectors.

2. Model II: The Input-Price Effect

In the previous section, we have shown that the presence of a free-rider problem may be a strong motivating factor behind the adoption of a uniform-tariff rule. In this section, we suggest another factor

which may make the uniform tariff a desirable policy. In particular, we focus on imported intermediate inputs.

In order to draw a sharp distinction between the present model and the previous one, we deliberately assume away the presence of a free-rider problem. This is done by assuming that there is only one final importable and that the imported input is not produced at home. In this setting, there is only one sector which can benefit from lobbying for a tariff.

To introduce the model formally, assume that there are two final goods, 0 and 1. As before, good 0 is an exportable and uses labor only. Good 1 is an importable which uses a sector-specific capital, labor and a pure imported input. The imported input is denoted 2. We note at the outset that the assumption that the imported input is used in importable and not in the exportable plays an important role in our analysis. Implications of the model when the input is also used in the exportable are discussed later.

As in the previous section, taking the tariff rate as given, we can summarize the solution to the firms' profit maximization problem in sector 1 in the restricted profit function $\Pi^1(1+t_1, 1+t_2, w; \bar{K}_1)$. The partial derivatives of this function with respect to the first three arguments, respectively, yield the output, negative of imported-input demand, and negative of labor demand in sector 1.

The lobbying function in sector 1 is assumed to take the same form as in (4a). As there are no other import-competing sectors, (4b), (5a) and (5b) play no role in the present model. Under NTR, there being no lobby for sector 2, we have $t_2 = 0$. In sector 1, the lobbying equilibrium is given by

$$(12) \qquad g'(t_1^N)\Pi_1^1(1+g(t_1^N), 1, w; \bar{K}_1) = w$$

Solution to this equation yields t_1^N which, in conjunction with the lobbying function, enables us to determine the equilibrium tariff rate.

Next, consider the UTR. Here the tariff granted to good 1 is imposed automatically on the imported input as well. Therefore, the lobbying equilibrium is given by

(13) $g'(l_1^U)\Pi_1^1(1+g(l_1^U),\ 1+g(l_1^U),\ w;\ \bar{K}_1) = w$

Comparing (12) and (13), we see that for $l_1^U = l_1^N$, the left-hand side of the latter a smaller. That is to say, the marginal-benefit-of-lobbying curve under UTR will lie below that under NTR. It is then immediately obvious that in equilibrium, $l_1^U < l_1^N$ or equivalently $t^U < t_1^N$. Intuitively, under UTR, tariff protection is accompanied by a production tax on good 1 in the form of a tariff on the imported input. Therefore, the marginal benefit of lobbying is reduced and the lobbyists seek less protection than under NTR.

The lower tariff under UTR will be necessarily beneficial in terms of a smaller distortion in consumption. In addition, the presence of a tariff on the imported input implies a lower effective protection to the final importable and hence a smaller distortion in production. Finally, resources devoted to lobbying are also less under UTR. Thus, welfare is unambiguously higher under UTR. We have

> Proposition 5. Assuming that the imported input is used exclusively in the final importable, the tariff on the final importable is lower and welfare higher under UTR than under NTR.

We can now deal with two important complications. First, suppose that the imported input is also produced domestically. Then if both import-competing sectors can lobby for tariffs, the free-rider problem considered in the previous section will reappear. This factor by itself is favorable to UTR. However, we must now also take into account the distortionary effect of the tariff on the intermediate input. A priori, we cannot determine whether this distortion is lower or higher under UTR than under NTR. However, if the number of import-competing sectors is large, the free-rider problem will play a decisive role and UTR will be welfare superior.

The second complication has more serious implications. This complication arises when the imported input is used in the exportable. To make the point succinctly, assume that the input is not produced at home and that it is not used in the final importable. In this case, the zero-profit condition in good 0 dictates that the wage be a declining function of t_2. Thus, the restricted profit function in sector 1 will have the form $\Pi_1^1(1+t_1, w(1+t_2); \bar{K}_1)$ where $w'(.) < 0$. Under NTR, the tariff will be sought by and granted to only sector 1, i.e., $t_2 = 0$. In Figure 1, let mb^1 continue to represent the marginal-benefit-of-lobbying curve under this regime. If we now switch to the UTR, holding t^U at $\bar{T}_1^N$, w will decline and the marginal benefit from lobbying will shift up. That is to say, the MB^1 curve will now lie above the mb^1 curve. Moreover, the ww line will be below that shown in Figure 4. Thus, more resources will be devoted to lobbying under UTR than under NTR. More importantly, the level of tariff will be higher and the level of welfare lower under UTR. Intuitively, lobbying now has two benefits: not only does it increase protection, but it also reduces labor costs thanks to general equilibrium interactions.

These results suggest that when imported inputs are used primarily in exportables, a welfare maximizing government will not adopt the UTR. Here the option to combine the UTR with duty drawbacks on inputs used in exports becomes an attractive option. For it can be shown that when the UTR is combined with a duty drawback scheme, welfare is higher than under NTR.[11] A practical difficulty with this approach, however, is that the presence of the drawback itself undermines the government's credibility with respect to the UTR. Strictly speaking, the very presence of the drawback violates the uniform tariff rule and may open the government to attacks by lobbies for further exceptions to the rule.

From a practical standpoint, two qualifications to this complication may be noted. First, in most developing countries, imported inputs are used more intensively in import-competing goods than in

[11]For a recent analysis of input tariffs and duty drawbacks in a conventional trade model, see Panagariya (1991).

exportable sectors. Therefore, on balance these inputs may still favor the UTR over NTR. Second, the free-rider problem emphasized in the last section may be sufficiently important that despite the problem noted in the previous two paragraphs the level of tariffs under UTR may be sufficient to make it the preferred regime.

Model III: Precommitment Effect

In the last two sections, we have considered situations when protection is determined on the demand side. In this section, we consider briefly a model where protection is determined on the supply side. We hypothesize that the government in the first period has a conventional welfare function but knows that the future government will favor one or more specific sectors over the others. In this setting, the adoption of the UTR by the present government may serve as an instrument for tying the hands of a future government. Alternatively, a rational citizenry behind the Rawlsian veil of ignorance may wish to adopt the UTR. That is to say, if individuals do not know which sector will employ them after the veil is lifted, they may find the UTR the preferred regime.

Our point can be made most simply using a model with one exportable and two importables. Both importables are final goods. As before, the exportable is denoted 0 and importables 1 and 2. The exportable uses only labor while importables use labor and a sector-specific factor. Assuming that the future government has a preference for sector 1, its problem may be written

$$(14) \quad \underset{t_1, t_2}{Max.} \quad \alpha\pi^1(1+t_1, w; \bar{K}_1) + \pi^2(1+t_2, w; \bar{K}_2) + wL - t_1\pi_1^1(1+t_1, w; \bar{K}_1) - t_2\pi_1^2(1+t_2, w; \bar{K}_2)$$

where $\alpha > 1$. If we set $\alpha = 1$, the expression in (14) represents the national income at world prices. The assumption $\alpha > 1$ implies that the government favors sector 1 over the other sector in its social

welfare function. The nation's true welfare as perceived by the present government or the citizenry behind the Rawlsian veil of ignorance is determined by a more conventional welfare function, however.

As in the previous two sections, the wage rate is determined entirely in sector 0. Therefore, w is fixed. The first order conditions under NTR are

$$(15a) \quad (\alpha-1)\pi_1^1(1+t_1^N,\ w;\ \bar{K}_1) - t_1^N\pi_1^1(1+t_1^N,\ w;\ \bar{K}_1) = 0$$

$$(15b) \quad - t_2^N\pi_1^2(1+t_2^N,\ w;\ \bar{K}_2) = 0$$

where superscript N distinguishes tariffs under NTR. Equation (15a) implies $t_1^N > 0$ while (15b) yields $t_2 = 0$. This result is quite intuitive: since the government weights the output of good 1 more heavily than the world price, a tariff on it is warranted. By contrast, Good 2 is weighted by the world price so that no tariff on it is warranted.

Next, suppose that the government's hands are tied by the uniform tariff rule. In this case, we must solve (14) subject to the constraint $t_1 = t_2 \equiv t$. The first-order conditions are now given by

$$(16) \quad \begin{aligned}(\alpha-1)\ \pi_1^1(1+t^U,\ w;\ \bar{K}_1) &- t^U\pi_1^1(1+t^U,\ w;\ \bar{K}_1) \\ &- t^U\ \pi_1^2(1+t^U,\ w;\ \bar{K}_2) = 0\end{aligned}$$

Comparing (15a) and (16), it can be shown that $t_1^N > t^U$. In general, we cannot say that under a conventional welfare function the country is necessarily better off under UTR than under NTR. However, the possibility that this may be so exists. It can be shown that the smaller the share of the preferred sector(s) in the economy the more likely that it is that the UTR will be superior.

The model in the present section should be distinguished from that in section 1. Unlike Model I, the present model has no lobbying costs. Therefore, the free-rider problem which was central in the former is absent from the latter. Instead, the result in the present case is driven by the fact that under

the UTR the government is forced to pay a penalty for protection to sector 1 in terms of protection to sector 2 which it would like to avoid.

Basic conclusions of this section may be summarized in

Proposition 6. Assuming that the government has a preference for particular sector, the tariff rate under UTR will be lower than that granted to the preferred sector under NTR. The level of welfare may be higher or lower under UTR, however. Ceteris paribus, the smaller the share of the preferred sector(s) in GDP measured at world prices, the more likely that welfare will be higher under UTR.

4. Conclusions

In spite of increasing popularity of uniform tariffs, to date the rationale for their superiority over alternative structures of tariffs has not been established. In this paper, we have focused on models where tariffs are determined endogenously. We have shown that in each of our models, it is possible for a uniform tariff regime to yield a higher welfare than a regime wherein tariffs are allowed to diverge across sectors.

We have identified three effects that may exert a moderating influence on political pressure for protection under tariff uniformity. The first of these is the free-rider effect: a uniform tariff regime is likely to generate less lobbying activity than a regime under which sectoral tariffs can differ. If the politically active import-competing sectors are numerous, this will enhance economic efficiency. The second is the input-price effect. When imported intermediate inputs are used predominantly in import-competing sectors (as in developing countries), tariff uniformity will reduce the enthusiasm of import-competing interests for tariffs. On the other hand, if imported inputs are used primarily in exportables, tariffs will be sought even more actively. Finally, we have the precommitment effect. Tariff uniformity

increases the cost to a future government of protecting favored sectors. If these favored sectors are small (relative to national income at world prices), a strategy of increasing costs in this manner is likely to enhance efficiency.

We think that our approach in this paper serves two important purposes. First, it highlights the need to be explicit about the logic that underlies the advocacy of tariff uniformity in specific cases. Vague references to "political-economy reasons" are insufficient to justify a preference for tariff uniformity. As we have shown, none of the arguments we have focussed on presents an unambiguous, airtight case for tariff uniformity. Second, our approach makes precise the set of circumstances under which political-economy arguments can indeed be relied on. Thus, if the arguments in this paper form the basis for the adoption of uniformity, it is essential to verify that the kind of lobbying pressures or governmental preferences for specific sectors which are central to our conclusions do exist. Moreover, it is important to verify that the conditions we have identified under which uniformity is desirable are likely to hold.

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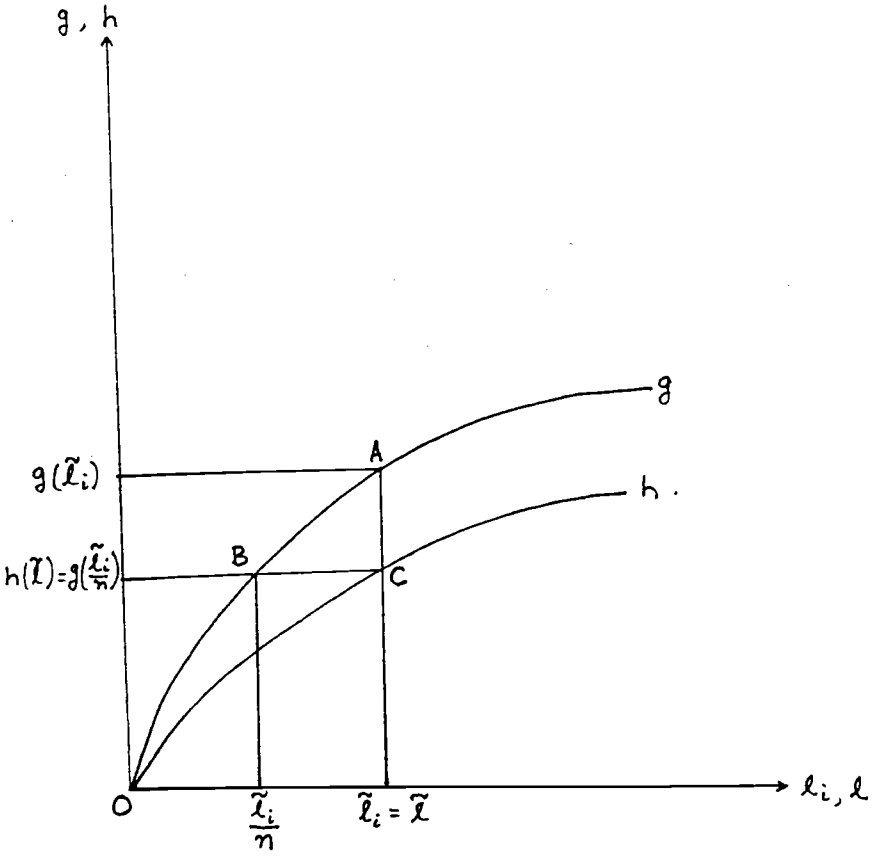
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Figure 1

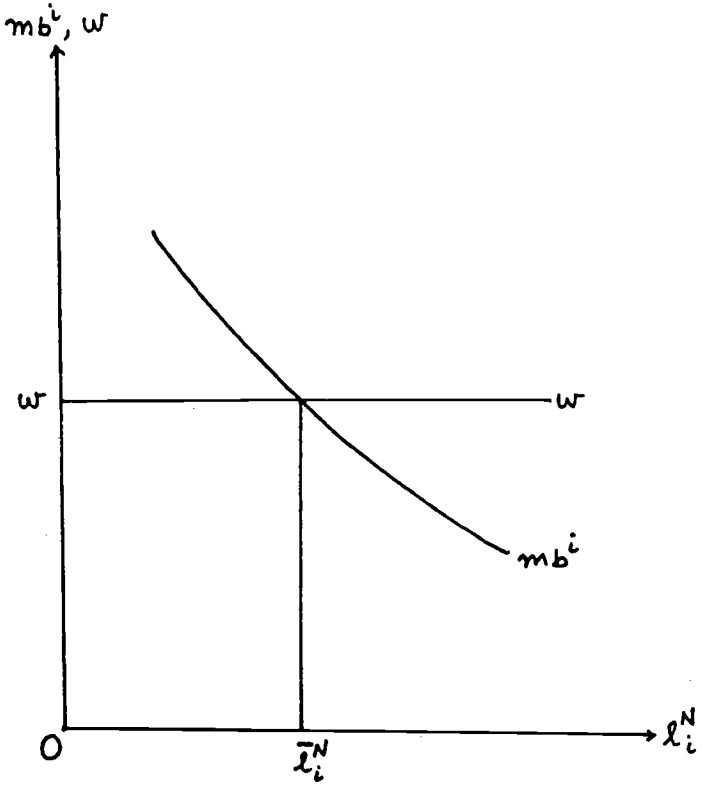

Figure 2

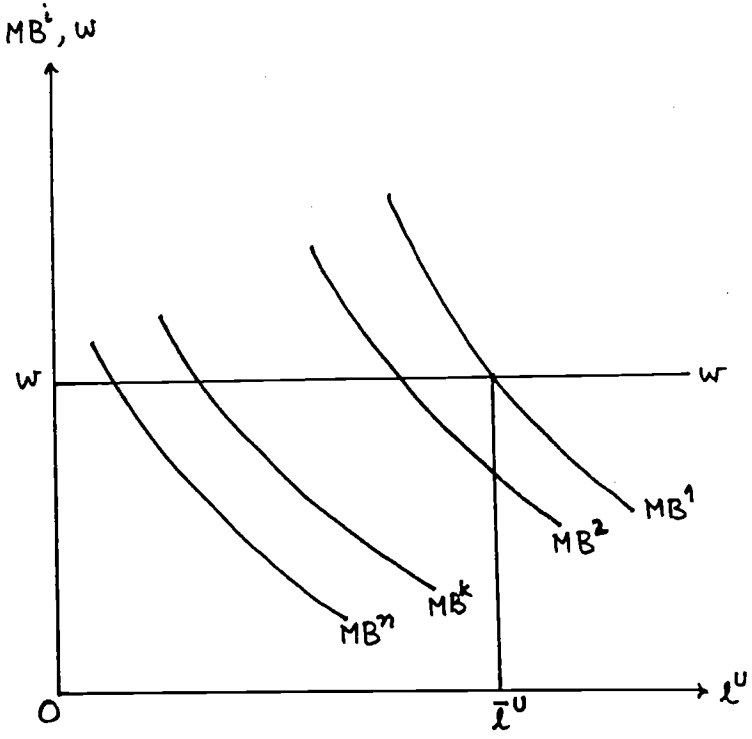

Figure 3

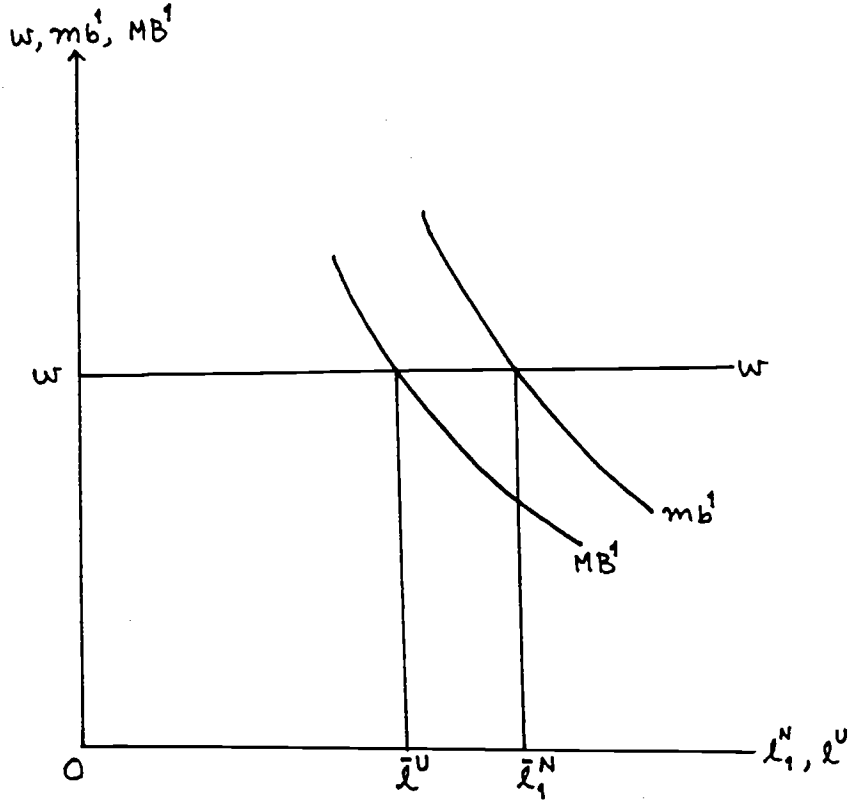

Figure 4