

Revenue Seeking: A Generalization of the Theory of Tariffs

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The theory of commercial policy has recently addressed three phenomena: (i) tariff (quota) seeking or lobbying by potential beneficiaries for the imposition of a tariff (quota), (ii) tariff (quota) evasion, and (iii) rent seeking or lobbying for getting an allocation of the import quota to earn the rents generated. Revenue seeking or lobbying to secure a share in the disposition of the tariff revenues is analyzed here. It is shown that revenue seeking may, even for a small country, result in a reduction in importable output. Furthermore, revenue seeking may be welfare improving. Rent seeking may be welfare improving as well.

I. The Problem

The formal theory of commercial policy, as constituted by the theory of trade and welfare, has traditionally failed to incorporate three types of phenomena that attend the imposition of tariffs:

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1. Tariff seeking (or tariff making): Where tariffs are imposed, for example, for protective (or other income-distributional) reasons, the potential beneficiaries of these protective tariffs will often lobby for their imposition.

2. Tariff evasion (or smuggling): Where tariffs exist, there is an incentive to evade them via smuggling, whether overt or in the form of overinvoicing and underinvoicing.

3. Revenue seeking: Where tariffs are imposed for, say, protective reasons, they will simultaneously happen to generate revenue. This, in turn, will generate a lobbying process to secure a share in the disposition of the revenues.

For each of the tariff (or "price") phenomena, there are corresponding *QR* (or "command") phenomena. Thus we have (1) *QR* seeking for protective reasons, (2) *QR* evasion, and (3) rent seeking, where there is (perfect or imperfect) competition and lobbying to get the licenses and hence earn the premia/rents that are associated with them, the licenses themselves having emerged from the (conceptually distinct) *QR*-seeking lobby's success at having the *QR*s established.

The first area of neglect has been addressed in much recent work, especially that of Brock and Magee (1978), and is attracting attention from analysts whose main objective is to explain why tariffs are what they are and, as in Cheh (1974), why they change in the way they do.¹

Recent analytical developments have also addressed the second area of neglect, beginning with the analysis of smuggling in the presence of tariffs by Bhagwati and Hansen (1973), utilizing the 2×2 HOS (Heckscher-Ohlin-Samuelson) model of trade theory. Numerous extensions of their work have followed, especially by Johnson (1972), Bhagwati and Srinivasan (1973), Bhagwati (1974), Sheikh (1974), and Ray (1978). Falvey (1978) has extended the analysis to smuggling in the presence of *QR*s, noting the nonequivalence of tariffs and *QR*s that follows in this case.²

However, the third area of neglect curiously continues to remain so. The familiar Meade (1952) assumption of lump-sum redistribution of tariff revenues has been widely used, preventing the analysis of revenue seeking, that is, the expenditure of real resources in the activity of getting a share of the revenues resulting from tariff imposition. That lobbies exist, and utilize real resources for pursuit of a share in the revenues that are disbursed by the state, is so obvious from the most

¹ There has been practically no integration of this work into general-equilibrium analysis or into the theory of trade and welfare. An important beginning has, however, been made by Findlay and Wellisz (1979).

² The phenomena of overinvoicing and underinvoicing, whose detection and economic causation have been analyzed in Bhagwati (1964, 1967), can also be analyzed identically as smuggling.

casual observation as to require no extended justification. However, whether the share of such revenues that gets to be sought through such lobbying is unity or less, on the average or for marginal increment in revenues, is a matter for empirical evaluation, and the setting up of "rules" subject to which revenues are disbursed is evidently a factor that tends to reduce this ratio below unity in many empirical contexts. The analysis of revenue seeking below, therefore, allows for the share of tariff revenues that is sought to vary below unity.

Our analysis of revenue seeking is developed in Sections II–V and is conducted within the general-equilibrium framework of the HOS model, thus permitting us to relate our findings readily to the main corpus of the general equilibrium theory of trade. Thus we are able, for example, to demonstrate how revenue seeking may, even for a small country, result in a reduction, rather than an increase, in the output of the importable industry.

By also focusing on the fact that, given the tariff, the introduction of resource-diverting revenue-seeking activity implies the withdrawal of factors from gainful employment into a zero-output activity in a tariff-distorted economy, we demonstrate the not-insignificant possibility (Sec. III) that revenue seeking may be welfare improving, and we establish the conditions for it to arise (Sec. IV), indicating therewith that this is a paradox but not a "theoretical curiosum."

As already noted, the "command" or *QR* counterpart of our revenue-seeking phenomenon is what Krueger (1974) has called "rent seeking." Her invaluable analysis of this phenomenon, conducted with the framework of a rather special, simplified model of complete specialization on one good but complicated via the introduction of a "distribution" sector, reached, however, the conclusion that rent seeking is always welfare worsening. This central conclusion is unfortunately not sustainable, as our analysis of revenue seeking, extended readily to rent seeking under a *QR* instead (in Sec. V), readily shows.

This reversal of her central conclusion, as also her exclusion of the possibility of revenue seeking, vitiates, furthermore, her "nonequivalence" proposition, that *QRs* are always inferior to tariffs because they attract rent seeking, embodied in the conclusion that "the major proposition of this paper is that competitive rent-seeking for import licenses entails a welfare cost *in addition to* the welfare cost that would be incurred if the same level of imports were achieved through tariffs" (1974, p. 295; emphasis added). Quite aside from the fact that rent seeking may be welfare improving and hence a *QR* with rent seeking may dominate a tariff without revenue seeking, Krueger's conclusion presupposes inappropriately that whereas the success of a protectionist lobby in getting a *QR* imposed will result in a rent-

seeking scramble for all the resulting premia/rents on the import licenses, an equivalent success of the protectionist lobby in getting a tariff enacted³ will be characterized by a total absence of a revenue-seeking scramble for a share of the resulting tariff revenues!⁴ Since even *QRs* are often allocated by reference to “rules,” or assigned to public-sector trading agencies or public-sector user corporations, a substantial fraction of the *QR*-generated rents is not “sought” in practice, whereas doubtless some fraction of revenues is sought, so that the extreme and opposed assumptions concerning tariffs and *QRs* underlying Krueger’s comparison thereof are unpersuasive.

A proper welfare comparison of tariffs and quotas, with both revenue seeking and rent seeking, is therefore undertaken by us in Section VI and is shown nonetheless to imply nonequivalence between the two under alternative, precise definitions of nonequivalence. Quite remarkably, different assumptions concerning the extent of revenue seeking and rent seeking are not necessary for this outcome.

Finally, in Section VII, we briefly reexamine the question of measuring the cost of protection, once revenue seeking is introduced.

II. Tariff Equilibrium with Revenue Seeking: The Geometry

Consider the standard 2×2 HOS model, with factors K and L , goods 1 and 2, a set of social indifference curves,⁵ and the “small-” country assumption so that the world goods price ratio is given.

The standard representation of a tariff equilibrium in this case is as in figure 1, with world price ratio (equal to minus the slope of the line)

³ The protectionist lobby will be indifferent whether it gets its protection through a tariff or a *QR*—in a world with certainty and full flexibility of *QRs* and tariffs in response to changing conditions. Evidently, this is not realistic, as noted in Bhagwati (1965).

⁴ The problem with Krueger’s argument stems evidently from the focus of the trade-and-developmental economists during the early 1970s on *QR*-generated rents. Thus, in analyzing the Indian economy’s reliance on industrial and import licensing, one of us had argued (Bhagwati 1973) that the system was creating a rentier society rather than encouraging the emergence of Schumpeterian entrepreneurs. The growth of a rentier class, and the rent-seeking activities, in a society with reliance on *QRs* was thus foremost in our thoughts. What one forgot then was that such rent seeking would be paralleled by revenue seeking if the same objectives were to be sought by “price” rather than “command” instruments, and therefore that a proper comparison between, say, a tariff and a quota to achieve a target increase in importable production, for example, would have to include revenue seeking for the tariff case if rent seeking was included in the quota case. This problem with the Krueger analysis was noted and discussed in Bhagwati (1978), but the need for a corrected analysis was merely indicated there and is being responded to in this paper.

⁵ For those who may find it offensive to assume social indifference curves (with attendant lump-sum transfers) in an analysis of revenue seeking, we may note that our conclusions are equally robust if we use the increment in the availability locus at world prices as a welfare improvement criterion in itself.

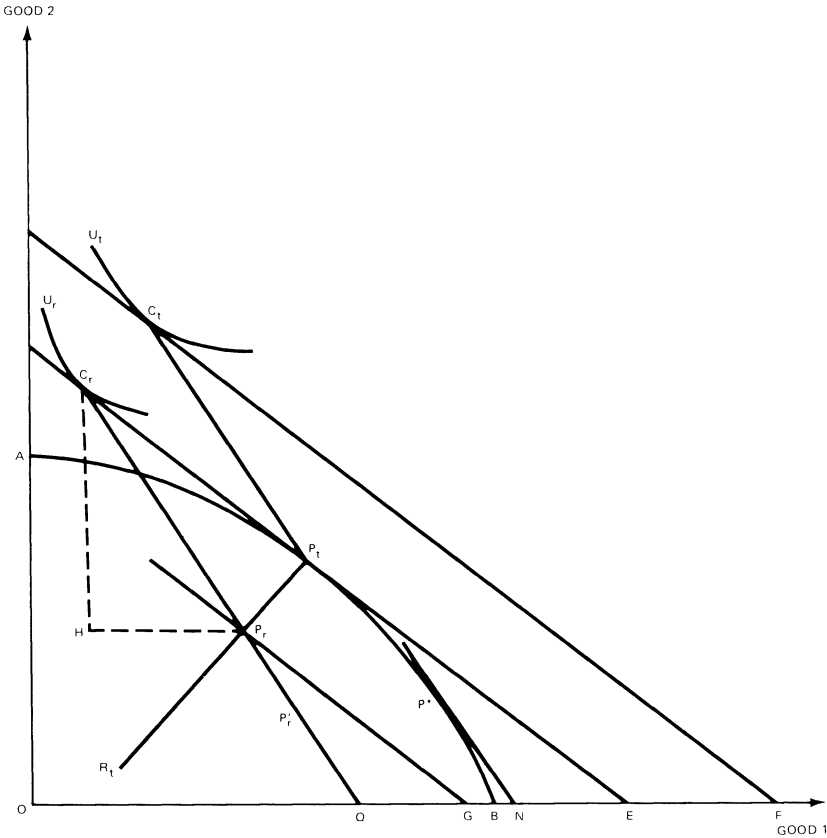


FIG. 1

$P_t C_t$, free-trade production at P^* , tariff-policy production and consumption at P_t and C_t , and the associated tariff revenue as EF in terms of good 1. Lump-sum transfer of revenues to consumers is assumed.

Now introduce revenue seeking into this HOS model. Envisage a production function in revenue seeking, with K_r and L_r being the factors used in rent seeking. It is evident that, given competition in this activity, the K_r/L_r ratio will be chosen to minimize costs, given the market values of the rental (r) and the wage (w).

In the 2×2 model, as long as we confine ourselves to incomplete specialization in production (as we do throughout Secs. II and III, but not in Sec. IV), the tariff-inclusive domestic goods price ratio ($C_t F = P_t E$ in fig. 1) will determine the factor price ratio, that is, the w and r faced by revenue seekers, and forthwith the K_r/L_r ratio.

Given this choice of K_r/L_r ratio, the total factors withdrawn from use in goods production at P_t will equal the amount of tariff revenue that

we assume to be subject to seeking. This follows from the fact that throughout we assume competitive revenue seeking. Our analysis will divide the total tariff revenue into two parts: the revenue that is sought and the Meade-type lump-sum transfer that escapes the seeking process. However, we will focus presently on the (empirically improbable) case where all revenue is sought and, only in Secs. III and IV, consider the case where some Meade-type transfer is permitted.⁶

Finally, the withdrawal of K_r and L_r for rent seeking will correspondingly reduce the total amount of factors available for production of goods 1 and 2. On the other hand, given the fixity of goods and factor prices, it is equally evident that the domestic consumption of goods will lie on the domestic expenditure line which is identical to the national-income-at-factor-cost line P_tE in figure 1. For domestic expenditure must equal domestic income in the revenue-seeking equilibrium, and the latter is nothing but the value of factors used in goods production plus the value of factors diverted to revenue seeking, which adds up to the value of all factors at w and r associated with P_t and hence to national income at factor cost at P_t .

The resulting revenue-seeking equilibrium is readily illustrated in figure 1. The domestic expenditure (or national income at factor cost) line is P_tE . Consumption must therefore occur at C_r . Moreover, the world price line must pass through C_r , so C_rQ is the world price line through C_r . At the same time, the new production point must lie on C_rQ , while it also lies on the generalized Rybczynski line P_tR_t —which is the locus of successive production points, at constant domestic goods price ratio P_tE , as factors are successively withdrawn for revenue seeking in proposition K_r/L_r . The production point that satisfies both the requirements is therefore clearly P_r . Then the difference between C_r and P_r defines C_rH as the import level, with tariff revenue now at GE : the value of factor income in goods production being OG , in revenue seeking being GE , and in aggregate being OE .

Note immediately that welfare falls, with the introduction of competitive revenue seeking, from U_t to U_r . This appears to be a thoroughly intuitive conclusion since resources are being diverted by revenue seeking to a "wasteful" activity with zero output (in terms of social valuation).⁷ However, as we note in Section III, this intuition

⁶ We will not, however, consider imperfectly competitive revenue seeking. As Tullock (1978) has noted in an interesting contribution, imperfectly competitive rent seeking may result in resource diversion that is less than the rents sought, and this is true, of course, of revenue seeking as well.

⁷ We are not assuming, with Tullock (1967), that tariff revenues are applied to wasteful projects such as building "tunnels that lead nowhere." However, revenue seeking leads to an outcome, in our analysis, that implies an identical zero-output diversion of resources.

needs correction: The welfare-worsening outcome is not the only possibility.⁸

III. Possible Paradoxes in the Presence of Revenue Seeking

Among the less compelling "paradoxical" outcomes, the following are evident from figure 1 on a little reflection.

i) The new, revenue-seeking equilibrium level of imports may exceed or be less than the original (prior to revenue seeking) equilibrium, that is, in view of similar triangles, as $C_r P_r \cong C_t P_t$. This has implications for the equivalence of tariffs and quotas, as argued in Section VI.

ii) The tariff revenue in the revenue-seeking equilibrium may exceed, equal, or be less than the original tariff revenue ($GE \cong EF$).

iii) Quite remarkably, the cost of revenue seeking shown in figure 1 is independent of any change in the production function of the revenue-seeking activity as long as the resulting shift in the Rybczynski line $P_t R_t$ continues to keep it intersecting $C_r Q$ at a point P_r representing incomplete specialization in the production of goods 1 and 2.⁹

However, the most remarkable paradoxes are the following in the positive and welfare analyses of tariffs.

iv) If the objective in imposing a tariff was to protect and thus increase the output of the importable good 2, the small-country assumption does ensure the absence of the Metzler production paradox (P_t , relative to P^* , implies an increase in the output of the protected good 2), when revenue seeking is absent. However, once revenue seeking is introduced, the Metzler paradox may arise despite the small-country assumption as when P_r is shifted to P'_r with $C_r Q$ and a modified $P_t R_t$ intersecting at P'_r to the southwest of P^* .

v) Again, the change in the production of the importable good following on revenue seeking opens up the interesting possibility that, in the presence of welfare-worsening revenue seeking, a target increase in the production of the importable good above the free-trade level may involve a lower (or a higher) tariff than in the absence of the revenue-seeking activity and, correspondingly, a lower (or a higher) welfare loss than that arising from a tariff without revenue seeking.

vi) More remarkably, we can show that revenue seeking may be welfare improving. To do this simply, we now consider the possibility

⁸ The full range of outcomes, and the conditions determining them, are the subject of the analysis in Sec. IV.

⁹ This proposition, however, does not hold for less than full competitive revenue seeking or where only a fraction of the revenue earned is sought and where complete specialization in production results.

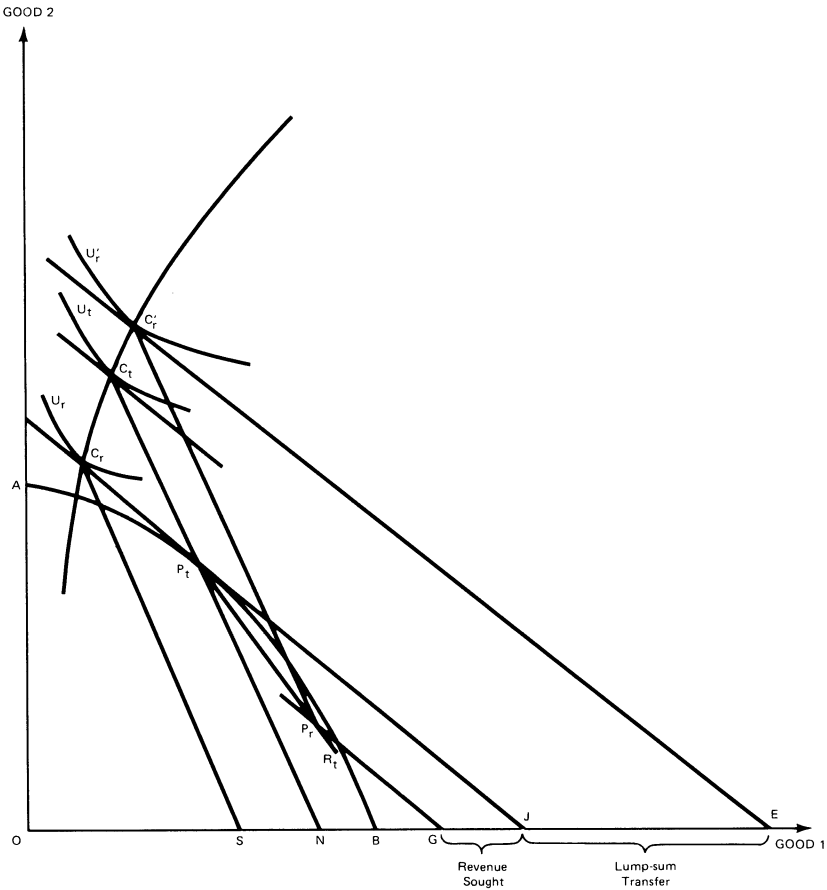


FIG. 2

that part of the revenue is handled as a Meade-type lump-sum transfer and only the remainder is competitively sought, so that the value of factors diverted to revenue seeking is less than the total revenue. Thus, consider figure 2, which uses much the same lettering as figure 1, and the income-consumption line at the tariff-inclusive domestic price ratio has been drawn. The difference is that the Rybczynski line $P_t R_t$ is now drawn flatter than the international price line $P_t N$. A possible revenue-seeking equilibrium is then shown at P_r , C_r' with total revenue collected at GE , the revenue offered and sought at GJ , and the lump-sum Meade-type transfer being JE . Thus welfare improves with revenue seeking to $U_r' (> U_t)$, and the proportion of tariff revenue disbursed to revenue seekers is less than unity, the proportion being GJ/GE .

This paradox is immediately resolved as soon as we recognize that the welfare-improving diversion of resources to the zero-output revenue-seeking activity in the tariff-distorted situation is formally identical to, and indeed the mirror image of, the phenomenon of immiserizing growth where the augmentation of resources in a tariff-distorted economy can immiserize the economy (as shown by Johnson [1967] and generalized in Bhagwati [1968]). Alternatively, the paradox can be understood by recognizing that the analytical problem of revenue seeking is equivalent formally to the problem of project evaluation in trade-distorted, small economies. In the latter case, given the trade distortion, resources are withdrawn for project use and can have a *negative* shadow price, as demonstrated and discussed in Bhagwati, Srinivasan, and Wan (1978) and Srinivasan and Bhagwati (1978), such that even a zero-output "project" (such as a "Keynesian" project to dig ditches and fill them up, under full employment) may be socially desirable. Analogously, in the former case, the zero-output, "wasteful" diversion of resources into revenue seeking from the trade-distorted equilibrium can be welfare improving: The shadow price of (one of the two) factors being withdrawn into revenue seeking may be negative.¹⁰

Once we have formulated the problem in mathematical terms, in the next section, it will be possible for us to go beyond a mere demonstration of this paradox and to delineate "zones" into which the Rybczynski line (R-line) may lie and thereby establish the conditions under which the outcome of revenue seeking may be welfare worsening or welfare improving. We therefore turn immediately to this analysis.

IV. Tariff Equilibrium with Revenue Seeking: The Mathematics

A. Formally, our model is simply stated as follows. We have:¹¹ \hat{k}_i = the (distorted-equilibrium) capital-output ratio, $\hat{\ell}_i$ = the (distorted-equilibrium) labor-output ratio, and X_i = output (activity) level, where $i = 1, 2, r$; $\sum X_i k_i = \bar{K}$, the fixed factor endowment of capital; $\sum X_i \ell_i = \bar{L}$, the fixed factor endowment of labor; and there are two goods, 1 and 2, and the revenue-seeking activity denoted by suffix r . As long as incomplete specialization in the production of goods 1 and 2 holds, as we assume initially, the coefficients \hat{k}_i and $\hat{\ell}_i$ are as at the nonseeking tariff-distorted equilibrium (i.e., as at P_i in figs. 1, 2). As considered

¹⁰ As Bhagwati et al. (1978) argue, the negative shadow price of a factor is a necessary, but not a sufficient, condition for a zero-output project to be welfare improving.

¹¹ The "hats" on the variables \hat{k}_i and $\hat{\ell}_i$ refer to their values reflecting the tariff-distorted equilibrium. For incomplete specialization, \hat{k}_i and $\hat{\ell}_i$ are obviously fixed parameters.

later, these coefficients will generally change after specialization in production is reached on good 1 or 2 with sufficient primary factor withdrawal to revenue seeking, and our analysis must be changed correspondingly.

The question at hand is, What is the welfare impact of factor withdrawal for revenue seeking? To consider this question, assume a standard social utility function, $U = U(C_1, C_2)$. We can then show that dU/dX_r has the same sign as dC_1/dX_r , and therefore the sign of the latter is sufficient to determine the welfare impact of revenue seeking. Thus, note that $C_1 = X_1 - E_1$ and $C_2 = X_2 + E_1/p^*$, where C_1, C_2 are the consumption levels of goods 1 and 2, E_1 is the export of good 1, and p^* is the relative international price of good 1.

It follows that, given the tariff rate t , we have:

$$\begin{aligned} \frac{U_2}{U_1} = p^*(1+t) \Rightarrow \frac{dC_2}{dX_r} &= - \left(\frac{U_{21}U_1 - U_{11}U_2}{U_{22}U_1 - U_{12}U_2} \right) \frac{dC_1}{dX_r} \\ &\equiv \theta \frac{dC_1}{dX_r}, \end{aligned}$$

where $\theta > 0$ under normality in consumption of both goods. Now,

$$\frac{dU}{dX_r} = U_1 \frac{dC_1}{dX_r} + U_2 \frac{dC_2}{dX_r} = U_1[1 + \theta p^*(1+t)] \cdot \frac{dC_1}{dX_r}, \quad (1)$$

so that $\text{Sgn}(dU/dX_r) = \text{Sgn}(dC_1/dX_r)$. Next, note that $C_1 + p^*C_2 = X_1 + p^*X_2$, from the balance of payments being assumed zero. Hence

$$\frac{dC_1}{dX_r} + p^* \frac{dC_2}{dX_r} = \frac{dX_1}{dX_r} + p^* \frac{dX_2}{dX_r},$$

and therefore¹²

$$(1 + \theta p^*) \frac{dC_1}{dX_r} = \frac{(\hat{k}_2 \hat{\ell}_r - \hat{\ell}_2 \hat{k}_r) + (\hat{\ell}_1 \hat{k}_r - \hat{k}_1 \hat{\ell}_r) p^*}{(\hat{k}_1 \hat{\ell}_2 - \hat{k}_2 \hat{\ell}_1)}. \quad (2)$$

But we can now introduce the concept of second-best shadow prices of primary factors at the tariff-distorted equilibrium, \hat{w}^* and \hat{r}^* , these being calculated à la Srinivasan and Bhagwati (1978) as the solution to the two equations,¹³ $1 = \hat{\ell}_1 \hat{w}^* + \hat{k}_1 \hat{r}^*$, and $p^* = \hat{\ell}_2 \hat{w}^* + \hat{k}_2 \hat{r}^*$, which yields

$$\hat{w}^* = \frac{p^* \hat{k}_1 - \hat{k}_2}{\hat{k}_1 \hat{\ell}_2 - \hat{k}_2 \hat{\ell}_1}, \quad (3)$$

¹² This is derived by substituting for dX_i/dX_r ($i = 1, 2$) from $\hat{k}_1(dX_1/dX_r) + \hat{k}_2(dX_2/dX_r) = -\hat{k}_r$ (full utilization of capital) and $\hat{\ell}_1(dX_1/dX_r) + \hat{\ell}_2(dX_2/dX_r) = -\hat{\ell}_r$ (full employment of labor).

¹³ The hats on \hat{w}^* and \hat{r}^* refer to the fact that these shadow prices reflect the tariff-distorted equilibrium coefficients, \hat{k}_i and $\hat{\ell}_i$, while the asterisks refer to the optimi-

and

$$\hat{r}^* = \frac{\ell_2 - p^*\ell_1}{\hat{k}_1\ell_2 - \hat{k}_2\ell_1}. \quad (4)$$

Substituting (3) and (4) into (2), we then get

$$(1 + \theta p^*) \frac{dC_1}{dX_r} = -(\ell_r\hat{w}^* + \hat{k}_r\hat{r}^*). \quad (5)$$

Therefore, given (1) and (5), we deduce that

$$\text{Sgn } \frac{dU}{dX_r} = \text{Sgn } -(\ell_r\hat{w}^* + \hat{k}_r\hat{r}^*). \quad (6)$$

This result is easily understood, for revenue seeking withdraws primary factors from the tariff-distorted resource allocation. The "output" from this revenue-seeking activity has a zero social valuation. Therefore, the welfare impact of the revenue seeking will be negative or positive exclusively as the social cost of the factors withdrawn; that is, $(\ell_r\hat{w}^* + \hat{k}_r\hat{r}^*)$ is positive or negative.¹⁴ Note, moreover, that the social cost of the factors withdrawn is equal to, and in fact derived from, the social cost defined in terms of the revenue-seeking-caused change in output of goods 1 and 2, valued at the international prices; that is, it equals $(\Delta X_1 + p^*\Delta X_2)$.

B. Next we can delineate three zones, around the initial tariff-determined production equilibrium P_t in figures 1 and 2, wherein the R-line may lie, with corresponding welfare-impact implications.¹⁵

In figure 3, we show P_t and the relevant segment of the production possibility curve. The three zones, I, II, and III, are then evidently designated by drawing the vertical and horizontal lines through P_t . Since the entry of the R-line into the three zones implies differential behavior of X_1 and X_2 vis-à-vis P_t , since this behavior can, in turn, be tied into the social cost of the factors diverted to revenue seeking (as noted at the end of the preceding subsection A) and therefore directly into the welfare impact of revenue seeking, we first derive the formulae governing ΔX_1 and ΔX_2 in response to revenue seeking.

Thus, assuming X_1^0 and X_2^0 to be the initial output levels at P_t , and the production levels with revenue-seeking activity at level $X_r > 0$ (but with incomplete specialization in production) to be X_1 and X_2 , and

zation; they are therefore second-best shadow factor prices. Also see the important paper of Findlay and Wellisz (1976) on second-best shadow prices.

¹⁴ Seen thus, the criterion for the sign of the welfare impact of revenue seeking in (6) is a special case of the criterion for evaluating the desirability of a project, the special case consisting in the "project" having zero output.

¹⁵ For an analogous delineation of welfare-improving and welfare-worsening cones in the context of making resource-allocational inferences from domestic resource calculations in trade-distorted economies, see Bhagwati and Srinivasan (1979).

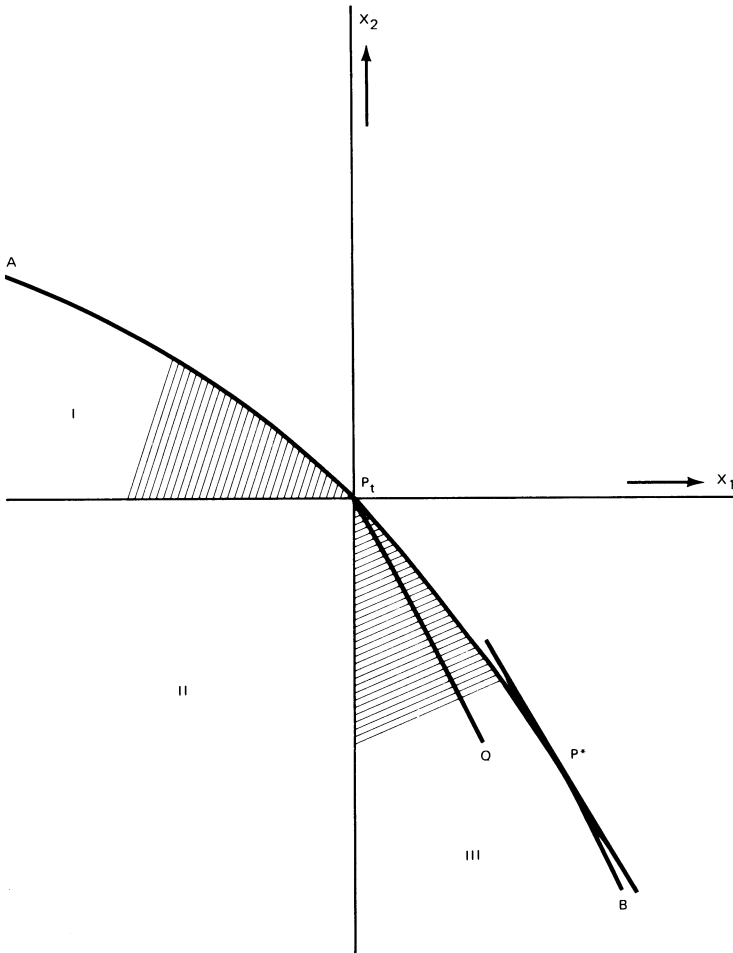


FIG. 3

defining $\Delta X_1 = X_1 - X_1^0$ and $\Delta X_2 = X_2 - X_2^0$, we have the following: $X_1 \hat{k}_1 + X_2 \hat{k}_2 + X_r \hat{k}_r = \bar{K} = X_1^0 \hat{k}_1 + X_2^0 \hat{k}_2$, and $X_1 \hat{\ell}_1 + X_2 \hat{\ell}_2 + X_r \hat{\ell}_r = \bar{L} = X_1^0 \hat{\ell}_1 + X_2^0 \hat{\ell}_2$. Then $\hat{k}_1 \Delta X_1 + \hat{k}_2 \Delta X_2 = -X_r \hat{k}_r$, and $\hat{\ell}_1 \Delta X_1 + \hat{\ell}_2 \Delta X_2 = -X_r \hat{\ell}_r$. Hence

$$\Delta X_1 = - \left(\frac{\hat{k}_r \hat{\ell}_2 - \hat{\ell}_r \hat{k}_2}{\hat{k}_1 \hat{\ell}_2 - \hat{k}_2 \hat{\ell}_1} \right) X_r, \tag{7}$$

and

$$\Delta X_2 = - \left(\frac{\hat{k}_1 \hat{\ell}_r - \hat{\ell}_r \hat{k}_r}{\hat{k}_1 \hat{\ell}_2 - \hat{k}_2 \hat{\ell}_1} \right) X_r. \tag{8}$$

Now, without loss of generality, assume that good 1 is the exportable and, moreover, capital intensive, that is, $\hat{k}_1/\hat{\ell}_1 > \hat{k}_2/\hat{\ell}_2$, and, further, that $X_r > 0$. Then we can conclude:

Zone I: $\Delta X_1 < 0$ and $\Delta X_2 > 0$. This zone will necessarily be entered by the R-line if $\hat{k}_r/\hat{\ell}_r > \hat{k}_1/\hat{\ell}_1 > \hat{k}_2/\hat{\ell}_2$, as evident from (7) and (8). Recall that the social cost of revenue seeking is $(\Delta X_1 + p^*\Delta X_2)$, which is, of course, the same as $X_r(\hat{\ell}_r\hat{w}^* + \hat{k}_r\hat{r}^*)$. Therefore, we can see from figure 3 that, given the fact that the free-trade production point P^* is to the right of P_t (because good 1 is assumed to be the exportable), welfare improvement cannot occur in zone I since the output of the exportable (importable) decreases (increases) compared with P_t . Revenue seeking will therefore be necessarily welfare worsening.

Zone II: $\Delta X_1 \leq 0$ and $\Delta X_2 \leq 0$. This zone will necessarily be entered by the R-line if $\hat{k}_1/\hat{\ell}_1 \geq \hat{k}_r/\hat{\ell}_r \geq \hat{k}_2/\hat{\ell}_2$, as evident from (7) and (8). Again, it follows that revenue seeking cannot be welfare improving, as seen immediately from the social-cost formula, $(\Delta X_1 + p^*\Delta X_2)$.

Zone III: $\Delta X_1 > 0$ and $\Delta X_2 < 0$. This zone will necessarily be entered by the R-line if $\hat{k}_1/\hat{\ell}_1 > \hat{k}_2/\hat{\ell}_2 > \hat{k}_r/\hat{\ell}_r$. In this zone (and this zone alone), therefore, it is evident from figure 3, as also from the social-cost formula, that welfare-improving revenue seeking can occur. It will occur, furthermore, if and only if $(\hat{\ell}_r\hat{w}^* + \hat{k}_r\hat{r}^*) < 0$.

Moreover, we may subdivide zone III with the dashed international price line P_tQ . The R-lines in the subzone to the left of P_tQ evidently must result in necessary welfare worsening, whereas the R-lines in the subzone to the right of P_tQ must result in welfare improvement.¹⁶

V. Quota Equilibrium with Rent Seeking

Consider now the replacement of a tariff with a quota that is equivalent to it if there is neither revenue seeking nor rent seeking. Furthermore, let there be fully competitive rent seeking.

Note first that, in the final rent-seeking equilibrium, the rents on imports must equal the value of factors devoted to rent seeking, exactly as the tariff revenues equaled the value of the factors devoted to revenue seeking. Next, the generalized R-line P_tR for rent seeking (at the initial implicit tariff) need not be identical to that for revenue seeking since the K/L ratio in the two seeking activities may differ.

Thus consider figure 4, where the initial quota equilibrium, in the absence of rent seeking, is at P_t, C_t and the quota is for import-level \bar{M} . Assuming that P_tR_r is the generalized R-line (at the initial implicit

¹⁶ Note, however, that an R-line in the welfare-improving subzone of zone III, on reaching complete specialization, will wind back toward the origin and so will eventually enter the welfare-worsening zones. Finally, we may note that (as we have shown at some length in a subsection which is not being published for reasons of economy of space but which is available from us on request) the paradoxical possibility of welfare-improving revenue seeking is compatible with the share of revenue seeking in total revenue being unity, although, that would imply, in our model, that the economy would have reached complete specialization. Where the economy is incompletely specialized, the share of revenue seeking is less than unity.

Among the important conclusions that follow from the rent-seeking analysis is that the Metzler production paradox can evidently arise now as much as with the tariff plus revenue-seeking equilibrium: A *QR* may wind up deprotecting the importable industry!

The other paradoxes established for the revenue-seeking case in Section III will hold, *mutatis mutandis*, in the rent-seeking case. In particular, we should note that rent seeking can be welfare improving as much as revenue seeking was shown to be. And the condition for this paradox to arise can be put into the same shadow-wage format as in (6) for revenue seeking. This can be done by noting that, with the *QR* resulting in changes in factor-use coefficients and prices facing consumers even for "small" changes in rent-seeking activity, we cannot work with changes in value of output foregone at international prices as our welfare-impact index. The shadow prices of factors must therefore be expressed directly in terms of the effect on the utility function and can be derived to be

$$\hat{w}^* = U_1 \left(\frac{dX_1}{dL} + \frac{f_1^1}{f_1^2} \cdot \frac{dX_2}{dL} \right) (X_r \text{ fixed}), \quad (9)$$

and

$$\hat{r}^* = U_1 \left(\frac{dX_1}{dK} + \frac{f_1^1}{f_1^2} \cdot \frac{dX_2}{dK} \right) (X_r \text{ fixed}), \quad (10)$$

where $f^i(k_i, \ell_i) = 1, i = 1, 2, r$, are the "intensive" production functions in the three activities. We can then get the welfare impact of rent seeking quite simply into the now-familiar format as

$$\frac{dU}{dX_r} = -(\ell_r \hat{w}^* + k_r \hat{r}^*), \quad (11)$$

and the welfare-improving paradox will evidently reappear when the bracketed social cost is negative and leads to $dU/dX_r > 0$.

VI. The Nonequivalence of Tariffs and Quotas

The preceding analysis has immediate implications for the question of whether tariffs and quotas are equivalent once seeking activities are introduced. Specifically, if the import level in the revenue-seeking equilibrium were turned into a quota (with attendant rent seeking), and all revenues and rents were fully and competitively sought, would this quota lead to an identical implicit tariff as the explicit tariff that was being replaced—this being the equivalence definition of Bhagwati (1965)? That is, if the import level in the tariff-with-revenue-

seeking equilibrium (i.e., C_rH in fig. 1) were turned into a quota and rent seeking were then present, would not this quota lead to an identical real equilibrium, with the implicit tariff equal to the earlier explicit tariff and therefore with production at P_r and consumption at C_r ? It should be evident now that this can happen only if the generalized Rybczynski locus P_tR_t for revenue seeking and the locus P_rR_r for rent seeking were the same. Otherwise, the quota C_rH will exceed or fall short of the imports in the rent-seeking equilibrium (at the implicit tariff defined by domestic price line P_tE), and the final rent-seeking equilibrium with import level C_rH will involve a reduced or increased implicit tariff.

In this important sense just defined, therefore, tariffs and quotas cease, generally speaking, to be equivalent when revenue seeking and rent seeking accompany them, respectively, and the nonequivalence arises essentially from the differences in capital intensity that can exist between the revenue-seeking and rent-seeking activities. This nonequivalence is at a much deeper level and is based on a more appropriate formulation of the problem than the Krueger (1974) proposition of nonequivalence which rests on permitting rent seeking for the quota and omitting altogether revenue seeking for the tariff.

An implication of the immediately preceding argument is that, if revenue seeking is admitted on the tariff side just as rent seeking is admitted on the quota side, this renders invalid Krueger's (1974, p. 295) central conclusion that, subject to an identical import level, the quota equilibrium will necessarily involve lower welfare vis-à-vis the tariff equilibrium. Thus, fixing the import level at the amount reached in the revenue-seeking equilibrium, it is easily seen that the rent-seeking equilibrium will imply lower or higher welfare than the revenue-seeking equilibrium according as the implicit tariff is higher or lower in the rent-seeking equilibrium. The outcome therefore may imply, in particular cases, that a quota is worse than a tariff, but it may imply the opposite as well.

VII. Measuring the Cost of Protection with Seeking

Finally, what happens to the familiar Hicksian measures of the cost of protection, as in Johnson's (1960) classic paper on the cost of protection? Lack of space forbids us to illustrate our argument fully. But it is evident that, in the presence of revenue seeking, the cost of protection can be decomposed in two alternative ways: either (1) take the "true" shift in production (e.g., from P^* in free trade to P_r in tariff-with-revenue-seeking equilibrium in fig. 1) in measuring the production cost (which would then be QN in terms of good 1 in fig. 1) and add to it the usual consumption cost; or (2) decompose the "true" production

cost (QN) into two elements: (i) the production cost corresponding to the production shift as it would occur in the absence of revenue seeking under the tariff (i.e., from P^* to P_t in fig. 1) and (ii) the further cost (or gain) corresponding to the added shift in production thanks to revenue seeking (i.e., from P_t to P_r in fig. 1).

Correspondingly, if the analyst is considering the cost of a quota with rent seeking that has led to an identical equilibrium shift in production (P^* to P_r in fig. 1), the two alternative ways of approaching the cost of protection are equally applicable (with GE representing, not tariff revenue, but the rents on the quota).

What does one make of Krueger's proposition that the cost of quota protection is now the cost of its "tariff equivalent" (without revenue seeking) "plus the value of the rents" (1974, p. 302), that is, that the total cost in figure 1 is (i) the production cost corresponding to the shift from P^* to P_t plus (ii) the consumption cost plus (iii) the value of the rents (GE)?

This is evidently inappropriate for two reasons: First, the value of the rents is always positive, whereas, under conditions established in Section IV above, the production cost of the seeking activity may be negative and hence a gain (as in the shift from P_t to P_r in fig. 2 rather than fig. 1), and second, even when the added production shift imposed by rent seeking imposes a production cost, this will be less than the value of the rents except under complete specialization in production of the exportable good.¹⁷ Moreover, an empirical analyst must also note that it is extremely unlikely that all rents will be sought competitively.

For all these reasons, it is certain that the valid procedure to estimate the cost of protection in the presence of seeking activities is to measure this cost conventionally, taking the production cost as that defined by the shift in production to the seeking equilibrium from the free-trade equilibrium. This does mean that the analyst must estimate, in general equilibrium with suitable specification of the seeking activities as in this paper, the shift in production from the observed seeking equilibrium (P_r) to the hypothetical free-trade equilibrium (P^*). But this has to be done in any case, even if seeking activity is at zero level as in the conventional analysis.

VIII. Concluding Observations

We hope to have opened up an entirely new, and important, aspect of the theory of tariffs and welfare by analyzing revenue seeking. The

¹⁷ Both of these possibilities were excluded by the restrictive model of Krueger (1974), which assumed complete specialization on the exportable good and that all rents were sought competitively.

analysis is further applicable, it should be evident, quite without qualification to the welfare effect of tariffs (in the absence of revenue seeking) when their collection involves a direct cost. For, in this case, we would be considering a situation that is formally equivalent to revenue seeking: The use of primary factors in revenue seeking associated with tariffs is, to that extent, identical with the use of these factors instead for revenue collection.

It should be emphasized that one of our central conclusions, that is, that revenue seeking may be welfare improving, follows from the fact that resource diversion to seeking activities occurs in a second-best situation since the economy is characterized by a tariff distortion. Therefore, conclusions based on first-best intuitions, that is, that resource diversion to "unproductive" activities must be wasteful, will not carry over into the analysis of seeking activities. It is this inadvertent confusion between first-best and second-best analyses which really accounts for the erroneous conclusion by the analysts of rent-seeking activities in the *QR* case that they necessarily increase the losses imposed by the *QR* directly.

Finally, many extensions suggest themselves. For example, it would be fruitful to establish the conditions under which the Metzler production paradox, demonstrated only as a possibility in this paper, would arise. Similarly, the conditions under which a tariff would have to be increased (decreased) in order to maintain a certain target level of importable production could also be established. The interaction of tariff evasion with revenue seeking also provides yet another example of the kind of policy-relevant welfare-theoretic analysis that could be undertaken.

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