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8 Endogenous Tariffs, the Political Economy of Trade Restrictions, and Welfare

Ronald Findlay and Stanislaw Wellisz

Evaluation of the welfare cost of trade restrictions has long been a major concern of economics and public policy. The founding fathers, both of our discipline and of our republic, were much concerned with this issue. Adam Smith complained that the deliberations of the legislature on these matters were directed by the "clamorous importunity of partial interests" rather than by "an extensive view of the general good," while James Madison in his famous tenth *Federalist* paper on the dangers of "faction" observed that "shall domestic manufacturers be encouraged, and in what degree, by restrictions on foreign manufacture, are questions which would be differently decided by the landed and manufacturing classes, and probably by neither with a sole regard to justice and the public good."

In the technical literature of applied welfare economics as represented by Harberger (1959) and Johnson (1960), for example, the welfare costs of exogenously given tariffs and quotas (or any taxes, subsidies, and quantitative restrictions) are assessed, in the tradition of Dupuit and Marshall, by calculating the areas of the "little triangles" of consumers' and producers' surplus lying beneath the demand and supply curves for the commodities on which these restrictions are placed. In this conventional theory of the cost of protection the increased rents to factors

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engaged in the protected industry are regarded as transfers to them from consumers or factors employed elsewhere in the economy, and are therefore not considered as constituting a cost to society as a whole.

Tullock (1967), however, rightly argues that various interest groups in the society would actively seek to promote the generation of these rents arising from the imposition of tariffs while others whose interests are adversely affected would seek to prevent them. Both sides would absorb scarce resources in the conflict over the extent and structure of trade restrictions, and the social value of these resources should be considered in addition to the conventional deadweight loss in arriving at estimates of the total welfare cost. Tullock illustrates his point by means of an extended analogy with theft, for which expenditures on safes and locks by the potential victim, and on nitroglycerine and oxyacetylene torches by the thieves constitute the social costs of the process of transferring incomes from the pockets of the law-abiding citizens to those of the criminals.[1]

Our purpose in this paper is to incorporate Tullock's valuable insight into the formal analysis of the welfare costs of a tariff. The tariff level will be determined endogenously in a general equilibrium model extended in the simplest possible way to incorporate the process of tariff formation emerging from the clash of opposing interest groups. The level of the tariff, the lobbying expenditures on "tariff seeking" and opposition thereto by the interest groups, and the associated deadweight losses will all be determined simultaneously within the same model. The analysis of this paper could be readily adapted to the topic of this conference, namely, the response to import competition, by having import competition initially trigger off tariff-seeking lobbying by the specific factor in the importable activity; this, in turn, would be opposed by the lobbying of the other specific factor in the model.

The general equilibrium structure employed will be that of the "specific factors" model used by Haberler, Ohlin, and Viner in their classic studies and recently revived by Jones (1971) and others. Two goods, "food" and "manufactures," are produced, with "land" specific to food and "capital" specific to manufactures. There is a constant returns to scale production function for each good, with the specific factor and labor as the arguments. Labor is homogeneous and freely transferable from one sector to the other. The international terms of trade are taken as given, and there is perfect competition in all factor and commodity markets. The supply of labor and of both specific factors is fixed.

In the absence of trade the relative price of food and manufactures will be determined by domestic demand conditions. With given factor supplies and technology, the rentals per unit of land and capital, equal to the marginal products of these specific factors in their respective sectors, can be determined as functions of the relative price of the two goods. If the given international terms of trade are such that the country has a comparative advantage in manufactures then the rental per unit of capital, and hence the total rents accruing to this specific factor, will fall as a result of trade while the rental per unit of land and the total rents of the landowning class will rise in terms of food and fall in terms of manufactures as labor is transferred from the former to the latter sector in response to the opportunity to engage in trade.

Suppose that both the landed and manufacturing interests are organized into Madisonian "factions" or pressure groups capable of influencing the political process with labor being purely passive. The landed interest would try to introduce a tariff on food at a prohibitive level if they could get away with it, whereas the manufacturing interest would try to preserve free trade. Depending upon the relative strengths and commitments of the two sides it is plausible to think that some tariff between zero and the prohibitive level will emerge. The social value of the resources used up by both sides in this struggle would constitute a welfare cost over and above the familiar deadweight loss associated with whatever tariff level emerges from the political process.

The following notation will be used in constructing the formal model:

F, M = outputs of food and manufactures,
T, K, L = fixed supplies of land, capital, and labor,
L_F, L_M = labor allocated to food and manufactures,
L_T, L_K = labor used in the political process by the landowning and capitalist interest groups,
π = fixed international price of food in terms of manufactures,
t = rate of tariff on imports of food,
p = domestic price of food in terms of manufactures,
w = real wages of labor in terms of manufactures,
q = rental per unit of capital in terms of manufactures,
r = rental per unit of land in terms of food.

The structure of the model is easily specified. Production functions for the two goods are

$$F = F(L_F, T), \tag{1}$$

$$M = M(L_M, K), \tag{2}$$

with constant returns to scale, positive first derivatives with respect to all arguments, and diminishing returns to labor in each case. The marginal product of each specific factor is an increasing function of the associated labor input.

Profit maximization and perfect competition result in

(3) $$p\frac{\partial F}{\partial L_F} = w,$$

(4) $$\frac{\partial M}{\partial L_M} = w,$$

(5) $$\frac{\partial F}{\partial T} = r,$$

(6) $$\frac{\partial M}{\partial K} = q,$$

The domestic price ratio p is connected to the given international terms of trade π by the relation

(7) $$p = (1 + t)\pi$$

where the tariff rate t is an *endogenous* variable to be determined by the operation of the political process as influenced by the pressure groups representing the landed and manufacturing interests.

Brock and Magee (1978) summarizes their own pioneering research on the political economy of tariffs, reported in a series of working papers. They apply sophisticated game-theoretic mathematical approaches to modeling the behavior of voters, parties, and lobbies in electoral processes that determine tariff levels. For our present purposes a much simpler formulation of the political process that can perhaps be considered as a "reduced form" of the Brock-Magee framework is possible.

Taking political institutions and attitudes in the country as given, we assume that a tariff level is determined as a stable function of the resources committed to the political process by each of the two interest groups. For convenience let labor be the sole input used by both sides in their political activities. This leads to the hypothesis that

(8) $$t = t(L_T, L_K),$$

which states that a determinate tariff results once the input of each interest group is specified. It is clearly reasonable to suppose that

$$\frac{\partial t}{\partial L_T} > 0, \quad \frac{\partial t}{\partial L_K} < 0,$$

$$\frac{\partial^2 t}{\partial L_T^2} < 0, \quad \frac{\partial^2 t}{\partial L_K^2} > 0,$$

implying that there are "diminishing returns" to both groups from participation in political activity. The positive increments in the tariff level resulting from successive unit increments in the input of the protariff group get smaller and smaller while the reductions attainable by the antitariff group also get smaller and smaller in absolute value. No compelling argument can be found, at the present level of generality, for attaching any restrictions on the sign of the cross-derivative. It is assumed that both L_T and L_K receive the going wage w.

Equilibrium in the labor market requires

$$L_F + L_M + L_T + L_K = L. \tag{9}$$

To the extent that they are successful the activities of the pressure groups constitute voluntary public goods for the individual landowners and capitalists. The "free rider" problem pointed out by Olson (1965) in this context is assumed to be solved somehow, so that we leave aside the internal organization of the groups, each of which is treated as a single "rational" agent that seeks to maximize its "class" interest in the political process. It should be apparent, however, that this collective action by landowners and capitalists only takes place in the "political" sphere, atomistic competition being the rule in the "economic" sphere of the production of food and manufactures and the distribution of the income arising therefrom. The two spheres are, however, obviously linked into a single interdependent system by virtue of the endogenous nature of the tariff.

Before considering the explicit determination of L_T and L_K, it will be helpful to note some properties of the model that follow if L_T and L_K are taken as given. From (8) the value of t is determined and hence of p from (7). Defining the labor available for production as

$$L_A = L - (L_T + L_K), \tag{10}$$

it follows readily from the structure of the model that F, M, $\underline{r}$, $\underline{q}$, and $\underline{w}$ are each determined as functions of p and L_A alone with the properties

$$\frac{\partial F}{\partial p} > 0, \quad \frac{\partial F}{\partial L_A} > 0, \tag{11}$$

$$\frac{\partial M}{\partial p} < 0, \quad \frac{\partial M}{\partial L_A} > 0, \tag{12}$$

$$\frac{\partial r}{\partial p} > 0, \quad \frac{\partial r}{\partial L_A} > 0, \tag{13}$$

$$\frac{\partial q}{\partial p} < 0, \quad \frac{\partial q}{\partial L_A} > 0, \tag{14}$$

$$\frac{\partial w}{\partial p} > 0, \quad \frac{\partial w}{\partial L_A} < 0. \tag{15}$$

Assuming that there would be free trade in the absence of any political pressure by the landed interest and that the political activities of the manufacturers are purely defensive in nature, the income of the landowners in terms of manufactures when L_T equals zero would be $\pi r(\pi, L)T$. The net benefit from engaging in the political process to the landowning class is therefore

$$
\begin{aligned}
N_T &= p(L_T, L_K) r[p(L_T, L_K), (L - L_T - L_K)]T \\
&\quad - \pi r(\pi, L)T - w[p(L_T, L_K), (L - L_T - L_K)]L_T \qquad (16)
\end{aligned}
$$

in which L_K is taken as a parameter. Note that the second term is independent of both L_T and L_K and is therefore a constant determined by the given values of π, L, and T. The dependence of $\underline{p}$ on L_T and L_K follows from (7) and (8). The first-order condition for maximizing N_T with respect to L_T is

$$
(17) \qquad \left[\left(1 + \frac{p}{r}\frac{\partial r}{\partial p}\right) \frac{LT}{p}\frac{\partial p}{\partial L_T} + \frac{LT}{r}\frac{\partial r}{\partial L_T} \right] \frac{prT}{L_T}
$$

$$
= \left[1 + \frac{L_T}{w}\frac{\partial w}{\partial L_T} + \frac{p}{w}\frac{\partial w}{\partial p}\frac{L_T}{p}\frac{\partial p}{\partial L_T} \right] w,
$$

which states, in elasticity form, that the marginal contribution of L_T in raising land rents prT should be equal to the marginal cost of L_T. Notice that an increase in L_T has three separate effects on the income from land. It increases $\underline{p}$, which induces an increase in $\underline{r}$, both of which raise the income of landowners, but an increase in L_T does reduce $\underline{r}$ at constant $\underline{p}$, which works in the opposite direction. It is assumed that the negative effect is small relative to the positive effects so that the sign of the entire term in parentheses on the LHS of (17) is positive. This condition is quite plausible and is indeed necessary for any expenditure on lobbying to be effective at all. The marginal cost of L_T is greater than $\underline{w}$ since

$$
\frac{L_T}{w}\frac{\partial w}{\partial L_T} \text{ and } \frac{p}{w}\frac{\partial w}{\partial p} \cdot \frac{L_T}{p}\frac{\partial p}{\partial L_T}
$$

in the coefficient of $\underline{w}$ on the RHS of (17) are both positive.

If $\hat{t}$ denotes the optimal tariff (possibly prohibitive) obtainable by the landed interest in the absence of any defensive measures by the manufacturing interest, $\hat{L}_T$ the amount of labor used by the landed interest to achieve this, and $\hat{q}$ the resulting rental per unit of capital, then the net benefit to the manufacturers of entering the political process to protect their incomes would be

$$
\begin{aligned}
N_K &= q[p(L_T, L_K), (L - L_T - L_K)]K \\
&\quad - \hat{q}[\pi(1 + \hat{t}), (1 - \hat{L}_T)]K \\
&\quad - w[p(L_T, L_K), (L - L_T - L_K)]L_K, \qquad (18)
\end{aligned}
$$

in which the second term is a constant independent of L_K. Maximizing N_K with respect to L_K, treating L_T as a parameter, requires

(19)
$$\left[\frac{p}{q}\frac{\partial q}{\partial p} \cdot \frac{L_K}{p}\frac{\partial p}{\partial L_K} + \frac{L_K}{q}\frac{\partial q}{\partial L_K}\right]\frac{qK}{L_K}$$
$$= \left[1 + \frac{L_K}{w}\frac{\partial w}{\partial L_K} + \frac{p}{w}\frac{\partial w}{\partial p}\frac{L_K}{p}\frac{\partial p}{\partial L_K}\right] w,$$

which states that the marginal return from employing L_K amount of labor to raise the income from capital should be equal to its marginal cost. The first term in the coefficient of the LHS is the product of two negative terms and therefore positive, while the second term is negative. It is again natural to suppose that the coefficient is on balance positive, making it worthwhile for the manufacturing interest to adopt defensive lobbying activities.

Given L_K the optimum L_T for the landed interest is determined by (17), while given L_T the optimum L_K for the manufacturing interest is determined by (19). The "reaction functions" showing the optimal response by each group given the action of the other can be obtained by total differentiation of the first-order conditions (17) and (19). These can be expressed as

(20)
$$\frac{dL_T}{dL_K} = -\frac{\dfrac{\partial^2 N_T}{\partial L_K \partial L_T}}{\dfrac{\partial^2 N_T}{\partial L_T^2}},$$

(21)
$$\frac{dL_K}{dL_T} = -\frac{\dfrac{\partial^2 N_K}{\partial L_T \partial L_K}}{\dfrac{\partial^2 N_K}{\partial L_K^2}}.$$

The denominators of (20) and (21) have to be negative to fulfill the second-order conditions for maximization of N_T and N_K so that the slope of each reaction function depends upon the sign of the corresponding cross-partial in the numerator. Unfortunately, however, each of these cross-partials is the sum of a long succession of individual terms of conflicting or indeterminate signs. We therefore simply assume that, whatever their slope, the reaction functions have a unique and "stable" intersection defining a Cournot-Nash equilibrium in the "political" sphere with L_T^* and L_K^* as the optimal inputs for each group consistently with the actions of the other. The equilibrium net benefits from engaging in the political process, N_T^* and N_K^*, can be determined from (16) and (18). It is assumed that both are nonnegative; i.e., it is worthwhile for each group to engage in the political process. The value of t^* and all the other eight variables of the system can be determined by equations (1) to (9) after L_T^* and L_K^* are known. We have thus depicted the general equilibrium of an economy with an endogenous tariff level.

The welfare cost of the endogenous tariff t^* is depicted in figure 8.1. The transformation curve TT corresponds to the situation in which the entire labor force L is used for productive activity. The free trade levels of production and consumption are determined by the points $\underline{a}$ and $\underline{c}$ where the slopes of TT and the maximum attainable indifference curve are equal to the given world price ratio π. If a tariff of level t^* were to be imposed *exogenously*, the standard analysis indicates that the production point would move to $\underline{b}$ on TT, where the slope is equal to $p^* = (1 + t^*)\pi$, and the consumption point to $\underline{e}$, where the slope of the indifference curve is also equal to p^*. The terms of trade remain unchanged at π. We make here the usual assumption that the entire proceeds of the tariff revenue are returned directly to the private sector. The welfare cost of the tariff is therefore measured in principle by the difference in utility levels between $\underline{c}$ and $\underline{e}$.

When the tariff level t^* is endogenously determined by a resource-using political process, however, the transformation curve TT is shifted inward to $T'T'$, since the labor force available for production is now reduced by $(L_T^* + L_K^*)$. The production point is at $\underline{b}'$ on $T'T'$, where the slope is equal to p^*. The reduction in the available labor force reduces the outputs of *both* goods at constant prices, by virtue of (11) and (12), in the context of the "specific factors" model that we are using. If we continue to assume that the tariff revenue is returned directly to the private sector, the consumption point will shift to $\underline{e}'$, with $\underline{e}$ and $\underline{e}'$ both lying on the Engel curve corresponding to relative price p^*. It is therefore apparent that the welfare cost of an endogenous tariff is higher than that of an independently given tariff of the same rate.

At this point it would be of some interest to compare the result just obtained with those of Bhagwati and Srinivasan (1979). In their model the tariff rate is set exogenously, as in the standard analysis. However, instead of assuming that the tariff revenue is distributed to the population according to some independently specified rule, they postulate a "revenue-seeking" activity that uses scarce resources to influence the allocation of the tariff revenue. The activity is also assumed to operate under competitive conditions so that in the final equilibrium position a dollar's worth of resources is used up for every dollar of revenue that the given tariff rate generates. The analysis is conducted in terms of the two-by-two Heckscher-Ohlin-Samuelson model with the "revenue-seeking" activity incorporated into it. The world price ratio is assumed to be given, just as in the present model.

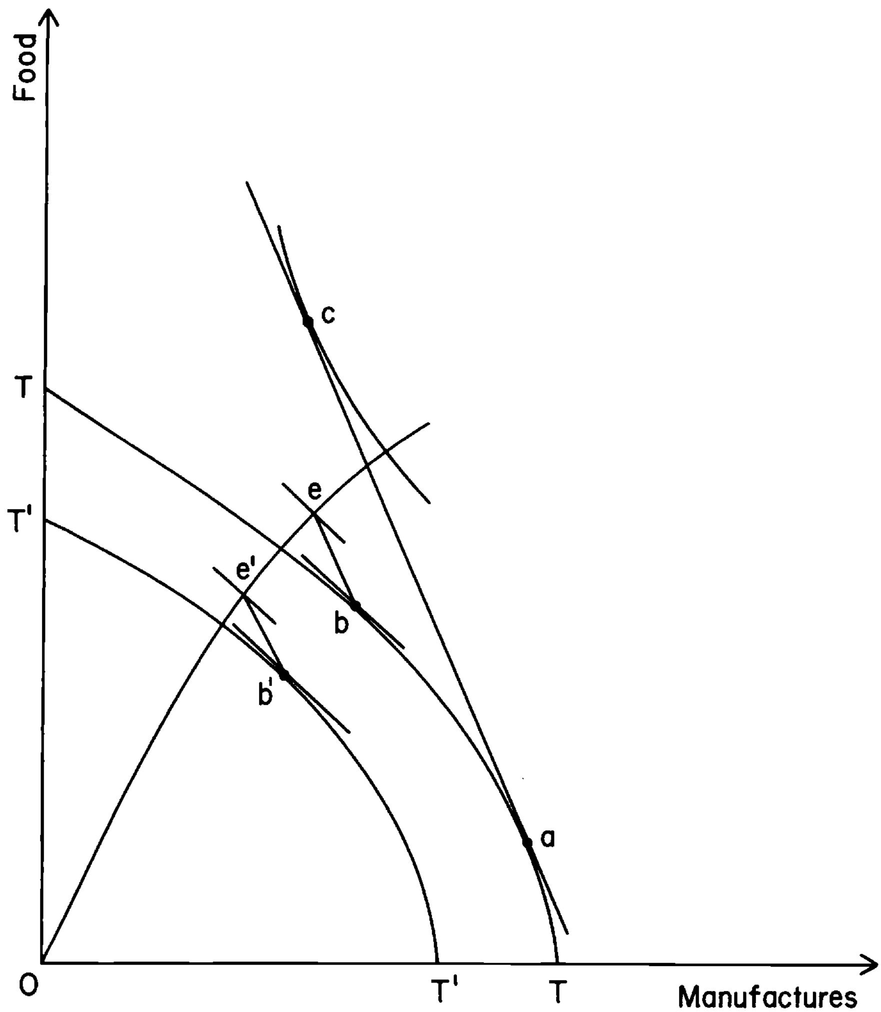

Fig. 8.1

An apparently paradoxical result that the authors obtain is that welfare can be *higher* in the presence of "revenue seeking" than it would be in the case of the conventional calculation of the welfare loss from an exogenously given tariff. As they note, the key to the paradox is the Johnson (1967) demonstration that capital accumulation in the presence of a tariff on the capital-intensive good can reduce welfare, since it is possible for the value of production at world prices to decline even though it of course goes up at the tariff-inclusive domestic price ratio. The key to Johnson's result in turn is the Rybczynski theorem, since the extra capital reduces the output of the labor-intensive exportable while increasing the output of the capital-intensive importable, thus making it possible for the total value of production at world prices to decline. If capital were to be the sole input used in "revenue seeking," then application of the Johnson reasoning in reverse would show how it is possible for welfare to increase as a result of that activity. To the extent that labor is also used in "revenue seeking," welfare would decline, but it is clearly possible that a sufficient degree of capital intensity could produce a net increase in welfare.

As Bhagwati and Srinivasan (1979) note, another way of expressing this result is in terms of the shadow prices of the factors of production. Following Little and Mirrlees (1969) the shadow prices of nontraded primary inputs can be defined as the change in the value of production at world prices resulting from a unit increase in the availability of the input.[2] When the Johnson "immiserizing" case arises the shadow price of capital is negative, thus making it possible for the existence of "revenue seeking" to raise the level of welfare á la Bhagwati-Srinivasan.

In terms of the model presented here the shadow price of labor is clearly positive, since a change in the availability of labor will change the output of *both* goods in the same direction. Thus the "tariff-seeking" and opposing activities involved in generating the endogenous tariff must result in a decline in welfare so long as labor is the only input used in those activities, as was assumed here. However, it is apparent that the specific factor used in the production of the importable could have a negative shadow price, since output of the importable is increased by one more unit of this factor being available but the output of the exportable falls as result of the diversion of labor to the importable sector that this would cause. The value of total production increases at the tariff-inclusive domestic price but could decline at world prices. Hence the Bhagwati-Srinivasan paradox could arise in the present context, if this input were also used in the "tariff-seeking" and opposing activities on a sufficient scale relative to labor: and then the welfare cost of the endogenous tariff could be less than the welfare cost of an identical tariff levied without such tariff-seeking and opposing activities.

An unconventional implication of the model presented here is that the welfare loss is not a monotonically increasing function of the tariff level. A low tariff resulting from an intense struggle that absorbs a large volume of resources in political activity could be worse, from the standpoint of overall welfare, than a higher tariff that is not vigorously opposed by the free trade forces. Some wars may simply not be worth winning, or even fighting. Constitutional amendments to outlaw tariffs would clearly be desirable, but the sort of continuing political struggle over an annual trade bill that we have described would simply be "capitalized" if such an amendment were to be a genuine possibility. A pluralist democracy of checks and balances between conflicting interest groups, as described by Dahl (1956) and other political scientists, is unlikely to produce a stable and enduring free trade regime except under exceptional circumstances such as those existing in Victorian England, where a world empire provided expanding opportunities to all social classes and serious rivals for industrial supremacy had not yet appeared.[3]

It remains true, of course, that free trade is the first-best social optimum in the absence of national monopoly power over the terms of trade. The question is whether and how that optimum can be attained. The traditional approach assumes away the question by postulating the existence of a benign, omniscient government that can use nondistortionary taxes and subsidies to place society at any point of the utility-possibility frontier. Coase (1960) argued that, in the absence of transaction and negotiation costs, private individuals themselves could work out a system of mutually beneficial deals with side payments to compensate losers that would attain a Pareto-optimal solution. However, the absence of free trade for most of the world's recorded history points to the reality of suboptimal conflict situations of the sort that we have tried to analyze in this paper with very elementary economic tools.

Notes

1. Also see the valuable paper of Krueger (1974) for a theoretical analysis of "rent seeking" where the rents on import quotas, exogenously imposed, are sought competitively. The Bhagwati and Srinivasan (1979) paper discussed below provides a critique of the Krueger contention that such rent seeking must be welfare-worsening, noting the inherently second-best nature of the problem. It also introduces the terminology of "tariff seeking" and "revenue seeking" used below.
2. See Findlay and Wellisz (1976) and Srinivasan and Bhagwati (1978) for the derivation of shadow prices for nontraded primary inputs.
3. See Kindleberger (1978) and Pincus (1977) for interesting historical examples of the political economy of tariffs.

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Comment Richard A. Brecher

Introduction

The paper by Findlay and Wellisz is well written, interesting, stimulating, and worthwhile. It extends the theory of rent seeking in an open economy by allowing such activity to determine economic policy endogenously, thereby departing from Bhagwati and Srinivasan (1980), who instead permit revenue seeking to redistribute the proceeds of an exogenously given tax. In the Findlay-Wellisz model, an import tariff results from intergroup conflict expressed through lobbying, which gives rise to

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an equilibrium of the Cournot-Nash variety. The following comments will focus on certain technical aspects of the paper, some possible extensions of the model, and various policy implications of the analysis. Limitations on space will keep these comments very brief, permitting only a slight sketch of the main arguments, whose details must be kept to a bare minimum here.

Technical Aspects

Equations (16) and (18) could be simplified by elimination of their constant components, $\pi r(\pi, L)T$ and $\hat{q}[\pi(1+\hat{t}), (1-\hat{L}_T)]K$, respectively. The central analysis would be essentially unaffected by this simplification, which leads to straightforward maximization of pressure-group income net of lobby costs, without unnecessary reference to some constant benchmark.

In discussing equation (19), the authors assume that $\partial(qK)/\partial L_K > 0$. It may be noted, however, that necessary and sufficient for this result is the plausible condition that $\partial M/\partial L_K > 0$. In other words, if and only if additional lobbying by capitalowners increases output of manufactures (as might reasonably be expected), the corresponding increase in manufacturing employment must *(ceteris paribus)* raise capital's gross income (before deducting the lobby costs), for well-known reasons connected with diminishing returns to labor. By similar reasoning in equation (17), however, $\partial(prT)/\partial L_T > 0$ if but not only if $\partial F/\partial L_T > 0$, since $\partial p/\partial L_T > 0$.

In the present paper, the equilibrium tariff must be nonnegative, because the authors assume that lobbying by capital (the sector-specific factor in exportables) is purely in defense of free trade. It might be more realistic and equally tractable to remove the constraint that $t \geq 0$, thereby generalizing the discussion to admit the plausible possibility of subsidized trade in the lobby-determined equilibrium. In this case, the reaction curve for capitalowners would simply be modified to have $L_K > 0$ (rather than $L_K = 0$) when $L_T = 0$, without any serious complication of the analysis.

Even in the absence of explicit rent seeking, the government might impose a tariff to anticipate the latent preferences of voters within the different interest groups. If the subsequent introduction of lobbying alters the government's perception of these preferences, the tariff might then be reduced below the initial (lobby-free) level. This possible movement toward the free-trade situation would be an efficiency gain to be weighed against the resource cost of lobbying, to arrive properly at an overall economic assessment of rent-seeking activity.

The net costs of lobbying might be overemphasized also by the paper's focus on the full-employment economy. In the presence of unemployed resources, the introduction of lobbying need not alter national income at any given tariff, but the associated increase in employment might well be considered socially desirable nevertheless.

As a final point on technical detail, it might be more appropriate for each pressure group to maximize its utility rather than its income (N_T or N_K). This modification could have some noticeable implications for the analysis. For example, as could readily be shown, stronger conditions would be needed to ensure a positive L_T intercept for the reaction curve of landowners. This line of discussion need not be pursued here, since the utility-maximizing approach to lobbying is adopted by Feenstra and Bhagwati in chapter 9.

Possible Extensions

If the cost of negotiation between landowners and capitalowners were assumed to be less than prohibitive, it might pay these two groups to collude as a type of cartel, which maximizes (and internally redistributes) joint rents (or utility). The cartel solution could even emerge automatically without need for intergroup negotiation, if landowners and capitalowners owned land and capital in the same proportion. Since defensive lobbying at cross purposes would be obviously unprofitable for the cartel, the resulting equilibrium must have $L_T \geq L_K = 0$ (or $L_K \geq L_T = 0$ if trade subsidies were allowed). Note that optimal policy for the cartel could be free trade—if a "small" tariff would create exactly offsetting gains and losses for landowners and capitalowners, respectively—even when the Cournot-Nash equilibrium involves a positive tariff. Free trade would also arise if the cartel were extended to include the remaining factor (labor) or if everyone owned all three factors in the same proportion.

Although the paper draws the battle lines between owners of land and of capital, other sorts of conflict are worth considering. For example, chapter 9 by Feenstra and Bhagwati focuses instead upon the familiar division between capital and labor, within the traditional trade-theoretic model with no sector-specific factors. It might also be rewarding to consider the interesting possibility of pressure groups that cut across national boundaries.

In the traditional (lobby-free) theory of tariffs for the small-country case, the welfare cost due to the well-known tariff-induced distortions in production and consumption increases monotonically with the tariff. If instead the magnitude of this cost were the same for all tariff levels ($t \gtreqless 0$), it could be effectively ignored in this context. Once the present paper highlights lobbying as an additional tariff-induced cost, it would be worthwhile to explore the relationship between size of tariff and total rent-seeking resources. Since these variables (t and $L_T + L_K$) are endogenously determined within the model, their relationship could be explored only by allowing changes in some exogenously given parameters.

Although the most visible of these parameters are π, K, L, and T, consider also the interesting possibility of rewriting equation (8) as follows: $t = t(L_T, L_K; G)$, where G is an index of government resistance to lobbying, so that $\partial t/\partial G < 0$ (given that negative tariffs are excluded). In other words, if the government becomes more willing to bear the political consequences of resisting pressure for tariffs, the level of protection will fall *(ceteris paribus)*. For the sake of concreteness, let the reaction curves be positively sloped (implying that $\partial^2 N_T/\partial L_T \partial L_K > 0$ and $\partial^2 N_K/\partial L_K \partial L_T > 0$). From the perspective of landowners, a rise in G looks like a rise in L_K, and hence their reaction curve shifts to a higher L_T for each L_K (provided that $\partial^2 N_T/\partial L_T \partial G > 0$). The reaction curve of capitalowners, however, shifts (except at the origin) to a lower L_K for each L_T (provided that $\partial^2 N_K/\partial L_K \partial G < 0$), since they interpret the rise in G as a fall in L_T. Given this asymmetric pattern of reaction-curve shifts, the direction of change in t and $L_T + L_K$ appears to be ambiguous, at the present level of generality. It therefore seems, for example, that a "small" increase in government resistance could lead to a larger tariff and more total lobbying, even though complete resistance could cause $t = L_T = L_K = 0$. To obtain a definite relationship between t and $L_T + L_K$, however, further restrictions on the model probably would be needed.

Policy Implications

In the case analyzed by Bhagwati and Srinivasan (1980), since an exogenously given tariff generates revenue-seeking activity, the costs of this activity can be attributed to the tariff. In the Findlay-Wellisz paper, however, the tariff cannot really be blamed for the associated costs of lobbying, since both of these variables are endogenously determined within the model. These costs in this case therefore must be attributed to something more basic. For example, perhaps lobbying is simply a natural consequence of a democratic system, which permits interest groups to operate freely and legally. From a somewhat different perspective, rent seeking might be viewed as due ultimately to the particular division of power in a national constitution, which enables the government to levy taxes attractive to various lobbies. Alternatively, the ultimate source of rent seeking might be unequal factor-ownership ratios, which make it possible for tariffs to redistribute income among individuals. Depending upon which of these (or other) viewpoints is adopted, the role and focus of policy may be quite different. Needless to say, moreover, policymakers must also consider the costs of any structural change contemplated, including the lobbying costs to oppose or reverse such change, as well as the rent seeking associated with the new environment.

According to a central proposition of the paper, a higher tariff might be associated with a higher level of welfare, for reasons relating to the endogeneity of economic policy. It may be noted, however, that this unconventional result can also occur in models where the tariff is exogenously given. An example of such an occurrence could be constructed readily in figure 2 of Bhagwati and Srinivasan (1980), by shifting their income-consumption curve $C_rC_tC_r'$ rightward until consumption point C_r lies instead where line P_tJ intersects the world-price line drawn through point P_r, without reversing the direction of international trade. (Although this constructed equilibrium is potentially unstable—because the cost of further revenue seeking would be less than the tariff revenues resulting—instability could be avoided by appropriately limiting the amount of earnable revenues in the manner suggested by Bhagwati and Srinivasan 1980.) A tariff-induced improvement in welfare for nationals of a small country might also arise when foreign-owned factors of production are present within the country, as shown by Bhagwati and Brecher (1980) and Brecher and Bhagwati (1981). It would be interesting, moreover, to consider the policy implications of combining the foreign-ownership and revenue-seeking analyses for the case in which domestic lobbies are operated locally by foreign interests based within the host country.

Conclusion

In short, the paper by Findlay and Wellisz is a most welcome contribution. Although the above discussion has been necessarily brief, it is hoped that the foregoing comments help to suggest the wide scope and broad significance of the analysis pursued by the authors.

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Comment Leslie Young

Introduction

Findlay and Wellisz have captured an important issue of political economy within a simple and lucid model which should be useful in

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attacking a wide range of questions.[1] Their contribution is thus most valuable and provocative. We shall show how their model can be simplified even further using duality theory. Using this simplification, we show that the lobbying equilibrium need not be unique. This has interesting implications for the political economy of tariffs. Finally, we point out that the equilibrium of the model depends on the choice of numeraire. This undesirable feature can be removed by assuming that the political factions maximize utility rather than profits.

A Dual Approach

Findlay and Wellisz consider how lobbying affects the rents on land and capital. This approach leads to rather complicated first-order conditions for a Cournot-Nash equilibrium of lobbying. Simpler conditions can be obtained if we assume that each faction maximizes revenue net of wages. This objective function is identical to that of Findlay and Wellisz when there are constant returns to scale in production (so that pure profits are zero).

Let $R^T(p,w)$ and $R^K(w)$ be the net revenue from production of farmers and manufacturers when the domestic price of food in terms of manufactures is p and the wage in terms of manufactures is w, i.e.,

$$R^T(p,w) = pF(p,w) - wL_F(p,w),$$
$$R^K(w) = M(w) - wL_M(w),$$

where $F(p,w)$ and $M(w)$ are the supply functions of food and manufactures and $L_F(p,w)$ and $L_M(w)$ are the derived demand functions for farm and manufacturing labor. By Hotelling's lemma (Varian 1978, p. 31):

(1) $$\frac{\partial R^T}{\partial p} = F(p,w) \qquad \frac{\partial R^T}{\partial w} = -L_F(p,w)$$
$$\frac{\partial R^K}{\partial w} = -L_M(p,w).$$

Farmers take as given the lobbying L_K of manufacturers and choose lobbying L_T to maximize production profits net of lobbyists' wages:

$$\max_{L_T} R^T(p,w) - wL_T.$$

The first-order condition is

$$\frac{\partial R^T}{\partial p}\cdot\frac{\partial p}{\partial L_T} + (\frac{\partial R^T}{\partial w} - L_T)$$

$$(\frac{\partial w}{\partial L_T} + \frac{\partial w}{\partial p}\cdot\frac{\partial p}{\partial L_T}) - w = 0.$$

Using the dual relations (1), this reduces to

$$F\frac{\partial p}{\partial L_T} = w + (L_F + L_T)\left(\frac{\partial w}{\partial L_T} + \frac{\partial w}{\partial p}\cdot\frac{\partial p}{\partial L_T}\right). \tag{2}$$

The left-hand side gives the effect on the revenue from food sales of the marginal change in domestic price from additional lobbying. The right-hand side gives the marginal rise in wage costs from additional lobbying. This equals the wage of the marginal lobbyist plus the effect on the total wage bill of the wage rise resulting from lobbying. This wage rise is the result of (1) the increased demand for lobbyists and (2) the increased demand for farm labor as a result of the induced rise in food prices.

Manufacturers take as given the lobbying L_T of farmers and choose lobbying L_K to maximize production profits net of lobbyists' wages:

$$\max_{L_K} R^K(w) - wL_K.$$

An analysis similar to that above yields the first-order condition

$$0 = w + (L_K + L_M)\left(\frac{\partial w}{\partial L_K} + \frac{\partial w}{\partial p}\cdot\frac{\partial p}{\partial L_K}\right). \tag{3}$$

The interpretation of (3) is similar to that of (2).
Thus a Cournot-Nash equilibrium of lobbying has been characterized by first-order conditions (2) and (3), which have straightforward interpretations.

Uniqueness of the Nash Equilibrium

In discussing the welfare implications of their model, Findlay and Wellisz state: "An unconventional implication of the model presented here is that the welfare loss is not a monotonically increasing function of the tariff level. A low tariff resulting from an intense struggle that absorbs a large volume of resources could be worse, from the standpoint of overall welfare, than a higher tariff that is not vigorously opposed. . . ." If the lobbying equilibrium were unique, as Findlay and Wellisz assume, then varying tariff levels could arise only from variations in some parameter of the model such as endowments, production possibilities, or lobbying effectiveness. Given such changes in the underlying structure, there is no reason to suppose that welfare losses decrease with reduced tariff levels—*whether or not* these are the outcome of a more intense political struggle. However, if the lobbying equilibrium were not unique, then a more interesting interpretation of the Findlay-Wellisz statement would be possible: in a model with *fixed* parameters there could be two equilibria, one of which involves lower tariffs *and* lower welfare because resources have been diverted into nonproductive lobbying.

We can give an example of this using standard assumptions. Suppose that the resources and techniques available to farmers and manufacturers imply production functions:

$$F = L_F^a,\ M = L_M^a \qquad a > 0.$$

Suppose also that the domestic price p is determined by lobbying as follows:

$$p(L_T, L_K) = L_T^d L_K^{-e} \qquad d > 0, e > 0.$$

If L_0 is the total supply of labor, then define

$$L \equiv L_0 - L_T - L_K, r \equiv 1/(1 + p^{1/(1-a)}).$$

Elementary (but tedious) calculations[2] show that the first-order conditions (2) and (3) become

$$1 + r(d + 1 - a) + (1 - a)L_T/L$$
$$+ Lrd(r - 1/a)/L_T = 0,$$
$$2 - a + r(e + a - 1) + (1 - a)L_K/L$$
$$- Lre(1 - r)/L_K = 0.$$

We have computed numerical solutions for the case $L_0 = 10$, $a = .75$. If (A) $d = .5$, $e = .5$, then there are *two* solutions (all numbers are rounded to two decimal places):

$$L_T^1 = .88, L_K^1 = .19 \text{ so } p(L_T^1, L_K^1) = 2.15,$$
$$L_T^2 = 1.12, L_K^2 = 1.09 \text{ so } p(L_T^2, L_K^2) = 1.01.$$

If (B) $d = .25$, $e = .5$, then there are again two solutions:

$$L_T^1 = .53, L_K^1 = .12 \text{ so } p(L_T^1, L_K^1) = 2.47,$$
$$L_T^2 = .67, L_K^2 = 1.13 \text{ so } p(L_T^2, L_K^2) = .90.$$

Cases (A) and (B) illustrate the point made by Findlay and Wellisz within a model with fixed parameters. In each case, the solution (L_T^1, L_K^1) involves a high domestic price but few resources in lobbying whereas the solution (L_T^2, L_K^2) involves a lower domestic price arising from a more intensive political struggle. Clearly the diversion of resources to lobbying in the second solution could result in lower welfare despite the reduction in tariff level.

More generally, nonuniqueness of the Nash equilibrium implies that the data of the political and economic system need not determine the outcome of that system. If this possibility were empirically important, then attempts to "explain" tariff levels by the effectiveness and the putative gains from lobbying (see section 10.5 of this volume) could be chimerical.

Choice of Numeraire and Utility-maximizing Factions

In most economic models a change of numeraire does not alter the optimal choice of firms since it merely scales up their maximands by a factor they treat as parametric: the relative price. In the Findlay-Wellisz model, however, firms seek to manipulate this relative price, so a change of numeraire *does* alter their optimal choice. For example, if farmers seek to maximize net profits expressed in terms of manufactures, then the first-order condition is

$$\frac{d}{dL_T}\{R^T - wL_T\} = 0.$$

If they seek to maximize net profits expressed in terms of food, i.e., $\{R^T - wL_T\}/p$, then the first-order condition is

$$p\frac{d}{dL_T}\{R^T - wL_T\} - \{R^T - wL_T\}\frac{\partial p}{\partial L_T} = 0.$$

Since $\partial p/\partial L_T \neq 0$, this condition clearly leads to a different choice. Similar remarks apply for the manufacturer.

These observations bring out the inappropriateness of the assumption that each faction maximizes its profits. If prices are regarded as parametric, then, whatever the numeraire, firms should maximize profits in order to maximize the utility of their owners. However, this will not be true if the firm is actively manipulating the prices its owners face *as consumers*. In such a situation, it is more reasonable to assume that each faction is concerned with maximizing a utility function in which profits appear as an argument. The assumption that the preferences of each faction can be represented by a *single* utility function is in the spirit of the Findlay-Wellisz analysis of the struggle between monolithic factions.

Dual concepts again facilitate the analysis. Let $V^T(q_M,q_F,Y)$ be the maximum utility of farmers given a price q_F for food, a price q_M for manufactures, and an income Y. We assume that the farmers' sole income is farm profits. If manufactures were the numeraire, then their maximand would be $V^T(1,p,R^T - wL_T)$. If food were the numeraire, then their maximand would be $V^T(1/p,1,\{R^T - wL_T\}/p)$. Since the indirect utility function is homogeneous of degree zero in prices and income, these two maximands are identical; i.e., the choice of numeraire is immaterial.

The first-order condition for a maximum of $V^T(1,p,R^T - wL_T)$ is

$$0 = \frac{\partial V}{\partial p}\cdot\frac{\partial p}{\partial L_T} + \frac{\partial V}{\partial Y}\cdot\frac{d}{dL_T}\{R^T - wL_T\}. \tag{4}$$

If $D^T(p,Y)$ is the farmers' demand function for food, then by Roy's formula (Varian 1978, p. 93)

$$D^T = -\frac{\partial V}{\partial p}/\frac{\partial V}{\partial Y}. \tag{5}$$

Dividing (4) by $\partial V/\partial Y$ and using the dual relations (1) and (5), we can reduce (4) to

$$(F - D^T)\frac{\partial p}{\partial L_T} = w + (L_T + L_K)\left(\frac{\partial W}{\partial L_T} + \frac{\partial w}{\partial p}\cdot\frac{\partial p}{\partial L_T}\right). \tag{6}$$

This differs from the profit-maximizing condition (2) in that the price effect of lobbying, $\partial p/\partial L_T$, applies not to all F units of food produced but only to those $F - D^T$ units sold outside the farming faction.

A similar analysis shows that if D^K is the demand for food by manufacturers, then their utility is maximized when

$$-D^K\frac{\partial p}{\partial L_K} = w + (L_K + L_M)\left(\frac{\partial w}{\partial L_K} + \frac{\partial w}{\partial p}\cdot\frac{\partial p}{\partial L_K}\right). \tag{7}$$

This differs from the profit-maximizing condition (3) in that account is taken of the price effect of lobbying on the food expenditure of manufacturers. Equations (6) and (7) would reduce to (2) and (3) only if neither faction consumed any food.

Notes

1. Errors in the oral version of these comments were pointed out by T. N. Srinivasan, John Chipman, and Paul Krugman. Avinash Dixit and Robert Feenstra also provided useful comments. D. C. McNickle and F. T. Baird carried out the numerical calculations.
2. Fuller details of the derivation are given in Young (1980).

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