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PROTECTION FOR SALE

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ABSTRACT

We develop a model in which special interest groups make political contributions in order to influence an incumbent government's choice of trade policy. In the political equilibrium, the interest groups bid for protection, and each group's offer is optimal given the offers of the others. The politicians maximize their own welfare, which depends on the total amount of contributions collected and on the aggregate welfare of voters. We study the structure of protection that emerges in political equilibrium and the equilibrium contributions that are made by the different industry lobby groups, and show why these groups may in some cases prefer to have the government use trade policy to transfer income rather than more efficient means. We also discuss how our framework might be extended to include endogenous formation of lobby groups, political competition between incumbents and challengers, and political outcomes in a multicountry trading system.

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1. INTRODUCTION

When asked why free trade is so often preached and so rarely practiced, most international trade economists will point to "politics". In representative democracies, trade policies are shaped by a political process that responds not only to the concerns of the general electorate, but also to the pressures applied by special interests. Interest groups contribute to political campaigns in an effort to influence both the candidates' positions and the election outcomes. Yet, despite the widespread agreement that real world political markets fail to generate "welfare maximizing" policies, we lack a coherent theory that predicts trade policy outcomes in different institutional settings.

A literature has developed that examines the political economy of trade policy formation (see Hillman 1989 for a survey). While this literature gives insights into many issues, the most commonly used approaches are not suitable for addressing the determinants of the structure of protection in political equilibrium. For example, Hillman (1982) and Long and Vousden (1991) posit a government that maximizes a *political support function* attaching different weights to the welfare of different individuals and interest groups. This reduced-form approach is useful for their purposes, but without a mechanism to determine the government's weighting scheme, it seems useless for predicting the equilibrium structure of protection. Similarly, Findlay and Wellisz (1982) employ a *tariff formation function* that relates policy outcomes to the political contributions of interested parties. Here, the political mechanism is buried inside a "black box", so there is no way to examine the relationship between the tariff functions for different industries.

In this paper we develop an approach to the political economy of trade policy formation that explicitly incorporates the interactions between voters, interest groups, and politicians. Our model determines an equilibrium set of trade policies and an equilibrium pattern of campaign contributions from primitive assumptions about tastes, technologies, market structures, and the institutional setting. Our approach is most similar to that taken by Magee, Brock, and Young (1989), where the authors suppose that politicians trade off political contributions from supportive lobby groups against the lost votes that result from market-distorting policies. But whereas these authors must limit their analysis to the case of a single free-trade lobby and single protectionist lobby that do political battle over the height of a single import barrier, we are able to use our model to derive an equilibrium structure of protection for many interdependent industries.[1] By so doing, we may provide a more rigorous grounding for empirical studies of the structure of protection, which so far have proceeded without much guidance from formal theory.

Our ultimate aim in developing a theory of trade policy formation is to shed light on the relative merits of alternative institutional arrangements for the world trading system. Should the GATT, for example, limit the freedom of its members to conclude regional trade agreements? Should it continue to forbid the use of certain policy instruments (e.g., import quotas and export subsidies) while implicitly or explicitly tolerating the use of others (e.g., tariffs and voluntary restraint agreements)? Should it continue to insist upon a most favored nation approach to trade liberalization? The answers to all of these and related questions require an understanding of the domestic political processes in the GATT member countries. International "rules of the game" limit the policy choices open to national governments and change the nature of the strategic interactions between elected officials and their constituents. A framework such as ours, which treats the relationship between political actions and policy outcomes as endogenous, is essential for evaluating how changes in the institutional setting will affect national policy choices.

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[1] There is another, more important difference between the Magee, Brock, and Young approach and our own, which we discuss in Section 2 below.

The remainder of the paper is organized as follows. Section 2 provides an informal and nontechnical overview of our model. The model is developed formally in Section 3. In Section 4 we describe the determinants of the structure of protection. There we derive a formula that relates the equilibrium trade tax or subsidy in an industry to the economic characteristics of the industry and to variables that describe the political environment. Section 5 characterizes the campaign contributions that the interest groups make to support the equilibrium policy choices. This analysis identifies the determinants of the relative political power of different industry lobby groups. In Section 6 we discuss the choice of policy instrument, showing that interest groups may support a regime that constrains the government to use trade policies rather than other, more efficient means of transfering income. The final section contains some elaborations of our theory. We describe briefly the structure of protection that emerges when intermediate inputs are imported and when the domestic industries are not perfectly competitive. We also discuss how our approach could be used to endogenize the formation of interest groups, to allow for political competition between multiple candidates, and to study political outcomes in a multicountry trading system.

2. OVERVIEW

We begin with an overview of our analytical approach, postponing the formal development of our model until the next section. We consider a small, competitive economy that faces exogenously given world output prices. The efficient policy for such an economy is free trade, so departures from free trade can be ascribed to the political process. The economy produces a numeraire good, with labor alone, and each of n additional products using labor and an input that is specific to the particular sector. We assume a high degree of concentration in the ownership of many of the n specific inputs and that the various owners of some of these inputs have banded together to form lobby groups. We do not at this point have a theory of lobby formation; rather we take it as given that some factor owners overcome the free-rider problem to conduct joint lobbying activities, while others do not.[2]

The lobby groups may offer political contributions to the incumbent officeholders. These officeholders are in a position to set current trade policy and it is this policy choice that the lobbyists seek to influence. We do not allow lobby groups to contribute to challenger candidates, nor do we consider at this stage the political competition between the incumbent government and any challengers. These restrictions represent a shortcoming of our approach.[3] Yet, the evidence for the United States supports our assumptions as a reasonable first approximation. In particular, Political Action Committees (PACs) gave more than three-quarters of their total contributions in the 1988 Congressional campaigns to incumbent candidates. If elections for open seats are excluded, incumbents received 6.3 times as much in contributions from PACs as did their challengers (Magelby and Nelson, 1990, p.86). Moreover, 62 percent of the campaign contributions by PACs in the 1987–88 campaign occurred in the first 18 months of the election cycle, often before a challenger to the incumbent had even been identified (Magelby and Nelson, 1990, p.67). Many of these incumbents would not be involved in close races when the elections came, so the contributions can only be seen as attempts to curry favor.[4]

We assume that the incumbent government maximizes a weighted sum of total contributions and aggregate social welfare. One way to justify our specification is to

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[2] Section 7 describes how the formation of lobby groups might be endogenized. The analysis in this paper could serve as an input into a more complete model that would predict which industries will organize politically.

[3] See, however, Section 7 for a discussion of how our model might be extended to allow for multiple candidates and contributions designed to affect election outcomes.

[4] Magelby and Nelson (1990, p.55) report that, of the 255 incumbent Congress members who received the greatest portion of their funding from PACs, only 19 took part in races where the challenger received 45 percent or more of the vote.

assume that politicians care only about being re-elected and that the odds of survival depend linearly on the utilities derived by the individual voters and on aggregate campaign expenditures. But a broader interpretation also is possible. Politicians may value contributions not only for the marginal effect that advertising and other campaign expenditures have on voter behavior, but also because the funds can be used to retire campaign debts from previous elections (which many times are owed to the politician's personal estate), to deter competition from quality challengers[5], and to show the candidate's abilities as a fundraiser and thereby establish his or her credibility as a potential candidate for higher political or party office. In some political contexts, contributions may be bribes that are direct additions to the politician's personal wealth. So it is reasonable to suppose that the politician's welfare is an increasing function of aggregate contributions, even if campaign spending has little or no direct influence on voting.[6]

We model the lobbying process as follows. Each organized interest group representing one of the sector-specific factors confronts the incumbent government with a *contribution schedule*. The schedule maps every policy vector that the government might choose (where policies are import and export taxes and subsidies on the n non-numeraire goods) into a campaign contribution level. Of course, some policies may evoke a contribution of zero from some lobbies. The government then sets the policy vector and collects from each lobby the contribution associated with its policy choice.

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[5] In their study of campaign spending in the 1978 Congressional election, Goldenberg et al. (1986) suggest that incumbents stockpiled contributions and made early campaign expenditures in order to dissuade strong challengers from entering the race. But Krasno and Green (1988a) find little evidence of such strategic spending in their regression analysis of challenger quality (as measured by an eight-point qualitative scale).

[6] Jacobson (1978, 1980, 1987) has argued that an incumbent's campaign spending level has little quantifiable effect on his or her chance of winning re-election. However, Green and Krasno (1988b) challenge this view, pointing out that Jacobson has either failed to control for the correlation between spending and the quality of the opponent or has used inappropriate instruments. They find a much larger influence of incumbent spending on election outcomes once challenger quality is taken into account.

An equilibrium is a set of contribution schedules such that each lobby's schedule maximizes the aggregate utility of the lobby's members, taking as given the schedules of the other lobby groups. In calculating their optimal schedules, the lobbies recognize that the politicians ultimately will set policy to maximize their own welfare. The Nash equilibrium contribution schedules implement an equilibrium trade policy choice.

We note that our model has the structure of a *common agency problem*, which arises when several principals attempt to induce a single agent to take an action that may be costly for the agent to perform. The government here serves as an agent for the various (and conflicting) special interest groups, while bearing a cost for implementing an inefficient policy that stems from its accountability to the general electorate. Bernheim and Whinston (1986b) have coined the term *menu auctions* to describe situations of complete information where bidders announce a "menu" of offers for various possible actions open to an "auctioneer" and then pay the bids associated with the action selected.[7] They have analyzed a class of such auctions and derived several results that will prove useful below for characterizing the political equilibrium in our economy.

We are now in a position to describe the main difference between our approach and that of Magee, Brock and Young (1989). In Magee, Brock and Young, special interest groups make their contribution decisions after the politicians have announced (and somehow committed to) their policy stances. The lobbyists cannot influence the policy choices — although the anticipation of contributions affects the politicians' announcements — but instead the lobby groups contribute in order to increase the probability that their preferred candidates will be elected. By contrast, our model emphasizes the use of contributions to influence policy choices. Our lobbyists reward

[7] At this point, our model does not include asymmetric information. An interestesting extension might include uncertainty on the part of the lobby groups about the true motives of the government. For analyses of common agency problems with asymmetric information, see Bernheim and Whinston (1986a) and Stole (1990).

politicians with greater contributions when the politicians take policy positions more to the interest group's liking. While in reality interest groups contribute to campaigns both to influence policies and to affect election outcomes, our reading of the evidence suggests that the former motive may in fact be the more important of the two. Not only do PACs in the United States make contributions early in the election cycle and to candidates who are not involved in closely contested races, but there are numerous examples of PACs that have contributed to a winning candidate shortly after an election even though they had supported his or her opponent during the campaign. Such behavior suggests, as Magelby and Nelson (1990, p.55) conclude, that "PAC money is interested money" that has "more than an electoral objective in mind."

3. FORMAL FRAMEWORK

A small economy is populated by individuals with identical preferences but different factor endowments. Each individual maximizes utility given by

(1) $$u = c_Z + \Sigma_{i=1}^{n} u_i(c_{Xi}) ,$$

where c_Z is consumption of good Z and c_{Xi} is consumption of good X_i, $i = 1,2,...,n$. The sub-utility functions $u_i(\cdot)$ are differentiable, increasing, and strictly concave. Good Z serves as numeraire, with a world and domestic price equal to one. We denote by p_i^* the exogenous world price of good X_i, while p_i represents its domestic price. With these preferences, an individual who spends an amount E consumes $c_{Xi} = d_i(p_i)$ of good X_i, $i = 1,2,...,n$ and $c_Z = E - \Sigma_i p_i d_i(p_i)$ of the numeraire good. The demand curve $d_i(\cdot)$ is the inverse of $u_i'(\cdot)$. The indirect utility function takes the form

$$(2) \qquad v(p,E) = E - \delta(p) ,$$

where $p = (p_1, p_2, \ldots, p_n)$ is the vector of domestic prices of the non-numeraire goods and

$$(3) \qquad \delta(p) \equiv \Sigma_i \, p_i d_i(p_i) - \Sigma_i \, u_i[d_i(p_i)] .$$

We note that these preferences imply a marginal utility of spending equal to one. Then by Roy's identity we have the partial derivative of $\delta(\cdot)$ with respect to p_i equal to the demand for product X_i; i.e., $\partial\delta(p)/\partial p_i = d_i(p_i)$.

Good Z is manufactured from labor alone with constant returns to scale and an input-output coefficient equal to one by choice of units. We assume that the supply of labor is large enough to ensure a positive supply of this good. Then the wage rate equals one in a competitive equilibrium. Production of each X_i requires labor and a sector-specific input. The technologies for producing these goods exhibit constant returns to scale and the various specific inputs are available in inelastic supply. Given that the wage rate is fixed at one, the aggregate reward to the specific factor used in sector i depends only on domestic price of the good X_i. We denote this reward by $\Pi_i(p_i)$. Profit maximization implies

$$(4) \qquad X_i(p_i) = \Pi_i'(p_i) ,$$

where the left-hand side of (4) gives the supply curve for good X_i.

In this paper, we restrict the set of policy instruments available to politicians. We allow the government to implement only trade taxes and subsidies.[8] These policies drive a wedge between domestic and world prices. A domestic price in excess of the

[8] See Section 6 for a discussion of why the lobby groups may in fact support this constraint on the government's choice of policy instrument.

world price implies an import tariff for a good that is imported and an export subsidy for one that is exported. Domestic prices below world prices correspond to import subsidies and export taxes. The net revenue from all taxes and subsidies, expressed on a per capita basis, is given by

$$(5) \qquad \tau(p) = \Sigma_i \,(p_i - p_i^*)\left[d_i(p_i) - \frac{1}{N} X_i(p_i)\right],$$

where N measures the total (voting) population. We assume that the government redistributes revenue uniformly to all of the country's voters. Then $\tau(p)$ gives the net government transfer to every individual.

A typical individual derives income from wages and government transfers, and possibly from the ownership of some sector-specific inputs. In what follows we will assume that individuals own at most one type of specific factor. It is notationally convenient nonetheless to define s_i^h as the share of the aggregate supply of the specific input used in sector i owned by individual h. Let l^h represent this individual's endowment of labor. Then the individual's total income, including any government transfers, is $l^h + \Sigma_i s_i^h \Pi_i(p_i) + \tau(p)$, and his consumption spending equals this amount less the amount of any political contributions he makes. We let $\lambda^h(p)$ denote the campaign contribution of individual h. These are made contingent on the trade policy implemented by the government, and since world prices are fixed, we can write the contributions simply as a function of the domestic price vector. It follows from (2) that, at domestic prices p, the individual h attains the utility level

$$(6) \qquad v^h = \omega^h(p) - \lambda^h(p), \quad h = 1,2,\ldots,N,$$

where

(7) $$\omega^h(p) \equiv \ell^h + \Sigma_i s_i^h \Pi_i(p_i) + r(p) - \delta(p).$$

Equation (6) decomposes the individual's welfare into two components: that attainable at domestic prices p in the absence of any campaign contributions, $\omega^h(p)$, and the utility loss associated with the political payments, $\lambda^h(p)$.

As discussed in section 2, the incumbent government cares about the total level of political contributions and about aggregate well being. The government values contributions, because they can be used to finance campaign spending and, as noted above, they may provide other direct benefits to the officeholders. Social welfare will be of concern to the incumbent government if voters are more likely to re-elect a government that has delivered a high standard of living. We choose a linear form for the government's objective function, namely[9]

(8) $$v^G = \Sigma_h \lambda^h(p) + a\, \Sigma_h \omega^h(p), \qquad a > 0\,.$$

The government ultimately chooses the vector of trade taxes and subsidies (or, equivalently, the domestic prices) to maximize v^G in (8).

Now let H_i denote the set of individuals who own some of the specific factor used in sector i, and let α_i denote the fraction of the N voters who are members of this set. We assume that the sets H_i are disjoint; i.e., that individuals own at most one type of

[9] In writing (8) we implicity assume that the government values a dollar of political contributions more than a dollar in the hands of the general public. That is, we could write the government's welfare function as $\tilde{v}^G = a_1\Sigma_h \lambda^h + a_2\Sigma_h(\omega^h - \lambda^h)$, where a_1 is the weight the government attaches to campaign contributions and a_2 is the weight it attaches to aggregate welfare. Maximizing $\tilde{v}^G$ is equivalent to maximizing v^G in (8) with $a = a_2/(a_1 - a_2)$, provided that $a_1 > a_2$. Our assumption that $a_1 > a_2$ implies no restriction on the size of the parameter a, which represents the government's valuation of a dollar of social welfare relative to its *net* valuation of a dollar of contributions (considering both the perceived benefit from the funding and the indirect cost associated with the reduction in the giver's welfare).

specific factor. This makes most sense if the specific inputs represent an indivisible factor such as human capital. We assume that in some (or possibly all) sectors, the specific factor owners with similar economic interests have organized themselves into lobby groups that coordinate their campaign giving decisions and communicate the political "offers" to the politicians. In the remaining sectors (if any), the individual owners of the specific factors remain unorganized and perceive themselves as too small to communicate demands effectively or to influence policy. We assume that the unorganized factor owners, as well as individuals who own no specific factors at all, make no campaign contributions. The set of organized industries is exogenous in our analysis.

The lobby representing an organized sector i offers a contribution schedule $\Lambda_i(p)$ to the government. It collects the necessary donations from the individuals that it represents, so that

$$(9) \qquad \Sigma_{h\in H_i} \lambda^h(p) = \Lambda_i(p).$$

The lobby acts to maximize the total welfare of its members, which ensures the existence of a burden-sharing scheme that yields gains from coordination to all members of the interest group. Letting L represent the set of industries with organized specific-factor owners, we take the objective function for the lobby in sector i to be

$$(10) \qquad v^i \equiv \Sigma_{h\in H_i} v^h = \Omega_i(p) - \Lambda_i(p) \quad \text{for } i \in L,$$

where

$$(11) \qquad \Omega_i(p) \equiv \Sigma_{h\in H_i} \omega^h(p) = \Sigma_{h\in H_i} l^h + \Pi_i(p_i) + \alpha_i N[\tau(p) - \delta(p)].$$

We can use the fact that only interest groups make political contributions to rewrite the objective function (8) of the incumbent government. We have

$$v^G = \Sigma_{i \in L} \Lambda_i(p) + a\Omega_A(p) , \tag{12}$$

where $\Omega_A(p) \equiv \Sigma_h \omega^h(p)$ represents the aggregate social welfare that would be realized at domestic prices p in the absence of any payments to politicians.

As a benchmark for future comparison, let us imagine for the moment that interest groups could make no campaign contributions or that any contributions could not be made contingent on trade policy outcomes. Then the government would choose policy to maximize its popularity; i.e., it would maximize aggregate welfare. The first-order condition for this problem, found using (4), (5), and (7), is

$$(p_i - p_i^*)[Nd_i'(p_i) - X_i'(p_i)] = 0 \quad \text{for all } i,$$

which yields an optimal policy of $p_i = p_i^*$ for all *i*. As usual, free trade maximizes social welfare for a small, competitive economy, and a government not subject to any pressures from special interests would choose this policy so long as it perceived some connection between its re-election prospects and the general standard of living. Any departures from free trade that we find in the political equilibrium below clearly can be attributed to the political process.

We describe in the next two sections the political equilibrium of a two-stage non-cooperative game in which the lobbies simultaneously choose their political contribution schedules in the first stage and the government sets policy in the second. An equilibrium is a set of contribution functions $\{\Lambda_i^o\}_{i \in L}$, one for each organized lobby group, such that each one maximizes the joint welfare of the group's members given the schedules proffered by the other lobbies and the anticipated decision rule of the government, and a domestic price vector p° that maximizes the government's objective v^G, taking the contribution schedules as given. We characterize the equilibrium structure of protection in the next section, and the political contributions that underlie the government's policy choice in the section that follows.

4. THE STRUCTURE OF PROTECTION

As we noted near the end of section 2, the interaction between the various lobbies and the government in this economy has the structure of a menu auction problem. Bernheim and Whinston (1986b) have characterized the equilibrium for a class of such problems. Although they limited their analysis to situations where players bid for a finite set of objects, it is clear that their main results apply also when, as here, the auctioneer can choose from a continuum of possible actions. Accordingly, we allow the government's choice set (of domestic price vectors) to be continuous.

Let P denote the set of domestic price vectors from which the government may choose. We bound P so that each domestic price p_i must lie between some minimum $\underline{p}_i$ and some maximum $\bar{p}_i$. For the most part, we restrict attention to equilibria that lie in the interior of P. Lemma 2 of Bernheim and Whinston (1986b) implies that an equilibrium to the trade policy game can be characterized as follows:

***Proposition** B–W*: $(\{\Lambda_i^{\circ}\}_{i\in L}, p^{\circ})$ is a subgame perfect Nash equilibrium of the trade policy game if and only if:

(a) Λ_i° is feasible for all $i\in L$;

(b) p° maximizes $\Sigma_{i\in L}\Lambda_i^{\circ}(p) + a\Omega_A(p)$ on P;

(c) p° maximizes $\Omega_j(p) - \Lambda_j^{\circ}(p) + \Sigma_{i\in L}\Lambda_i^{\circ}(p) + a\Omega_A(p)$ on P for every $j\in L$;

(d) for every $j\in L$ there exists a $p^j\in P$ that maximizes $\Sigma_{i\in L}\Lambda_i^{\circ}(p) + a\Omega_A(p)$ on P such that $\Lambda_j^{\circ}(p^j) = 0$.

Condition (a) restricts each lobby's contribution schedule to be among those that are feasible; i.e., contributions must be non-negative and no greater than the aggregate income available to the lobby's members. Condition (b) states that, given the contribution schedules offered by the lobbies, the government sets trade policy to maximize its own welfare. The last two conditions allow us to characterize the equilibrium structure of protection and the equilibrium pattern of political contributions, respectively. We derive and apply condition (c) here, while postponing discussion of condition (d) until the next section.

Condition (c) requires that, for each lobby j, the equilibrium price vector must maximize the joint welfare of that lobby and the government, given the equilibrium contribution schedules of the other lobbies.[10] If this were not the case, then lobby j could reformulate its contribution schedule to induce the government to choose the jointly optimal price vector and could appropriate nearly all of the surplus from the switch in policy. Since the government would willingly choose the alternative policy and lobby j would benefit from the switch, the original price vector could not have been an equilibrium.

To establish this, we need only describe the deviation that would be welfare improving for lobby j. Let $\tilde{p}$ be the conjectured equilibrium price vector, with conjectured equilibrium contribution schedules $\tilde{\Lambda}_i(p)$ for $i \in L$. Let $\hat{p}$ be a price vector that maximizes joint welfare $(v^j + v^G)$ for lobby j and the government, given the contribution offers of the lobbies other than j. Now consider the contribution schedule $\hat{\Lambda}_j(p) \equiv \Sigma_{i \in L}\tilde{\Lambda}_i(\tilde{p}) + a\Omega_A(\tilde{p}) - \Sigma_{i \in L, i \neq j}\tilde{\Lambda}_i(p) - a\Omega_A(p) + \epsilon\varphi^j(p)$ that lobby j might use

[10]Bernheim and Whinston formulate this condition somewhat differently; they require

$$[\Omega_j(p^\circ) + a\Omega_A(p^\circ)] - [\Omega_j(p) + a\Omega_A(p)] \geq \Sigma_{i \in L, i \neq j}\Lambda_i(p) - \Sigma_{i \in L, i \neq j}\Lambda_i(p^\circ)$$

for all $j \in L$ and $p \in P$. These alternative statements are of course equivalent.

in place of its alleged equilibrium schedule $\tilde{\Lambda}_j(\cdot)$, where $\varphi^j(\cdot)$ is any non–negative function that reaches a unique maximum at $p = \hat{p}$. Note that $\hat{\Lambda}_j(\cdot)$ is non–negative in view of (b). This new schedule exactly compensates the government for any loss associated with choosing an arbitrary price vector p instead of the conjectured equilibrium price vector $\tilde{p}$, and rewards the government with an extra amount $\epsilon\varphi^j(p)$ for choosing p. Evidently, the deviation to schedule $\hat{\Lambda}_j(\cdot)$ induces the government to choose $\hat{p}$ for all $\epsilon > 0$. Then lobby j 's welfare becomes $\Omega_j(\hat{p}) - \hat{\Lambda}_j(\hat{p}) = \Omega_j(p^o) - \Lambda_j^o(p^o) + \Delta^j - \epsilon\varphi^j(\hat{p})$, where $\Delta^j > 0$ represents the gain in joint welfare $v^j + v^G$ that results from replacing $\tilde{p}$ with $\hat{p}$. For ϵ small enough, we have $\Delta^j > \epsilon\varphi^j(\hat{p})$, which implies $\Omega_j(\hat{p}) - \hat{\Lambda}_j(\hat{p}) > \Omega_j(\tilde{p}) - \tilde{\Lambda}_j(\tilde{p})$; i.e., lobby j gains from the deviation. This establishes the necessity of condition (c) for a Nash equilibrium.

Let us assume now that the lobbies set political contribution functions that are differentiable, at least around the equilibrium point p^o. In a moment we will argue that there are some compelling reasons for focussing on contribution schedules that have this property. With contribution functions that are differentiable, the fact that p^o maximizes $v^j + v^G$ implies that a first-order condition is satisfied at p^o, namely,

$$(13) \qquad \nabla\Lambda_j^o(p^o) - \nabla\Omega_j(p^o) + \Sigma_{i\in L}\nabla\Lambda_i^o(p^o) + a\nabla\Omega_A(p^o) = 0, \quad \text{for all } j \in L.$$

At the same time, the government's maximization of v^G requires another first-order condition,

$$(14) \qquad \Sigma_{i\in L}\nabla\Lambda_i^o(p^o) + a\nabla\Omega_A(p^o) = 0 .$$

Taken together, (13) and (14) imply

$$(15) \qquad \nabla\Lambda_i^o(p^o) = \nabla\Omega_i(p^o) \quad \text{for all } i\in L.$$

Equation (15) establishes that all contribution schedules must be *locally truthful* around p^o; that is, each lobby sets its contribution schedule so that the marginal change in the contribution for a small change in policy matches the effect of the policy change on the lobby's gross welfare. In other words, the shapes of the schedules reveal the lobbies' true preferences in the neighborhood of the equilibrium. The intuition for this result can be seen in Figure 1. In the figure, we plot the contribution C_i made by lobby *i* along the vertical axis, and the domestic price p_i along the the horizontal axis.[11] The curve labelled GG is an indifference curve for the government. It shows the contributions from lobby *i* that would compensate the government for altering the price of good *i*, in view of the change in aggregate welfare *and* the change in contributions from all other lobbies that would result from the price change. The curve labelled LL depicts an indifference curve for lobby *i*. We will soon see that these curves must be upward sloping in the neighborhood of the equilibrium, although this fact is not needed for the present argument. Now suppose that the lobby offers the contribution schedule CC, inducing the government to maximize its welfare at point E. Since CC is not tangent to LL at E, there exists a point E' along GG that yields greater welfare to lobby *i* than point E. The lobby could induce the government to choose E' instead of E by offering a contribution schedule that coincides with CC until a point somewhere below point E, falls below CC at that point, and then rises to be tangent with GG at E'. Thus, it will always be possible for the lobby to reconfigure its contribution schedule so as to raise its welfare unless CC and LL are tangent to one another (and to GG) at the equilibrium point.

We can extend this notion of "truthfulness" to define, as Bernheim and Whinston

[11]A similar argument could be made about the price of any good *j*. That is, we could plot the analogous curves in the space of C_i and p_j and show that lobby *i*'s contribution schedule must have the same slope as its indifference curve at the equilibrium price p_j.

do, a *truthful contribution schedule*. This is a contribution schedule that *everywhere* reflects the true preferences of the lobby. It pays to the government for any policy p the excess (if any) of lobby j's gross welfare at p relative to some base level of welfare. Formally, a truthful contribution function takes the form

$$(16)\qquad \Lambda_j^T(p,B_j) = \max\,[0, \Omega_j(p) - B_j]$$

for some B_j. Notice that truthful strategies are differentiable, except possibly where the contribution becomes nil, because the gross benefit functions are differentiable. Bernheim and Whinston have shown that players bear essentially no cost from playing truthful strategies, because the set of best responses to *any* strategies played by one's opponents includes a strategy that is truthful (see Section 5 below). They have also shown that all equilibria supported by truthful strategies and only these equilibria are stable to non-binding communication among the players (i.e., they are "coalition proof"). For these reasons they argue that *truthful Nash equilibria* (those equilibria supported by truthful bid functions) may be focal among the set of Nash equilibria.

Truthful Nash equilibria (TNE) have an interesting property. The equilibrium price vector of any TNE satisfies[12]

$$(17)\qquad p^{\circ} = \arg\max_{p \in P}\,[\Sigma_{j \in L}\,\Omega_j(p) + a\Omega_A(p)]\,.$$

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[12] To see this, note that condition (b) of Proposition B–W implies that $\Sigma_{j\in L}\,\Lambda_j^{\circ}(p^{\circ}) + a\Omega_A(p^{\circ}) \geq \Sigma_{j\in L}\,\Lambda_j^{\circ}(p) + a\Omega_A(p)$ for all $p\epsilon P$. If the contribution functions are truthful, then from the definition (17), $\Lambda_j^{\circ}(p^{\circ}) = \Omega_j(p^{\circ}) - B_j^{\circ}$ (where B_j° is the equilibrium net benefit to lobby j) and $\Lambda_j^{\circ}(p) \geq \Omega_j(p) - B_j^{\circ}$ for all $j\epsilon L$ and all $p\epsilon P$. Therefore $\Sigma_{j\in L}\,\Omega_j(p^{\circ}) + a\Omega^A(p^{\circ}) \geq \Sigma_{j\in L}\,\Omega_j(p) + a\Omega_A(p)$ for all $p\epsilon P$.

Equation (17) says that, in equilibrium, truthful contribution schedules induce the government to behave as if it were maximizing a social welfare function that weights different members of society differently, with individuals represented by a lobby group receiving a weight of $1+a$ and those not so represented receiving the smaller weight of a. In other words, our model provides the microanalytic foundations for the reduced-form political support functions used for example by Long and Vousden (1991).

We return now to the characterization of equilibrium trade policies that can be supported by differentiable –– although not necessarily globally truthful — contribution schedules.[13] We sum (15) over all i, and substitute the result into (14), to derive

$$\Sigma_{i\in L}\nabla\Omega_i(p^o) + a\nabla\Omega_A(p^o) = 0 \,. \tag{18}$$

This equation characterizes the equilibrium domestic prices supported by differentiable contribution functions. Notice that this is just the first order condition that is necessary for the maximization of (17), although we see that it must hold more generally (i.e., for all differentiable contribution schedules, even those that are not everywhere truthful). Our next step is to calculate the partial derivatives that appear in (18). Using (3), (4), (5) and (11), we find

$$\Omega_{ij}(p) = (I_{ij} - \alpha_i)X_j(p_j) + \alpha_i(p_j - p_j^*)\, M_j'(p_j) \,, \tag{19}$$

where $\Omega_{ij}(\cdot)$ represents the partial derivative of $\Omega_i(\cdot)$ with respect to p_j, $M_j(p_j) \equiv$

[13] Even if one does not accept the Bernheim–Whinston argument for TNE, one might want to require that contributions schedules be differentiable, because these schedules will be robust to small mistakes in calculation on the part of the lobbies, whereas a lobby might suffer a large penalty for a small miscalculation if it used a non-differentiable payment schedule.

$Nd_j(p_j) - X_j(p_j)$ represents the net import demand function, and I_{ij} is an indicator variable that equals one if $i = j$ and zero otherwise. Equation (19) states that lobby i benefits from an increase in the price of good X_i above its free trade level and it benefits from a decrease in the price of any other good below its free trade level. The specific-factor owners benefit more from an increase in the price of their industry's output the larger is the free-trade supply of the good. The benefit to lobby i that results from a decline in the price of another good j falls as the share of the members of lobby i in the total population shrinks, and it vanishes completely in the limit when $\alpha_i = 0$. When the members of lobby i are a negligible fraction of the total population, they receive only a negligible share of the transfers generated by taxes on good j and they enjoy only a negligible share of the surplus that derives from consumption of good j. In this case, they are unaffected by changes in the domestic price of that good.

Summing the expressions in (19) for all $i \epsilon L$ gives the effect of a small policy change on the aggregate gross welfare of all individuals who are a member of some organized interest group. We find

$$\Sigma_{i\epsilon L}\Omega_{ij}(p) = (I_{jL} - \alpha_L)X_j(p_j) + \alpha_L(p_j - p_j^*)M_j'(p_j) , \tag{20}$$

where $I_{jL} \equiv \Sigma_{i\epsilon L} I_{ij}$ is an indicator variable that equals one if industry j is organized and zero otherwise, while $\alpha_L \equiv \Sigma_{i\epsilon L}\alpha_i$ denotes the fraction of the total number of voters that is represented by a lobby. Equation (20) reveals that, starting from free-trade prices, lobby members as a whole benefit from a small increase in the domestic price of any good that is produced by an organized industry and (provided $\alpha_L > 0$) from a small decline in the price of any good that is produced by an unorganized industry.

Finally, we compute Ω_{Aj}, the partial derivative of aggregate welfare with respect to the price of good j. Using the definition $\Omega_A(p) \equiv \Sigma_h \omega^h(p)$ and (3), (4), (5) and (7), we find

$$\Omega_{Aj}(p) = (p_j - p_j^*)M_j'(p_j)\,.$$

Substituting this expression and (20) into (18) gives the equilibrium domestic prices, assuming that these prices lie in the interior of P.[14] We express the result in terms of the equilibrium ad valorem trade taxes and subsidies, which are defined by $t_i^o \equiv (p_i^o - p_i^*)/p_i^*$.

Proposition 1: If the lobbies use contribution schedules that are differentiable around the equilibrium point, and if the equilibrium lies in the interior of P, then the government chooses trade taxes and subsidies that satisfy

$$\text{(21)} \qquad \frac{t_i^o}{1+t_i^o} = \frac{I_{iL} - \alpha_L}{a + \alpha_L}\,\frac{1}{m_i^o\, e_i^o}, \qquad \text{for } i = 1,2,\ldots,n,$$

where $m_i^o = M_i(p_i^o)/X_i(p_i^o)$ is the equilibrium ratio of imports to domestic output (negative for exports) and $e_i^o = -M_i'(p_i^o)p_i^o/M_i(p_i^o)$ is the elasticity of import demand or of export supply (the former defined to be positive, the latter negative).

Proposition 1 describes a modified Ramsey rule. All else equal, industries that

[14] The domestic price of good X_i may be driven to the boundary of P if one of several constraints becomes binding. First, the owners of the specific factor used in industry i may not have sufficient resources to "protect themselves" from other lobbies; i.e., the political contributions needed to keep p_i above $\underline{p}_i$ may exceed their aggregate income. Second, some lobby group j may bid for such a large export subsidy that the income of some individuals will not be sufficient to cover the per capita levy needed to finance the subsidy. Then p_j will be driven to $\bar{p}_j$. These extreme outcomes, which are made possible by the linearity in our specification, are not an especially interesting feature of the model. Thus, we do not pursue the equilibria with corner solutions any further.

have high import demand or export supply elasticities (in absolute value) will have smaller ad valorem deviations from free trade, as it is costly for the government to introduce policy distortions in such sectors. But considerations of deadweight loss are modified by political variables in the determination of the equilibrium structure of protection. First, note that *all* sectors that are represented by lobbies are protected by import tariffs or export subsidies in the political equilibrium.[15] Whereas, import subsidies and export taxes are applied to those sectors that have no organized representation. The organized lobbies as a group manage to raise the domestic prices of the goods from which they derive profit income and to lower the prices of the goods that they only consume. The political power of a particular organized sector is reflected by the ratio of domestic output to imports. In sectors with large domestic output, the specific factor owners have much to gain from an increase in the domestic price, while (for a given import demand elasticity) consumers have relatively little to lose from protection when the volume of imports is low.[16]

The smaller is the weight that the government places on a dollar of aggregate welfare compared with a dollar of campaign financing, the larger in absolute value are

[15] The formula for the equilibrium trade tax can be expressed as

$$t_i^o = \frac{I_{iL} - \alpha_L}{a + \alpha_L} \frac{X_i(p_i^o)}{[-p_i^* M_i'(p_i^o)]} .$$

If this equation has a solution for a case where $I_{iL} = 1$, then it must involve $t_i^o > 0$. If the equation has no solution, then $p_i^o = \bar{p}_i$, and again $t_i^o > 0$.

[16] Our formula suggests that only two variables — the elasticity of import demand and the ratio of imports to domestic output — should explain the cross–industry variation in protection levels. Empirical studies of the structure of protection are reviewed by Anderson and Baldwin (1987) and Baldwin (1984). However, the existing studies fail to control for import demand elasticities, while including many variables that are not indicated by our model (but which may be correlated with the omitted variable), thus rendering the regression results impossible to interpret in the light of our theory. The other variables that enter (21) affect all industries similarly, so an empirical test of these predictions would require time series or cross-country data.

all trade taxes and subsidies. But an interior solution remains possible even if the government cares only about contributions ($a = 0$). This is because the interest groups, themselves, do not want the distortions to grow too large. As the share of voters who are members of one interest group or another increases, equilibrium rates of protection for the organized industries decline. At the extreme, when all voters belong to an interest group ($\alpha_L = 1$) and all sectors are represented ($I_{iL} = 1$ for all i), then free trade prevails in all markets. In this case, the various interest groups neutralize one another, so that an industry's demands for protection are matched in equilibrium by the opposing interest groups' bids for a low domestic price. On the other hand, if interest group members comprise a negligible fraction of the voting population ($\alpha_L = 0$), then no trade taxes or subsidies will be applied to goods not represented by a lobby (for which $I_{iL} = 0$). As we have noted before, when the potential political contributors are few in number, they stand to gain nothing from trade interventions in sectors other than their own.[17]

5. POLITICAL CONTRIBUTIONS

We have characterized the structure of protection that emerges from the political process whenever the interest groups use contribution schedules that are locally differentiable. This restriction on the contribution functions leaves latitude for schedules with many different shapes (away from equilibrium), and in fact the set of contribution schedules that supports the equilibrium policy vector is not unique. Different sets of equilibrium contribution schedules give rise to different equilibrium donations by the various lobby groups and thus to different net payoffs for the groups' members. If we are to say something more about which lobbies contribute the most to

[17] This result would change if demands for the non-numeraire goods had positive income elasticities.

influence policy, we must introduce additional assumptions that allow us to select among the set of Nash equilibria.

We focus attention henceforth on truthful Nash equilibria; that is, equilibria that arise when the lobbies announce truthful contribution schedules. As we have noted before, every lobby can always substitute a truthful strategy for a non-truthful strategy and achieve the same net payoff after the substitution as in the original (non-truthful) equilibrium.[18]

When we restrict attention to truthful contribution schedules, the competition between the lobbies involves only the choice of the scalars $\{B_i\}$. Given these "anchors" for the contribution functions, the truthfulness requirement dictates the shapes of the schedules (see [17]). The net welfare of lobby *i* in a truthful Nash equilibrium is given by $v^i = \min\,[\Omega_i(p), B_i]$. Moreover, we know that $p = p^o$ in equilibrium. It follows that lobby *i* will set the largest B_i that preserves the government's incentive to choose the equilibrium policy action, p^o.

To see this, suppose that lobby *i* has set its $B_i = \hat{B}_i$, and that the government's optimal response to the resulting truthful contribution schedule of this lobby and the others is p^o. Suppose further that $\Lambda_i^T(p^o,\hat{B}_i) > 0$; i.e, the conjectured equilibrium

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[18] Consider the equilibrium contribution schedules $\{\hat{\Lambda}_j\}$ that induce the domestic price vector $\hat{p}$. Suppose that $\hat{\Lambda}_i$ is not truthful. Let lobby *i* replace $\hat{\Lambda}_i$ with the truthful schedule $\Lambda_i^T = \max\,[0, \Omega_i(p) - \hat{B}_i]$, where $\hat{B}_i \equiv \Omega_i(\hat{p}) - \hat{\Lambda}_i(\hat{p})$ is lobby *i* 's net payoff in the original equilibrium. If the government still chooses $\hat{p}$ when faced with Λ_i^T, then clearly the net payoff to lobby *i* remains equal to $\hat{B}_i$. Since the government chose $\hat{p}$ in the original equilibrium, if it selects an alternative policy $\tilde{p}$ when faced with Λ_i^T in place of $\hat{\Lambda}_i$ (and all other schedules unchanged), it must be the case that $\Lambda_i^T(\tilde{p},\hat{B}_i) > \hat{\Lambda}_i(\tilde{p}) \geq 0$. But then $\Lambda_i^T(\tilde{p},\hat{B}_i) = \Omega_i(\tilde{p}) - \hat{B}_i$, and so the lobby secures the net payoff $\hat{B}_i$ in this case as well.

calls for a positive campaign contribution from lobby *i*. Might lobby *i* wish to increase its B_i by a small amount ϵ, thereby uniformly reducing all of its positive policy bids? Clearly, if the government would still choose p° were $\Lambda_i^T(p^\circ,\hat{B}_i)$ to be replaced by $\Lambda_i^T(p^\circ,\hat{B}_i+\epsilon)$, then this deviation would be welfare improving for lobby *i*. We have then the essence of condition (d) in Proposition B–W. Each lobby raises its B_i, thereby shifting its contribution schedule downward, until it reaches a point where the government is indifferent between choosing p° and some alternative policy p^{-i} that is not favorable to lobby *i*. At this unfavorable point, the lobby's contribution is nil, so a further increase in B_i would reduce the offer associated with p° but not that associated with p^{-i}, and would therefore induce the government to switch from the former policy choice to the latter.

We can illustrate this process diagrammatically for the special case in which there are exactly two lobbies and the government cares only about campaign financing ($a = 0$). In Figure 2, the shaded area represents the set of contribution pairs (C_1,C_2) that the government could collect for all possible choices of the price vector p, when the contribution schedule of lobby 1 is $C_1 = \Lambda_1^T(p,B_1)$ and that of lobby 2 is $C_2 = \Lambda_2^T(p,B_2)$. Lobby *i* makes its largest contribution at the point on the figure labelled Y_i, i = 1,2. With truthful contribution schedules, this point must represent lobby *i* 's most preferred policy choice. We wish to know whether the assumed B_1 and B_2 are an equilibrium pair of anchors for the truthful contribution schedules.

Given the shaded opportunity set, a government that wishes to maximize its welfare will opt for point Q, which is tangent to its indifferent curve, a negatively-sloped 45° line in this case. Underlying this point is some particular policy choice. Now lobby 1 recognizes that a slight increase in B_1 (i.e., a slight reduction in all positive donations), will shift the shaded area uniformly to the left, to the location indicated by the dotted lines. Faced with this altered set of possibilities, the government would choose point Q′, a leftward displacement of point Q. But the policy that underlies point Q' is the same as that underlying point Q. Evidently, lobby 1 benefits from this change. Of course, the situation illustrated in the figure affords lobby 2 the same opportunity to improve its net welfare.

Figure 3 depicts an equilibrium configuration. Here both lobbies have increased their B_i's (relative to the situation depicted in Figure 2), so that some policy choices available to the government generate a nil contribution from one or both of the lobbies. Consider, for example, point Y_1, which corresponds to the similarly labelled point in Figure 2. This point is not feasible, because lobby 2 cannot offer a negative contribution as implied. Rather, if the government were to choose the policy most preferred by lobby 1, it would receive the contributions represented by point Z_1, which includes a contribution of zero from lobby 2. The heavy line represents the outer envelope of the government's opportunity set. In the situation shown, the government collects the same total campaign funds for choosing Q, Z_1, and, Z_2. No other points offer contributions as great as these, so the policies that underlie the three points comprise the set of welfare maximizing choices for the government. Were lobby i to raise its B_i any further, the government would select point Z_j, $j \neq i$, instead of point Q, and the net welfare of lobby i would fall discretely. Thus, neither lobby has any incentive to deviate. Notice that lobby i contributes nothing at Z_j, as stipulated by condition (d) of Proposition B–W.

We now present a formal procedure for calculating the equilibrium contributions and net welfare levels when an arbitrary number of lobbies set truthful contribution schedules and the government maximizes v^G as given in (12). According to the logic of the case just discussed, each lobby i must solve the following problem:

Problem B: maximize B_i, subject to $\Gamma_i(p^\circ, B_i) \geq \Gamma_i(p, B_i)$ for all $p \in P$, where $\Gamma_i(p, B_i) \equiv \Sigma_{j \in L, j \neq i} \Lambda_j^T(p, B_j^\circ) + \Lambda_i^T(p, B_i) + a\Omega_A(p)$.

The term $\Gamma_i(p^\circ, B_i)$ gives the payoff to the government when lobby *i* sets an anchor of B_i, given that the other lobbies have set their equilibrium anchors B_j°. The term $\Gamma_i(p, B_i)$ is the government's payoff when it chooses some other policy action p, for the same set of anchors. The problem facing each lobby, then, is to set B_i as large as possible without giving the government cause to choose some alternative price vector p instead of the equilibrium vector p°.

In Figure 4, the solid curve represents the government's payoff $\Gamma_i(p^\circ, B_i)$, plotted as a function of B_i. The curve is downward sloping until B_i reaches $\bar{B}_i$, which is the smallest B_i for which $\Lambda_i^T(p^\circ, B_i) = 0$. Further increases in B_i cannot make Λ_i^T negative, and so they have no effect on the government's welfare. The broken curve in the same figure represents $\hat{\Gamma}_i(B_i) \equiv \max_{p\in P} \Gamma_i(p, B_i)$. This is the payoff to the government when lobby *i* sets its anchor at B_i and the government chooses its *optimal* policy response. When B_i is small, the government has no incentive to choose a policy other than p°, and so the two curves coincide. But for sufficiently large B_i, the government may find that the small contribution it receives from lobby *i* as a payment for choosing p° does not adequately compensate it for making this choice rather than another (for which it receives no contribution from lobby *i*). Then $\hat{\Gamma}_i(B_i) > \Gamma_i(p^\circ, B_i)$, and further increases in B_i have no effect on the government's policy choice or welfare.

If the government would opt for p° even in the absence of a contribution from lobby *i*, then the two curves never diverge. In this case, the lobby sets $B_i = \bar{B}_i$ and makes no contributions in equilibrium. Otherwise, the equilibrium net benefit for lobby *i* is given by the point of divergence of the two curves, labelled B_i° in the figure. At B_i°, the government receives the same reward for choosing p° as for choosing an alternative p^{-i}, which will be its most preferred policy for all $B_i > B_i^\circ$. That is, if we define

$$(22) \qquad p^{-i} = \arg\max_{p\in P} \Sigma_{j\in L, j\neq i} \Lambda_j^T(p, B_j^\circ) + a\Omega_A(p) \quad \text{for all } i \in L,$$

the most preferred point for the government when lobby *i* does not contribute, then

$$(23) \qquad \Sigma_{j\in L, j\neq i}\, \Lambda_j^T(p^{-i}, B_j^o) + a\Omega_A(p^{-i}) = \Sigma_{j\in L}\, \Lambda_j^T(p^o, B_j^o) + a\Omega_A(p^o) \;\text{ for all } i \in L.$$

These two sets of equations allow us to solve for the net welfare levels of the various lobbies in a TNE with positive contributions by all lobbies.[19] As a consistency check, we must make sure that at B_i^o, lobby *i* would make no contribution were the policy p^{-i} to be chosen by the government. This requires

$$(24) \qquad \Omega_i(p^{-i}) \leq B_i^o \quad \text{for all } i \in L.$$

If (24) fails for some *i*, then that lobby benefits from raising its B_i (reducing its equilibrium contributions) until the constraint that payments must be non-negative becomes binding at $\bar{B}_i$.[20]

Let us examine some special cases, to see how the equilibrium contributions are determined. First we consider the case in which there is only a single organized lobby group, representing the specific factor owners in some industry *i*. The equilibrium price vector for this case has $p_i^o > p_i^*$ and (so long as $\alpha_i > 0$) $p_j^o < p_j^*$ for $j \neq i$ (see [21]). But we know that the government would opt for free trade in the absence of any contributions from the one and only special interest group; thus, $p^{-i} = p^*$. Using (23), we find the equilibrium campaign contribution of lobby *i*, $\Lambda_i^T(p^o, B_i^o) = a\Omega_A(p^*) - a\Omega_A(p^o)$. We see that the lobby contributes an amount that is proportional to the

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[19] Theorem 2 in Bernheim and Whinston (1986b) provides an alternative characterization of the equilibrium payoffs in a menu auction. It is easy to show that the net payoffs $\{B_j^o\}$ that satisfy (22) and (23) also satisfy the conditions of their theorem.

[20] In this case the lobby's net welfare is given simply by $\bar{B}_i = \Omega_i(p^o)$.

excess burden that the equilibrium trade policies impose on society. The factor of proportionality is the weight that the government attaches to aggregate gross welfare (relative to campaign contributions) in its own objective function. In this political equilibrium, the politicians derive exactly the same utility as they would have achieved by allowing free trade in a world without influence payments. So the lobby captures all of the surplus from the political relationship.

Next we consider the equilibrium that emerges when all sectors are organized and all voters are represented by one special interest group or another. We have seen that the political competition in this case results in free trade ($p^o = p^*$). Nonetheless, each lobby must make a positive campaign contribution in order to induce the government to choose this outcome rather than one that would be still worse from its perspective. Take for example the case where there are only two non-numeraire goods and two lobbies, say 1 and 2. Using (23), we have

$$(25) \qquad \Lambda_i^T(p^o, B_i^o) = [\Lambda_j^T(p^{-i}, B_j^o) + a\Omega_A(p^{-i})] - [\Lambda_j^T(p^o, B_j^o) + a\Omega_A(p^o)], \quad \text{for } i = 1,2;\ j \neq i$$

By the definition of p^{-i} (see [22]) and the fact that $p^{-i} \neq p^* = p^o$, we know that the right-hand side of (25) is positive for $i = 1,2$. Thus, both lobbies actively contribute to the incumbent government in order to support the free trade outcome.

Which lobby makes the larger contribution? To answer this question, we rewrite equation (25) as[21]

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[21] In order to do so, we need $\Lambda_j^T(p^{-i}, B_j^o) - \Lambda_j^T(p^*, B_j^o) = \Omega_j(p^{-i}) - \Omega_j(p^*)$. Given that the contribution schedules are truthful, this will be the case if both $\Lambda_j^T(p^{-i}, B_j^o)$ and $\Lambda_j^T(p^*, B_j^o)$ are positive. We have already seen that the latter is true. Since the right-hand side of (25) is positive and $\Omega_A(p^{-i}) < \Omega_A(p^*)$, we have $\Lambda_j^T(p^{-i}, B_j^o) > \Lambda_j^T(p^*, B_j^o)$.

$$(26a)\qquad \Lambda_1^T(p^\circ,B_1^\circ) = [\Omega_2(p^{-1}) + a\Omega_A(p^{-1})] - [\Omega_2(p^*) + a\Omega_A(p^*)]\,,$$

$$(26b)\qquad \Lambda_2^T(p^\circ,B_2^\circ) = [\Omega_1(p^{-2}) + a\Omega_A(p^{-2})] - [\Omega_1(p^*) + a\Omega_A(p^*)]\,.$$

Each lobby i must contribute to the politicians an amount equal to the difference between what its rival and the government could jointly achieve were lobby i not itself active in the political process and what the two actually attain in the full political equilibrium. Thus, each lobby pays according to the political strength of its rival. Take for example the case where the industries are symmetric except that they have different, perfectly inelastic supply functions $X_i(p) = \bar{X}_i$. Then the interest group representing factor owners with the smaller endowment makes the *larger* political contribution.

The final special case that we shall consider arises when there are only two industries, both organized, but the ownership of the specific factors is so highly concentrated that interest group members account for a negligible fraction of the total voting population. The political equilibrium for this case has positive protection for both sectors (i.e., $p_i^\circ > p_i^*$ for $i = 1,2$). But since $\alpha_i = 0$, $i = 1,2$, each lobby interacting on its own with the government would allow free trade to prevail in the market for the good produced by the other industry. Moreover, each would induce the same protection for its own sector as emerges anyway in the two-lobby equilibrium (since, lobby j does not oppose the protectionist demands made by lobby i when $\alpha_j = 0$). In short, we have $p^{-1} = (p_1^*,p_2^\circ)$ and $p^{-2} = (p_1^\circ,p_2^*)$. Since the members of each interest group receive only a negligible share of government transfer payments and derive only a negligible share of the surplus from consuming the non-numeraire products, the aggregate utility of these individuals depends only on their factor income and

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Thus, the former must be true as well.

therefore only on the domestic price of their industry's output. It follows from this discussion that $\Omega_j(p^{-i}) = \Omega_j(p^\circ)$. Then applying (23) once again, we have

$$\Lambda_1^T(p^\circ,B_1^\circ) = a\Omega_A(p_1^*,p_2^\circ) - a\Omega_A(p_1^\circ,p_2^\circ) \tag{27a}$$

$$= a\Big\{N[-\delta_1(p_1^*) + \delta_1(p_1^\circ)] - M_1(p_1^\circ)(p_1^\circ - p_1^*) - [\Pi_1(p_1^\circ) - \Pi_1(p_1^*)]\Big\},$$

$$\Lambda_2^T(p^\circ,B_2^\circ) = a\Omega_A(p_1^\circ,p_2^*) - a\Omega_A(p_1^\circ,p_2^\circ) \tag{27b}$$

$$= a\Big\{N[-\delta_2(p_2^*) + \delta_2(p_2^\circ)] - M_2(p_2^\circ)(p_2^\circ - p_2^*) - [\Pi_2(p_2^\circ) - \Pi_2(p_2^*)]\Big\},$$

where $-\delta_i(p_i) \equiv u_i[d_i(p_i)] - p_i d(p_i)$ is per capita consumer surplus derived from good i. In this case, like the first one that we discussed, each lobby contributes the product of the government's weight on aggregate gross welfare and the excess burden caused by the policy used to protect the lobby's interests. To see this, note that the three terms inside the curly brackets in the second lines of (27a) and (27b) are, respectively, the loss of consumer surplus, the gain in government revenue, and the gain in producer surplus generated by the equilibrium trade intervention in each industry. In other words, the terms in the curly brackets sum to the familiar Harberger triangles of deadweight loss associated with a protectionist policy in a small country. Each lobby makes a positive contribution to the incumbent politicians, but the officeholders attain only the welfare level that they would have achieved in a free trade equilibrium without political contributions. All surplus accrues to the interest groups.

6. WHY LOBBIES MAY PREFER TRADE POLICIES

In deriving the political–economic equilibrium, we have limited the government's choice of policy instrument to trade taxes and subsidies. It may seem that the interest groups would prefer to have the government use more efficient means to transfer income, if such means were available. In this section we show that this is not necessarily the case. In fact, the lobby groups may support institutions that constrain the government to transfer income as inefficiently as possible. Accordingly, a regime that allows only voluntary export restraints (with quota rents transfered to foreigners) may be even more desirable to the lobbies than one that allows for import tariffs. Our analysis highlights the importance of the institutional setting for determining the power of special interest groups in political equilibrium.

To make our points, we consider a setting similar to that above, except that now the government can use output subsidies instead of (or in addition to) trade policies to transfer income to the specific-factor owners.[22] We will focus on two of the special cases that were discussed before. In both of these there are only two industries besides that producing the numeraire good Z, and each set of specific-factor owners is represented by an industry lobby that offers a truthful contribution schedule. In the first special case all voters own some of one specific factor or the other (i.e., $\alpha_L = 1$). In the other case, the specific-factor owners comprise a negligible fraction of the total voting population (i.e., $\alpha_L = 0$).

We have seen that the equilibrium policy choice in a TNE maximizes a weighted sum of the utilities of represented and unrepresented voters. When all voters are represented by an organized lobby, the equilibrium policy choice maximizes aggregate welfare. Laissez faire prevails when output subsidies are allowed, just as free trade

[22] As will become clear, similar arguments apply when other policy intruments are available as well.

emerged when the government could invoke only trade policies. Thus, an interest group will prefer a regime that allows only trade interventions to one that instead (or in addition) admits output subsidies if and only if its equilibrium political contribution in the latter regime exceeds that in the former. But it is easy to show that, under the conditions at hand, this is always the case.

Recall that each lobby contributes in equilibrium the difference between what its rival lobby and government could jointly achieve in the absence of its own participation in the political process and what they in fact achieve in the political equilibrium. The equilibrium entails the same policy outcome (i.e., laissez faire) under either regime. But the rival lobby and the government together can jointly attain greater welfare in a policy regime that allows output subsidies (or other, more efficient policies) than in one that does not.[23] It follows that the lobbies' contributions will be greater (and their net welfare lower) in the output-subsidy regime than in the trade-policy-only regime.

Now consider the case in which $\alpha_L = 0$. Then the equilibrium does not maximize aggregate welfare, and each lobby contributes a times the excess burden associated with the policy that bolsters its members' incomes (i.e., output subsidy or import tax, as the case may be). Under these circumstances the net payoff to lobby i in any policy

[23] Let $\Omega_i(s,t)$ be the gross-of-contribution welfare of lobby i when the vector of specific output subsidies (taxes if negative) is s and that of specific import taxes or export subsidies is t. Let $\Omega_A(s,t)$ be aggregate welfare in this case. Then

$$\Omega_i(s+t,0) + a\Omega_A(s+t,0) =$$

$$\Omega_i(s,t) + a\Omega_A(s,t) + N(\alpha_i + a)[\delta(p^*) - \delta(p^*+t) - \Sigma_j t_j d_j(p_j^*+t_j)] ,$$

Since the term in square brackets is positive (the sum of the Harberger triangles associated with the consumption distortions of the trade policies), the government and any one lobby can always gain by eliminating any trade taxes and augmenting the existing output subsidies by the same per unit amounts. It follows that the *maximal* welfare attainable when output subsidies are available (with or without the additional availability of trade policies) exceeds the *maximal* welfare attainable when only trade policies can be used.

regime equals $\Omega_i - \Lambda_i^T = \Omega_i - a(\Omega_A^* - \tilde{\Omega}_A^i)$, where $\tilde{\Omega}_A^i$ is aggregate welfare when the equilibrium policy applies to output or trade of industry i and no other policies are in force and Ω_A^* is aggregate welfare under laissez faire.[24] Therefore the payoff to lobby i differs from $\Omega_i + a\tilde{\Omega}_A^i$ by a constant. But, with $\alpha_L = 0$, each lobby does not contribute to influence the policy affecting the other industry, and so $\Omega_i + a\tilde{\Omega}_A^i$ is also the maximal welfare for lobby i and the government when lobby j does not participate in the political process. We have already seen that this joint welfare is higher under an output-subsidy regime than under a trade-policy-only regime (see footnote 22). It follows that each lobby prefers an institutional setting where output subsidies are allowed.

We have then one example where the lobbies would prefer to allow the government the use of output subsidies to transfer income and one example where they'd rather prohibit such subsidies and force the use of less efficient trade policies. In the case where $\alpha_L = 1$, competition between the lobbies is intense. The availability of an efficient income-transfer tool makes credible an implicit government threat to join forces with the opposing lobby. Each lobby has little political power under these conditions and it prefers to tie the government's hands. In fact, the lobbies most prefer a complete prohibition on all policies that can be used to transfer income, which would spare them the need to make campaign contributions. On the other hand, when $\alpha_L = 0$, the lobbies do not compete with one another for policy influence and so each prefers to grant politicians access to the most efficient tool that can be used for transfering income to special interests. We can see that the institutional setting and the political and economic environment combine to determine the policy outcome and the ultimate distribution of income.

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[24] For example, in the trade-policy regime, $\tilde{\Omega}_A^1 = \Omega_A(p_1^o, p_2^*)$ and $\Omega_A^* = \Omega_A(p_1^*, p_2^*)$.

7. ELABORATIONS AND EXTENSIONS

We have developed our analytical framework for determining policy outcomes in the simplest possible context: some subset of owners of sector–specific inputs used in competitive, final-good producing industries contributes to incumbent politicians to influence a small country's trade policies. In this concluding section, we elaborate the model to allow for an imported intermediate input and for an imperfectly competitive market structure, and discuss briefly how the model might be extended to include endogenous lobby group formation, competition among political candidates, and interactions between several countries operating in a world trading system.

A. *Intermediate Goods*

Our model can be modified readily to allow for imported intermediate inputs. Suppose, for example, that there is one such good Q, producible at home with labor and a sector-specific input. Suppose further that the intermediate good is used in some or all of the sectors producing the goods X_i, but not in the sector producing the numeraire good Z. Then the aggregate reward to the owners of the specific factor used in the production of final good X_i becomes $\Pi_i(p_i,q)$, where q is the domestic price of the intermediate good Q, while the reward to the owners of the specific factor used in domestic production of the intermediate good is $\Pi_Q(q)$. We could proceed as before to derive the equilibrium trade policies and campaign contributions.

Two notable results emerge from such an exercise. First, imports of the intermediate good may be subsidized in the political equilibrium, even if the interests of the owners of the specific factor used in producing good Q are represented by a lobby group. This contrasts with the situation for final-good producers, where all organized industries succeed in securing some trade protection. The explanation, of course, is that the representatives of the final-goods producers lobby forcefully against higher domestic prices for intermediates, since such higher prices have a direct, adverse effect on their profits. Second, the formula for the equilibrium import tariff or export subsidy applicable to trade in any final good X_i can be decomposed into two terms, one that has the same form as before (see, e.g., equation [21]) and the other that is an increasing function of the equilibrium tariff applicable to intermediate inputs. Both of these results suggest that the political process tends to favor the interests of final-good producers relative to those of intermediate-good producers.

B. *Imperfect Competition*

Now suppose that, in addition to the industries described in Section 3, there exists another set of industries where competition is imperfect. In these sectors, output is produced from labor alone and there are a fixed number of home firms that compete with one another and with imports that are an imperfect substitute for the (homogeneous) domestically-produced good. Owners of the domestic firms earn monopoly rents in the oligopolistic equilibrium, and if they are politically organized, their representatives will bid for tariffs that shelter them from competition with imports.

The easiest example to work out is one in which demands for the goods produced by the oligopolists are linear in both the domestic price and the import price, and where the domestic producers engage in Cournot competiton. Then the formula for the equilibrium trade policy applicable to goods produced in competitive sectors is exactly as given in Proposition 1, while all organized oligopolistic industries succeed in buying relief from import competition. It should be noted that aggregate welfare maximization requires a positive tariff on elastically-supplied imports that compete with a good produced by an imperfectly competitive domestic industry (see Flam and Helpman, 1987). However, the tariffs that emerge in the equilibrium with political contributions exceed those that maximize aggregate welfare. Both the equilibrium tariff rates themselves and the ratio of these rates to the aggregate welfare-maximizing tariffs fall with the number of firms active in the domestic industry.

C. *Lobby Group Formation*

In our analysis, we have taken the set of industries that is organized politically to be exogenous. Our analysis could serve as an input into a more complete theory that would predict not only the outcome of a political process that caters to existing special interests groups, but also which interests will organize to seek political favors. In order to address the latter question, it is necessary to assess both the costs of political organization and the benefits. Little is known about the cost of coalition formation, although it is likely that these costs are higher for concentrated interests than for diffuse ones. As for the benefits, a model such as ours is needed in order to predict what the political outcome will be when the organization does and when it does not take place.

An analogy can be drawn with theories of endogenous market structure. There, it is necessary to formulate first a model of oligopolistic competition with a fixed number of firms in order to measure what profits would be with and without entry. The complete theory includes an entry-stage game, where potential producers decide whether to incur the costs of entry in view of the prospective profits. Our model could be similarly extended to include an additional stage. In the first stage, owners of specific factors would decide whether to bear the cost of organizing politically. In the second stage, the organized groups would offer contribution schedules to the politicians. Finally, the government would set trade policy.

D. *Political Competition*

Political competition between political parties might also be handled by adding additional stages to our game. In a sense, we could marry the approach taken by Magee, Brock, and Young (1989) to the one taken here. In a first stage, interest groups could contribute money to either of two parties to influence the outcome of a coming election. The parties might differ in the weights they attach to aggregate welfare in their political objective functions, or they might have different *ideologies*; i.e., preferences for certain types of policies that are independent of their effect on the average voter. Once the election was concluded, there would be a second stage of political contributions wherein the interest groups would offer contribution schedules in an attempt to influence policy choices. Here, a group that contributed to a defeated politician before the election might well offer to contribute to his newly elected rival afterwards (as actually happens, according to the evidence cited in Section 2). Finally, the elected government would make its policy choice, having been unable to commit to any particular policy action until after it actually took power. Notice that our analysis in this paper would be an essential ingredient in this, more complete model. Each lobby would need to evaluate what the political outcome would be (policy and implied contributions) in the event that each candidate won the election, in order to decide which candidate to support financially and to what extent.

E. *The International Trading System*

We have studied the political process determining trade policies in a small country that acts in isolation. Additional considerations arise when large countries interact in a world trading system. First, large countries must take account of terms-of-trade effects. A government that would choose "optimal" tariffs and export taxes in the absence of political contributions will be induced to deviate from those policies by special interests that stand to gain from still higher tariffs and from smaller export taxes. Our model can be used to determine the equilibrium trade policies for a large country with passive trade partners.[25] But the outcome of the political process in one country will affect economic interests in others and may invite retaliation. Our methods can be used to ask what policies will emerge when several large countries set their trade taxes and subsidies simultaneously and noncooperatively. This question has been asked by Johnson (1953) and others for the case of a government that acts to maximize aggregate welfare, but it has rarely been addressed in the context of a government that is motivated by political considerations (but see Baldwin, 1990).

International institutions such as the GATT have been formed so that countries might cooperate in setting their trade policies. Surely the political environments in the member countries condition the bargaining that takes place under GATT auspices. An approach such as ours can be used to predict the outcome of international trade negotiations. It can also be used to design better "rules of the game". As we noted in the introduction, an assessment of the constraints that international agreements might impose on national governments' policy options requires a good understanding of how the policy process will play out in the individual trading countries.

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[25] We can represent foreign import demand and export supplies by writing $p_i^* = \phi_i(M_i)$. Then it can be shown that

$$t_j^o = \frac{I_{jL} - \alpha_L}{a + \alpha_L} \frac{X_j}{(-\, p_j^* M_j')} + \frac{1}{e_j^*},$$

where $e_j^* \equiv p_j^*/M_j\phi_j'(M_j)$ is the foreign elasticity of export supply (positive) or import demand (negative). The political pressures and terms-of-trade considerations are mutually reinforcing for import goods, but are in opposition to one another for export goods. All organized import industries receive protection in the political equilibrium, but exports may be subsidized or taxed.

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Figure 1

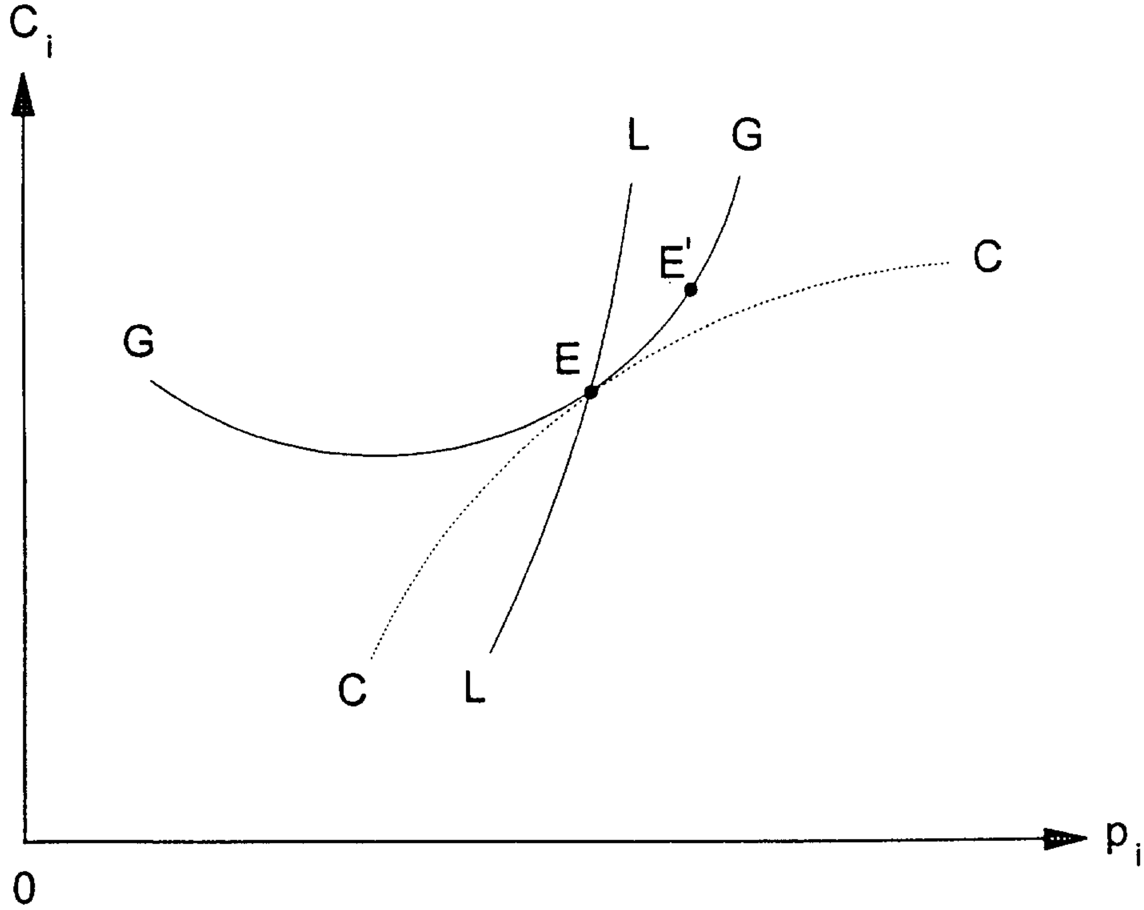

Figure 2

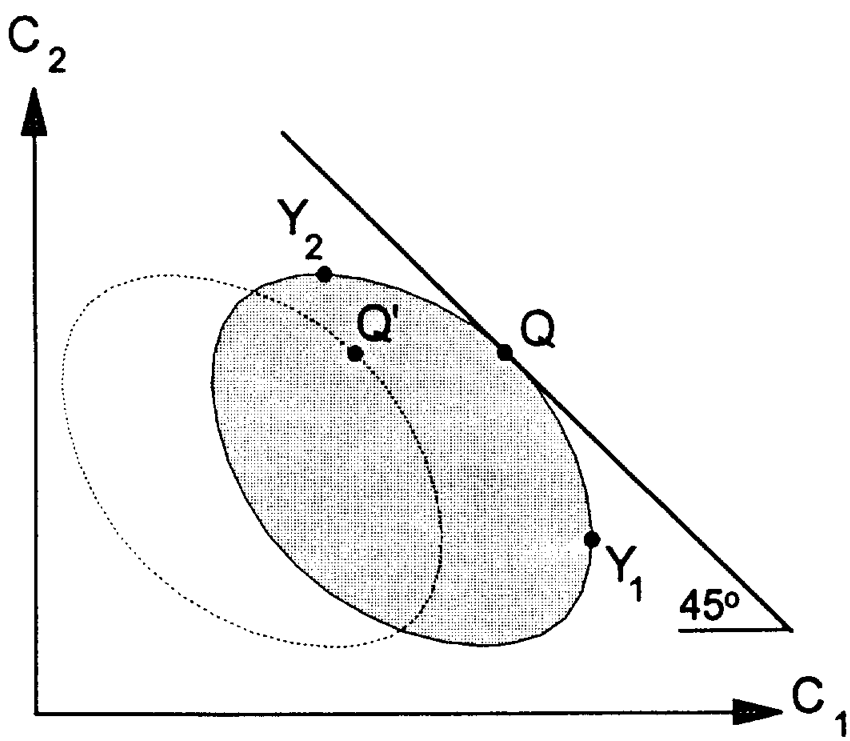

Figure 3

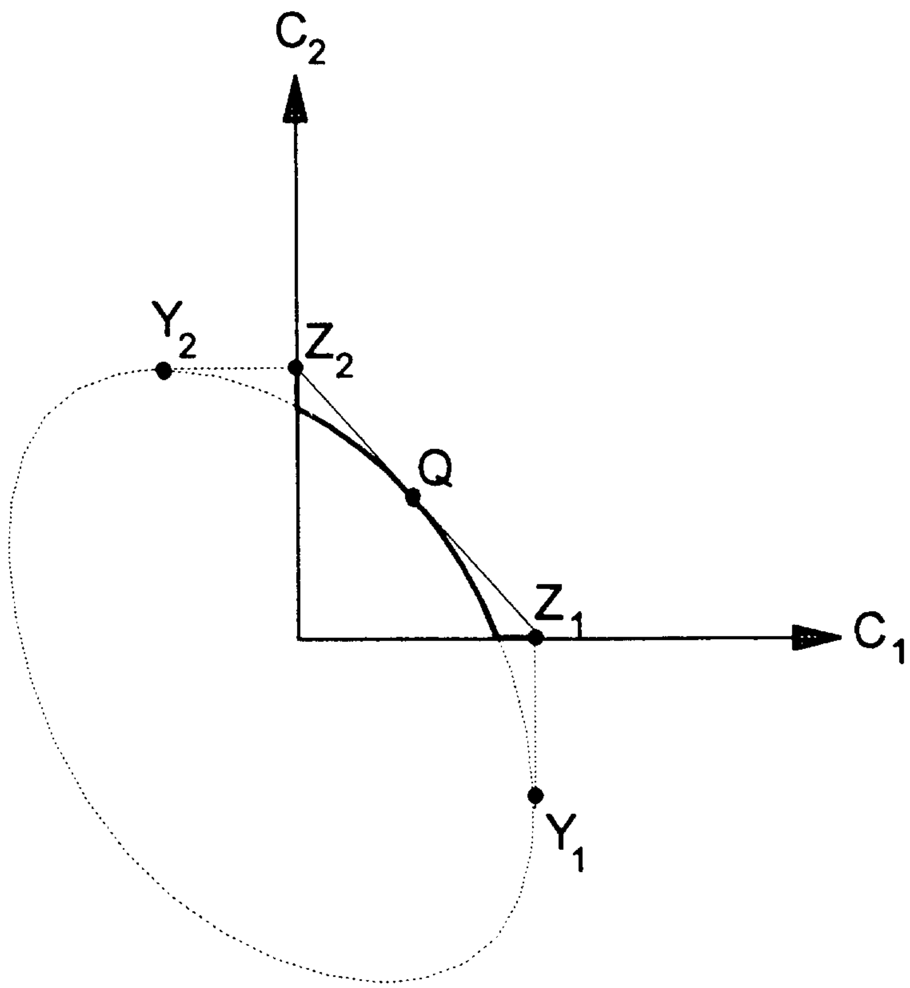

Figure 4