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PROTECTION AT STAKE

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When it comes to trade policy, there is a frequent inherent conflict between domestic producers and domestic consumers. Increased imports cause a downward pressure on domestic prices and, hence, improve domestic consumer welfare while diluting domestic producer profits. Here the implications of an import quota in an oligopolistic market à la Cournot are examined. In a lobbying contest between the two interest groups, consumers and producers, their relative political contributions determine the probabilities of the policy-maker choosing their respective bliss points: free trade or autarky. We find that as the number of foreign competitors in the domestic market increases, the policymaker receives more contributions and the probability of winning shifts in favor of domestic consumers.

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I. INTRODUCTION

The basic premise of our investigation is an inherent conflict between domestic producers and domestic consumers regarding the effects of trade policy. Domestic producers will argue that with few domestic firms and

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relatively many foreign competitors of substantial size, too large a share of the oligopolistic rents is lost to foreigners. The more "excessive" the foreign competition, the more rent is transferred abroad. Evidently, protection from foreign competitors increases the domestic producers' market power and, consequently, their oligopolistic rents. This rent-shifting effect is certainly in the domestic firms' interest. Domestic consumer advocates would argue that, if effective, protectionist measures reduce aggregate foreign supply to the domestic market. The loss of foreign supply need not and typically will not be fully made up by the increased supply of domestic firms. A resulting net drop in total market supply causes a price increase and a decrease of domestic consumer surplus. In the case of "excessive foreign competition", when domestic producers would benefit most from protection, there is often very little rent to be shifted. The potentially huge benefits of protection accruing to domestic producers occur primarily at the expense of domestic consumers. Under certain instances of static oligopoly, trade restrictions might even facilitate quasi-collusion between domestic and foreign firms and help increase the profits of both. See Harris (1985), Krishna (1989). Further, in practice, a quantity restricted foreign firm could attempt to work around the restriction through upgrading, i.e., improving the quality and increasing the price of its product, and thus maintaining or even expanding the volume of its sales and supporting if not boosting its profits.

1.1. Policy Objectives

Our second premise is that a nation's adopted trade policy depends crucially on the policymaker's objectives. Government can deal with the tradeoff between domestic consumer and producer surplus in two fundamentally different ways. A purely self-interested policymaker might consider the presence of conflicting interests as an opportunity for eliciting maximal political support. Here we consider the extreme case of a self-interested politician swayable via political contributions without any genuine policy convictions whatsoever. We model a lobbying contest between the two interest groups, consumers and producers, where their relative political contributions determine the probabilities of the

policymaker choosing their respective bliss points: free trade or autarky. Specifically, the self-interested policymaker's response to increased foreign competition à la Cournot is investigated.

Like Haller and Milam (1999), we investigate the effects arising from the imposition of quotas in very simple models of imperfect quantity competition.[1] The main focus of Haller and Milam (1999) lies on how the endogenous choice of quotas responds to differing numbers of foreign and domestic firms when a benign policymaker maximizes a utilitarian social welfare function, that is a weighted sum of domestic consumer and producer surplus. They conclude that if the benign policymaker maximizes a utilitarian social welfare function with exogenously given welfare weights, then as a rule, minor foreign competition renders autarky the optimal trade policy whereas under "excessive" foreign competition free trade is optimal. Thus "excessive" foreign competition is desirable under this welfare criterion whereas modest foreign competition is not. In case foreign firms have a cost advantage, one would expect that the inherent conflict of interest between domestic consumers and domestic producers is aggravated. Then, indeed, even modest foreign competition may prove desirable while "excessive" foreign competition is still more desirable. Obviously, a domestic cost advantage can work against the free trade policy choice. In addition to these comparative statics results, interesting feedback dynamics emerges when the welfare weights are responsive to domestic industry size. Then domestic industry output may only partially recover from a transitory foreign supply shock, even if all exogenous variables have returned permanently to pre-shock values.

1.2. Basic Model of Political Contribution Contest

The situation considered here is one in which a finite number of foreign and domestic firms produce output for domestic consumption. All

[1] For several decades, quotas have been the predominant protectionist policy in certain key industries with a more or less oligopolistic market structure, e.g. automobiles, steel, textiles. Our focus lies on the central trade-off between domestic consumer and producer surplus. In reality, trade policies have multiple consequences felt by domestic and foreign economic agents such as consumers, producers, factor suppliers, recipients of public transfers. In particular, any distortionary effects due to collecting and expending public funds are ignored here. We also ignore that consumers may have a stake in the industry as owners or workers.

firms supplying this domestic market are profit maximizing. They form a static quantity-setting oligopoly with a linear demand curve. We shall assume zero marginal costs for all firms. Given the number of domestic and foreign firms and the quota in place, a unique Cournot-Nash equilibrium emerges with corresponding domestic consumer and producer surpluses. Hence the effect of the trade policy choice is perfectly predictable.

Haller and Milam (1999) determined the optimal action of a benevolent policymaker and found that it belonged to two polar cases, autarky or free trade.[2] However, in literally every country, policy decisions are not merely driven by the desire to further the public interest, but to some degree by the aspiration to gain or maintain political power and perks. Our setting lends itself to the analysis of a political contribution or lobbying contest between consumers and producers. Threatening to change trade policy — either to impose or to lift a trade barrier — can be used to induce the parties to engage in a contest. The basic feature of a two-party contest is that each party spends resources. The contributions or efforts of both parties determine winning probabilities for each of them. The winner obtains a prize.[3] In our context, the contributions are monetary outlays by domestic consumers and domestic producers. The prize is implementation of the winner's most preferred trade policy, i.e., free trade for consumers and autarky for domestic producers. Given the market structure, each party has well defined expected payoffs in terms of all parties' contributions and there exists a unique Nash equilibrium in the associated strategic game among both interest groups where political contributions constitute the strategic variables. Now the interesting question is how the total equilibrium contribution responds to a change in market structure, more precisely to an increase in the number of foreign firms. The intuitive conjecture: that an increase in foreign competition would lead to an increase in total contributions: is confirmed. Moreover, the probability of free trade increases with enhanced foreign competition.

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[2] This dichotomy, resulting from a U-shaped objective function, is also exhibited in Laussel et al. (1988), pp. 1555-1556.

[3] See the introductions of Dixit (1987), Schmidt (1992), and Baik (1993, 1994, 2008) for an account of the literature on economic and politico-economic contests.

1.3. A Glance at the Contest Literature

Baik (2008, footnote 1) defines a contest as *a situation in which individual players or groups compete by expending irreversible effort or resources to win a prize.* In other words, a contest is a competition with winners and losers, typically a single winner. And the costs of all players, of both the eventual winner(s) and losers will be sunk. An all-pay auction is a contest according to this definition whereas most auction designs are not. Beyond their colloquial meaning, sports contests, political contests, and military contests often satisfy the formal definition. Some contests, like golf tournaments or automobile races, not only determine a winner, but also a rank order (possibly with ties) of the participants. Many contests distinguish only between the winner(s) and the losers, like a United States presidential election, a patent race, or an all-pay auction. For a brief introduction to contests, see Corchón (2007) and Konrad (2009).

Most of the literature models a contest as a strategic game between individuals, each of which competes for oneself. In contrast, team sports and lobbying by special interest groups, among others, constitute instances of contests among groups. In such inter-group contests, a crucial modeling issue is how the intra-group efforts translate into contest outcomes. Following the prevailing literature, we postulate a contest success function of the form $\mu(\alpha,\beta)$ in a two-group contest where $\mu(\alpha,\beta)$ is the probability of winning for the first group, $1-\mu(\alpha,\beta)$ is the probability of winning for the second group, α is the first group's aggregate effort and β is the second group's aggregate effort. Contests with success functions of this particular form, sometimes referred to as "Tullock-type", have been studied by Katz et al. (1990), Baik (1993, 2008), and several others, and will be analyzed anew in Section 3.1 below. Lee (2009) goes beyond the prevailing literature and considers "weakest-link contests" where α and β are the lowest efforts in the respective groups.

Our own contribution concerns a rent shifting or rent seeking contest between two special interest groups, domestic consumers and domestic producers. The winning group will have its preferred trade policy

implemented.[4] Rent shifting or rent seeking typically occurs in contests between special interest groups each of which tries to influence political decisions, for instance allocation of property rights, regulatory policy, or trade policy. But rent shifting and rent seeking contests can also occur outside the political domain, for instance in advertising wars. Within the political domain, special interest groups can seek influence in various ways. During an election campaign, they can make financial contributions to parties or candidates, in order to enhance the chances of their favorite candidate(s) to win or in order to influence the articulated policy positions (platforms) of certain candidates. After a political office holder is determined, via an election or in other ways, special interest groups may still lobby for specific policies or favors. This is what our paper is about: Domestic consumers and domestic producers expend efforts or money to sway the office holder in favor of their preferred trade policies. Grossman and Helpman (2002) provide a succinct yet lucid introduction to special interest politics and present a collection of their articles on political influence instruments in general and influence seeking on trade policy in particular. Grossman and Helpman (2001) offer an elaborate treatment of special interest politics.

II. A COURNOT MODEL WITH IDENTICAL FIRMS

In Haller and Milam (1999), the sequencing of events is that first the domestic policymaker commits to a trade policy which is followed by Cournot competition among domestic and foreign producers subject to the set policy. Here the opening consists in a contest between two interest groups, domestic consumers and domestic producers. Their political contributions determine the odds in an ensuing lottery among trade policies. After the lottery is played and a particular trade policy is realized, Cournot competition takes place accordingly.

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[4] The economic analysis of rent seeking dates back to at least Tullock (1967). The term rent seeking was coined by Anne Krueger (1974).

2.1. The Stackelberg Game

Consider first, like in Haller and Milam (1999), a Stackelberg game with $n+1$ players. The policymaker (domestic government) acts as a Stackelberg leader and sets an aggregate quota, $\bar{x}$, on industry imports. Unlike in Haller and Milam (1999), the policymaker is assumed to lack a trade policy objective of his own, i.e., he is completely indifferent between the various quota levels and their consequences. The *n* other players are quantity-setting firms. They are Stackelberg followers and produce a homogeneous good for the domestic market. Of these *n* firms, $n_f \geq 0$ are foreign and $n_d \geq 1$ are domestic, so that $n = n_f + n_d$. The number of domestic firms in the industry is fixed; however, the ratio of foreign to domestic firms, n_f / n_d, may vary as n_f varies. The firms face a domestic inverse demand function $p(x) = 1 - x$ for $0 \leq x \leq 1$, where $x = \sum_i x_i$ is the total output supplied to the domestic market. Further $p(x) = 0$ for $x > 1$. All firms have constant marginal cost $c = 0$. Therefore, firms' output decisions in the domestic market are not affected by conditions in other markets. In addition to market conditions represented by the inverse demand function, foreign firms may face a binding quota. The payoff functions of the *n* firms are their profit functions, Π_i for firm *i* with output x_i, given as

$$\Pi_i = p \cdot x_i . \tag{1}$$

The welfare of domestic consumers is measured by consumer surplus, given as:

$$CS(x) = \int_0^x p(t)dt - p(x) \cdot x = \frac{1}{2} \cdot x^2 \quad \text{for} \quad 0 \leq x \leq 1 . \tag{2}$$

The welfare of domestic producers is measured by their producer surplus, that is, the aggregate profit of domestic firms given as

$$\Pi_D = \sum_{i \in D} \Pi_i , \tag{3}$$

where D is the set of all domestic firms. The strategy spaces for all $n+1$ players are identical and equal to $\mathbb{R}_+$.

2.2. Maximal Gains and Losses from Quotas

After the quota $\bar{x} \geq 0$ is set, the n firms engage in Cournot competition. We are particularly interested in the resulting Cournot-Nash equilibrium values of $x, CS(x), \Pi_i$, and Π_D as a function of $\bar{x}$. We look at two extreme cases, autarky and free trade.

(a) Autarky: In the present context, this amounts to $\bar{x} = 0$. If foreign firms are at a severe cost disadvantage, which is not the case here, they may voluntarily abstain from the market. In any case, equilibrium outputs are $x_f = 0$ for each foreign firm f and $x_d = 1/(n_d + 1)$ for each domestic firm d. Moreover, $x = n_d/(n_d + 1)$, $CS = (1/2) \cdot [n_d/(n_d + 1)]^2$, $\Pi_d = 1/(n_d + 1)^2$ for each domestic firm, and $\Pi_D = n_d/(n_d + 1)^2$.

(b) Free Trade: This amounts to no quota or a non-binding quota. The equilibrium output is $x_i = 1/(n+1)$ and its equilibrium profit is $\Pi_i = 1/(n+1)^2$ for each firm i. Further $x = n/(n+1)$, $CS = (1/2) \cdot [n/(n+1)]^2$ and $\Pi_D = n_d/(n+1)^2$.

A policy change from free trade to autarky reduces domestic consumer surplus by

$$\Delta CS = (1/2) \cdot \{[n/(n+1)]^2 - [n_d/(n_d+1)]^2\}. \tag{4}$$

A policy change from autarky to free trade reduces domestic producer surplus by

$$\Delta \Pi_D = n_d \cdot \{1/(n_d+1)^2 - 1/(n+1)^2\}.$$

III. TRADE POLICY CONTEST

In literally every country, policy decisions are not merely driven by the desire to further the public interest, but to some degree by the aspiration

to gain or maintain political power and perks. Here we examine the effects of changing market structure when the policymaker, instead of trying to maximize domestic welfare, is receiving a payoff in the form of political contributions (campaign contributions, bribes, etc.) from import-competing domestic firms and domestic consumers. We model such a situation as a lobbying contest between the firms and consumers where each group is trying to influence the policymaker. The size of their contributions is determined by the two groups solving the problem of maximizing their respective expected payoffs.

Strictly speaking, the problem of political influence buying at hand corresponds to a bipartite contest with domestic consumers and foreign producers on one side and domestic producers on the other side. In what follows, we reduce the problem to a two-party contest. First, we treat domestic consumers as one entity, for instance a consumer advocacy group, that wants to maximize the value of total expected consumer surplus minus consumer contributions. Secondly, as a rule, no contributions from foreign firms occur, because consumers as an aggregate always value free trade more than any one foreign firm. The only exception concerns the case of a single foreign firm that values free trade more than the consumer advocacy group. Thirdly, while there may well be several domestic producers, only one will participate in the contest. Namely, we assume that the domestic firms are identical and operate independently. This leads to a free-rider problem. For this reason the equilibrium contributions of individual domestic firms are indeterminate whereas their aggregate contribution is unique. The aggregate contribution can be found by considering the problem where only one domestic firm contributes according to the solution of its own individual optimization problem: maximization of expected profit minus contribution.

3.1. Bipartite Contests

Baik (1993) deals with the free-rider problem in contests. To our knowledge, his is the first explicit formal treatment of this problem in the

literature.[5] We establish a few preliminary results about bipartite contests that we consider of general interest. Tailoring the results to our needs, we restrict ourselves to bipartite contests. In other respects, our argument is much shorter and our assumptions are slightly weaker in comparison with Baik's analysis.

In a bipartite contest, there are two finite and non-empty groups of players which we call the α-group and the β-group. The α-group consists of the α-players $i = 1,\ldots,I$. The β-group consists of the β-players $j = I+1,\ldots,I+J$. Members of the α-group choose non-negative contributions (effort, pecuniary outlays, physical resources) α_i, $i = 1,\ldots,I$, whereas the members of the β-group choose non-negative contributions β_j, $j = I+1,\ldots,I+J$. Let α and β also stand for the aggregate contributions:

$$\alpha = \sum_i \alpha_i \quad \text{and} \quad \beta = \sum_j \beta_j$$

At the very end, one groups loses and the other wins. A losing player *k* receives a gross payoff V_k^{ℓ} *k* and a winning player *h* receives a gross payoff $V_h^w > V_h^{\ell}$. For an arbitrary player *k*, set $\Delta V_k = V_h^w - V_h^{\ell}$, the "opportunity cost of losing". Given aggregate contributions α and β, the α-group wins with probability $\mu = \mu(\alpha,\beta)$ and the β-groups wins with probability $1-\mu$. We make the following assumptions on the function $\mu(\cdot,\cdot)$:

(A1) $\mu(\alpha,\beta)$ is increasing in $\alpha \geq 0$ and decreasing in $\beta \geq 0$.

(A2) $\mu(\alpha,\beta)$ is concave in $\alpha \geq 0$ and convex in $\beta \geq 0$.

(A3) The partial derivative $D_\alpha \mu(\alpha,\beta)$ exists at every (α,β) with $\alpha > 0$.

(A4) The partial derivative $D_\beta \mu(\alpha,\beta)$ exists at every (α,β) with $\beta > 0$.

In the strategic game or contest $\Gamma = (N,(S_k)_{k\in N},(A_k)_{k\in N})$ with players or participants $k \in N = \{1,\ldots,I+J\}$,

- each player *k* has strategy set $S_k = \mathbb{R}_+$;
- an α-player *i* achieves an expected payoff

[5] For further developments, see Baik (2008).

$$A_i(\alpha_1,\ldots,\alpha_I;\beta_{I+1},\ldots,\beta_{I+J}) = \mu(\alpha,\beta)\cdot V_i^w + (1-\mu(\alpha,\beta))\cdot V_i^\ell - \alpha_i;$$

- a β-player *j* achieves an expected payoff

$$A_j(\alpha_1,\ldots,\alpha_I;\beta_{I+1},\ldots,\beta_{I+J}) = (1-\mu(\alpha,\beta))\cdot V_i^w + \mu(\alpha,\beta)\cdot V_i^\ell - \beta_j .$$

After renormalizing payoffs, we obtain

$A_i = \mu(\alpha,\beta)\cdot\Delta V_i - \alpha_i$ and

$A_j = (1-\mu(\alpha,\beta))\cdot\Delta V_j - \beta_j$, respectively.

Lemma 1 *Suppose* $(\alpha_1,\ldots,\alpha_I;\beta_{I+1},\ldots,\beta_{I+J}) \in \mathbb{R}_+^{I+J}$ *is a Nash equilibrium of* Γ.

(i) *If i and f are two* α*-players with* $\Delta V_i > \Delta_f$*, then* $\alpha_f = 0$.

(ii) *If* $\Delta V_{I+1} = \ldots = \Delta V_{I+J}$*, then* $(\alpha_1,\ldots,\alpha_I;\beta_I,0,\ldots,0)$ *is also a Nash equilibrium of* Γ.

PROOF. (i) holds trivially for $\alpha = 0$. If $\alpha > 0$, consider an α-player *g* with $\alpha_g > 0$. The first order condition for payoff maximization of this player is $D_\alpha\mu(\alpha,\beta)\cdot\Delta V_g - 1 = 0$. Now let *i* and *f* as in (i). If $\alpha_f = 0$, then by direct utility comparison, $\alpha_f = 0$ also has to hold in equilibrium. In case $\alpha_i > 0$, it follows that $D_\alpha\mu(\alpha,\beta)\cdot\Delta V_f - 1 < D_\alpha\mu(\alpha,\beta)\cdot\Delta V_i - 1 = 0$, hence $\alpha_f = 0$ in equilibrium.

(ii) holds trivially for $\beta = 0$. If $\beta > 0$, consider a β-player *h* with $\beta_h > 0$. The first order condition for payoff maximization of this player is $D_\beta\mu(\alpha,\beta)\cdot\Delta V_h - 1 = 0$. Because of identical opportunity costs of losing, this first order condition is satisfied for all β-players at the given equilibrium. It persists and still implies equilibrium play, in case $\beta_{I+1},\ldots,\beta_{I+J}$ are modified, but $\alpha_1,\ldots,\alpha_I$, and β remain at their previous equilibrium levels. Hence the assertion. Q.E.D.

According to the Lemma, the essential analysis of a bipartite contest can possibly be reduced to a two-party contest as claimed before. In our context, the β-players are the domestic producers. Under the assumption that they are identical and act independently, it suffices to consider just one of them, by assertion (ii) of the Lemma. The α-players are the domestic consumer lobby and the foreign producers. Under the assumption that all firms are identical and act independently, it turns out that with the model specified in Section 2,

$$V_f^w = \Pi_f = \frac{1}{(n_d + n_f + 1)^2} \quad \text{and} \quad V_f^\ell = 0 \ , \quad \text{hence} \quad \Delta V_f^w = \frac{1}{(n_d + n_f + 1)^2}$$

for a foreign firm *f* whereas the opportunity cost for domestic consumers is given as the difference in domestic consumer surplus between free trade and autarky which is, by (4):

$$\Delta CS = \frac{1}{2} \cdot \frac{n_f[n_d(n_d + n_f + 1) + (n_d + n_f)(n_d + 1)]}{(n_d + 1)^2 (n_d + n_f + 1)^2}$$

We obtain $\Delta CS > \Delta V_f$ except for $n_f = 1$, in which case $\Delta CS < \Delta V_f$ holds. By (i), we can restrict ourselves either to the domestic consumer lobby or the single foreign firm as the only relevant α-player.

3.2. Two-Party Contests

A two-party contest is a bipartite contest with the special feature that each of the two groups consists of a single player, called the α-player for the α-group and the β-player for the β-group. The model simplifies in that the α-player and β-player choose respective contributions (pecuniary outlays) $\alpha \geq 0$ and $\beta \geq 0$ which determine corresponding winning probabilities $\mu(\alpha, \beta)$ and $1 - \mu(\alpha, \beta)$. Let $\Delta A > 0$ denote the α-player's payoff difference between winning the prize and losing and $\Delta B > 0$ denote the β-player's payoff difference between winning the prize and losing. The prize can be the patent in a patent race or getting elected in a political race. For instance, Hillman and Ursprung (1988) analyze a contest between two candidates seeking election for a political office. They assume that a candidate's chances of getting elected depend on the campaign contributions by foreign and domestic producer interests which in turn respond to the candidates' trade policy announcements. They show that neither candidate has an interest to announce a campaign platform endorsing tariffs, if negotiated voluntary export restraints are a conceivable trade policy option.

In our context, the prize is implementation of the winner's most preferred trade policy, that is free trade for consumers or foreign firms and autarky for domestic producers. Given the market structure, each

party has well defined expected payoffs in terms of α and β and there exists a unique Nash equilibrium (α^*, β^*) in the associated strategic game. Then $\alpha^* + \beta^*$ is the total contribution in equilibrium. Now the question is how the total equilibrium contribution responds to a change in market structure, more precisely to an increase of the number of foreign firms. The intuitive conjecture: that an increase in foreign competition would lead to an increase in total contributions: turns out to be always correct if one uses the special logit form (6).

A very popular functional form for winning probabilities is the so-called **logit form**

$$\mu(\alpha, \beta) = \frac{g(\alpha)}{f(\alpha) + g(\beta)} \tag{5}$$

with $f > 0$ and $g > 0$, f increasing in α, g increasing in β. We adopt the special logit form

$$\mu(\alpha, \beta) = \frac{\alpha}{\alpha + \beta} \tag{6}$$

which is well defined if $\alpha > 0$ or $\beta > 0$. We set $\mu(0,0) = 1/2$. Clearly, $\alpha = 0$ or $\beta = 0$ is not an equilibrium choice.

For $\beta > 0$, the α-player solves $\text{MAX}_\alpha[\frac{\alpha}{\alpha + \beta} \cdot \Delta A - \alpha]$, with first-order condition

$$(\alpha + \beta)^2 = \beta \cdot \Delta A . \tag{7}$$

For $\alpha > 0$, the β-player solves $\text{MAX}_\beta[\frac{\alpha}{\alpha + \beta} \cdot \Delta B - \beta]$, with first-order condition

$$(\alpha + \beta)^2 = \alpha \cdot \Delta B . \tag{8}$$

Equating the right-hand sides of (7) and (8) yields

$$\alpha = \beta \cdot \frac{\Delta A}{\Delta B} \tag{9}$$

and

$$\beta = \alpha \cdot \frac{\Delta B}{\Delta A} \tag{10}$$

Substituting (9) into (7) and (10) into (8) yields the reaction functions

$$\alpha = \sqrt{\beta \cdot \Delta A} - \beta; \tag{11}$$

$$\beta = \sqrt{\alpha \cdot \Delta B} - \alpha . \tag{12}$$

To determine the Nash equilibrium, we reformulate (11) and (12) as

$$\alpha + \beta = \sqrt{\beta \cdot \Delta A} \quad \text{and} \quad \alpha + \beta = \sqrt{\alpha \cdot \Delta B} .$$

Now equate the right-hand sides, substitute (11) for α and solve for β to obtain the equilibrium value

$$\beta^* = \frac{\Delta A \cdot (\Delta B)^2}{(\Delta A + \Delta B)^2} . \tag{13}$$

Similarly, after equating the previous right-hand sides, substitute (12) for β and solve for α to obtain

$$\alpha^* = \frac{(\Delta A)^2 \cdot \Delta B}{(\Delta A + \Delta B)^2} . \tag{14}$$

In the sequel, we shall address the question which market structures are more "attractive" for the policymaker, by generating more equilibrium contributions. We obtain the total amount of equilibrium contributions by adding (13) and (14):

$$\alpha^* + \beta^* = \frac{\Delta A \cdot \Delta B}{\Delta A + \Delta B} . \tag{15}$$

Another interesting comparative statics question is how the equilibrium probabilities (policymaker priorities), $\mu^* = \mu(\alpha^*, \beta^*)$ and $1-\mu^*$ respond to a change of market structure. From (13) and (14),

$$\mu^* = \frac{\alpha^*}{\alpha^* + \beta^*} = \frac{\alpha^* / \beta^*}{1 + \alpha^* / \beta^*} = \frac{\Delta A / \Delta B}{1 + \Delta A / \Delta B} \tag{16}$$

and, hence, μ^* is increasing in $\Delta A / \Delta B$.

3.3. Domestic Consumer Lobby Contra Domestic Producer

In a contest between the domestic consumer lobby and a domestic producer, the respective terms in (15) and (16) are

$$\Delta A = \Delta CS = \frac{1}{2} \cdot \frac{n_f [n_d (n_d + n_f + 1) + (n_d + n_f)(n_d + 1)]}{(n_d + 1)^2 (n_d + n_f + 1)^2}$$

and

$$\Delta B = \Delta V_d = \frac{1}{(n_d + 1)^2} - \frac{1}{(n_d + n_f + 1)^2} = \frac{(n_d + n_f + 1)^2 - (n_d + 1)}{(n_d + 1)^2 (n_d + n_f + 1)^2},$$

a single firm's opportunity cost of losing. We first address the question how total equilibrium contributions respond to increased foreign competition. An increase of n_f causes an increase of ΔCS and ΔV_d and, hence, outward shifts of the reaction functions (11) and (12). If either the case of strategic substitutes (both reaction functions downward sloping) or the case of strategic complements (both reaction functions upward sloping) prevails, then an outward shift of the equilibrium point occurs so that total equilibrium contributions rise. However, the reaction functions (11) and (12) are backward bending and bell shaped, respectively, in α - β -space. Therefore, the intuitively appealing argument cannot be applied. The technically correct argument goes as follows. By (15), the total equilibrium contribution is increasing in both ΔA and ΔB. Since ΔCS and ΔV_d are increasing in n_f, the total equilibrium contribution goes up as n_f becomes larger. In the case of $n_f = 1$, the appropriate two-party contest should be between the foreign

firm and a domestic firm. Direct comparison of ΔV_f for $n_f = 1$ and ΔCS for $n_f = 2$ yields $\Delta CS|_{n_f=2} > \Delta V_f|_{n_f=1}$. Therefore, the total equilibrium contribution also goes up under this circumstance. If for legal reasons, the foreign firm cannot make campaign distributions, then the domestic consumer lobby comes into play again and the previous comparison applies.

Next we address the question how the winning probability μ^* is affected by a change in n_f. By (16), μ^* is an increasing function of $\Delta A / \Delta B$. Now

$$\frac{\Delta CS}{\Delta D_d} = \frac{1}{2} n_d + \frac{1}{2} \cdot \frac{n_f (n_d + 1)}{n_f + 2(n_d + 1)}$$

is an increasing function of n_f, for arbitrary n_f. Specifically,

$$\frac{\Delta CS}{\Delta V_d} = \frac{n_d^2 + 3n_d + 1}{2n_d + 4} \quad \text{for} \quad n_f = 2 \quad \text{and}$$
$$\frac{\Delta V_f}{\Delta V_d} = \frac{n_d^2 + 2n_d + 1}{2(2n_d + 4)} \quad \text{for} \quad n_f = 1.$$

This shows that μ^* is always increasing in n_f. We have demonstrated

Proposition 1 *If n_f, the number of foreign firms increases, then*
(i) *the policymaker receives more contributions and*
(ii) *the probability of winning shifts in favor of domestic consumers.*

3.4. Alternative Lobbying Structures

It is also interesting to see what happens under different assumptions on the lobbying structure. For instance, $n_d > 1$ domestic producers could form a unified lobby. Then $\Delta B = \Delta V_d$ has to be replaced by $\Delta B = n_d \cdot \Delta V_d$, the opportunity cost of losing for the entire domestic industry. In that case, the quantities $\alpha^* + \beta^*$ and μ^* would differ. In fact, $\alpha^* + \beta^*$ would go up and μ^* would fall, while all other qualitative

conclusions would remain unaffected. On the other hand, a segmentation of consumers into several interest groups or the existence of a single, but less influential consumer lobby would be reflected by $\Delta A = \varphi \cdot \Delta CS$ with a constant $\varphi \in (0,1)$ or $\Delta A = \Delta V_f$, whichever is smaller. For sufficiently large φ, the qualitative features remain the same. For sufficiently small φ, the probability μ^* would first decrease and then increase in n_f, since ΔV_f is declining in n_f with limit 0 as n_f tends to infinity. The impact of the lobbying structure on the structure of protection is also addressed by Grossman and Helpman (1994) who develop a model of a policymaker whose objective function depends on total contributions and aggregate voter welfare. They analyze a menu auction where interest groups tender contributions conditional on the trade policy adopted and government chooses a trade policy that maximizes its utility, given the bids made. For certain lobbying structures, they can determine the net gainers (the policymaker or particular interest groups) from lobbying activities.

IV. CONCLUDING REMARKS

In many concentrated industries, domestic firms face significant foreign competition in the domestic market, with both domestic and foreign firms exercising market power. Haller and Milam (1999) conclude that, more often than not, endogenous trade policy using total domestic surplus as its yardstick tends to be free trade when the number of foreign firms increases. Here we find that if, at the other extreme, trade policy is endogenized as the equilibrium outcome of a contest based on political contributions by domestic consumers and domestic producers, then increased foreign competition also favors free trade in that the equilibrium probability of free trade unambiguously goes up. Furthermore, the total equilibrium contribution rises in response to increased foreign competition.

In their seminal contribution, Brander and Spencer (1981) study a rent-extracting tariff policy against a foreign monopolist operating in the domestic market and facing potential market entry by a domestic firm, where entry is costly. They show that the threat of entry makes the rent-extracting policy particularly attractive, even if actual entry does not

occur in equilibrium. Since then a vast literature under the rubric of strategic trade has examined the consequences of trade barriers in imperfectly competitive markets.[6] Often quotas appear inferior to tariffs, so that even an optimal quota is merely a second-best instrument. Anderson (1988) strongly endorses this assessment. Nonetheless, given the observed political bias in favor of quotas, further study of the effects of quotas is warranted. As a by-product of their analysis, Haller and Milam (1999) present yet another case of superiority of tariffs over quotas ― and quota-tariff combinations. However, tariffs prove to be a losing proposition in the election contest model of Hillman and Ursprung (1988). Syropoulos (1992) studies the use of trade policies as anti-collusive policies against foreign oligopolists in a repeated game framework and finds that for some parameter constellations, quotas can be preferable to tariffs.

[6] See, e.g., Brander and Spencer (1985), Dixit (1984), Harris (1985), Helpman and Krugman (1985, 1989), Eaton and Grossman (1986), Krugman (1986, 1987), McMillan (1986), Krishna (1989), Rotemberg and Saloner (1989).

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