Protection for Sale, Monopolistic Competition and Variable Markups
Preliminary Version

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We extend the basic model of trade protection with special interest groups developed in Grossman and Helpman (1994) to include monopolistic competition with variable markups. We find the following results: (i) for sectors organized into lobbies the endogenous import tariff is always positive and inversely related to the degree of import penetration; (ii) for unorganized sectors the endogenous import policy can be a tariff or a subsidy, depending on the policy implemented by the partner country; (iii) the endogenous export policy consists in an export tax for unorganized sectors and in a subsidy for organized sector provided that goods are sufficiently differentiated.

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1. INTRODUCTION

Free trade is often the welfare maximizing choice in many theoretical models and frequently advocated in international policy frameworks. However, when trade policy comes into play, free trade is rarely chosen by individual countries and not easily chosen by groups of countries. There are a number of explanations for this discrepancy between theory and practice. One is that real markets are not perfectly competitive and there are market imperfections. Another reason is that politics matters and there are many sources of strategic interactions to be taken into account.

A vast literature has been written on this topic, however one of the most influential papers is the one by Grossman and Helpman (1994) (henceforth GH), which is among the firsts to develop a formal micro-founded model with clear-cut testable predictions about the cross-sectional structure of protection. In their model trade policy endogenously emerges from the interaction between government and organized sectoral lobbies. GH show that, within a perfectly competitive framework where free trade is the social optimum, the structure of protection that emerges in the political equilibrium entails an import tariff (export subsidy) in organized sectors and an import subsidy (export tax) in unorganized sectors. Moreover, the level of protection is positively related to the import penetration ratio for unorganized sectors and negatively for organized sectors, while the opposite holds for import elasticity. These predictions are confirmed by many empirical studies, such as Goldberg and Maggi (1999) and Gawande and Bandyopadhyay (2000). However, the same studies often find that lobbies seem to have surprising little power over the government, which is not in line with the GH model. As a matter of fact, the unexpectedly benevolent government is the very puzzle of empirical studies on the "protection for sale" type of models. In addition, the GH model predicts that unorganized industries should receive negative protection (e.g. an import subsidy), while according to the empirical evidence, industries classified as unorganized receive positive levels of trade protection.[1]

In a subsequent paper Grossman and Helpman (see Grossman and Helpman 1995) study endogenous protection in a two-country setting, where terms of trade are operative. In this context, the optimum tariff (or export tax) argument for protection delivers a motive for taxing international trade also in unorganized sectors.

[1] On this matter see Ederington and Minier (2008).

A number of further extensions of the GH model have been proposed. For instance, Mitra (1999) endogenizes lobbies formation; heterogeneous firms are considered in Bombardini (2005); Matschk and Sherlund (2006) incorporate labor unions and labor mobility into the model; Facchini et al. (2006) develop a quota version of the GH model; trade in intermediate inputs is introduced in Gawande and Krishna (2012). Despite these models demonstrate that additional factors can enrich the original framework, yet the core of the GH model and its basic predictions remain unchanged.

An interesting extension of the baseline model, relevant for this paper, is found in Chang (2008), who considers the case of monopolistic competition *à la* Dixit and Stiglitz (1977). The predictions of this model depart from the original ones in three fundamental ways: first, the equilibrium outcome entails protection in all sectors, whether organized or not; second, the imperfectly competitive structure of the economy implies that free-trade is no more the welfare maximizing choice; third the level of protection always varies inversely with the import penetration ratio (in GH this happens in organized sectors only). These results are mainly driven by the degree of market power of firms, which introduces linkages between sectors (cross-price effects) and rivalry between lobbies. As a consequence, individual lobbies have a smaller incentive to ask for protection. Furthermore, although the model takes lobbies as exogenous, the scope for lobby formation seems reduced with respect to the GH model: since unorganized sectors will be protected anyway, they have an incentive to act as free riders.

A specific feature of the Chang (2005) paper is given by the Dixit-Stiglitz market structure, which implies that markups are constant, so ruling out, by construction, any possible terms of trade effects from the analysis. In this paper we relax this assumption by introducing monopolistic competition with variable markups into a model with special interest groups, where trade policy is the result of a political calculus as in GH. One immediate implication is that domestic and foreign producer prices reflect the government interventions in trade, so that equilibrium trade policies now depend on the rich interplay of different mechanisms, namely: (i) the political support motive for trade interventions, due to the campaign contributions of organized sectors able to influence government decisions; (ii) the imperfect-competition motive for trade protection reflecting the non-optimality of free trade in a non-competitive setting; (iii) the terms-of-trade motive for trade protection related to the existence of a certain degree of strategic interactions among firms in a monopolistic competition framework allowing for variable markups. It should be noted that the first force drives the main results in the GH seminal paper, while in Chang (2005) results stem from the interactions between the first and the second forces. Finally, in Grossman and Helpman (1995), where the small-country assumption is removed and border prices depend on purchases and sales, trade protection is the result of the first and of the third motives.

Our results can be summarized as follows. For sectors organized into interest groups the endogenous import tariff is always positive and inversely related to the degree of import penetration; for unorganized sectors the endogenous import policy can be a tariff or a subsidy, depending on the policy implemented by the partner country, and is inversely related to the level of import penetration, provided that the relative weight the government attaches to aggregate welfare and/or the gross markup on domestic sales are relatively high; under general conditions, namely a sufficient high degree of product differentiation, the endogenous export policy consists in an export subsidy for organized sectors and in an export tax for unorganized sectors.

The reminder of the paper is organized as follows. In Section 2 we outline the imperfectly competitive model and describe the tariff setting game. Section 3 presents the equilibrium structure of trade protection, taking as given trade policy of the rest of the world. Section 4 analyzes the structure of protection in a noncooperative trade policy equilibrium. Section 5 concludes and discusses possible extensions for further research.

2. THE FRAMEWORK OF ANALYSIS

Consider an economy with n sectors each of which presenting a continuum of firms in the space $[0,1]$ producing horizontally differentiated goods (i.e. the total mass of firms is equal to one in each sector). The economy is populated by individuals with identical preferences, but different factor endowments:

$$U = x_0 + \sum_{i=1}^{n} U_i(\mathbf{x}_i), \tag{1}$$

where x_0 is the quantity of the homogenous good 0 and $U_i(\cdot)$ is the sub-utility function defined on the set $\mathbf{x}_i$ of differentiated goods of sector i. $U_i(\cdot)$ is assumed to be symmetric, differentiable, increasing in all its arguments and strictly concave.[2] Different varieties of each good are perceived as imperfect substitutes by consumers who have a taste for variety. Let λ_i $(1-\lambda_i)$ be the fraction of domestic (foreign) firms of sector i. We assume that for each sector i the utility function $U_i(\cdot)$ takes the following form:

$$U_i(\mathbf{x}_i) = \alpha_i \left(\int_0^{\lambda_i} x_{hi,k} dk + \int_0^{1-\lambda_i} x_{fi,k} dk \right) + \tag{2}$$
$$-\frac{\beta_i - \gamma_i}{2} \left(\int_0^{\lambda_i} x_{hi,k}^2 dk + \int_0^{1-\lambda_i} x_{fi,k}^2 dk \right) - \frac{\gamma_i}{2} \left(\int_0^{\lambda_i} x_{hi,k} dk + \int_0^{1-\lambda_i} x_{fi,k} dk \right)^2,$$

where $x_{hi,k}$ $(x_{fi,k})$ is the quantity of the generic k-variety produced domestically (abroad) and all parameters are assumed to be positive. In particular, α_i indicates the intensity of consumers' preferences for differentiated goods belonging to sector i; the parameter γ_i measures the degree of substitution between any pair of varieties given β_i, so that goods are substitutes, independent, or complements according to whether $\gamma_i \gtreqless 0$. The larger γ_i the closer substitutes goods are. If β_i were allowed to be equal to γ_i, then goods would be perfect substitutes and the utility function would degenerate into a standard quadratic utility defined over a homogenous product. In what follows we assume that $\beta_i > \gamma_i > 0$, implying that consumers love variety.

The homogenous good is produced in both regions under perfect competition and constant returns to scale and can be freely traded. We shall use this good as the numéraire (i.e. the price $p_0 = 1$). Let Y denote the income of the representative consumer and $p_{hi,k}$ $(p_{fi,k})$ be the price of the domestic (foreign) variety. Further, let $\tau_i > 0$ $(\tau_i < 0)$ denote the specific import tariff (subsidy) for sector i and $s_i > 0$ $(s_i < 0)$ represent the specific export subsidy (tax). In what follows, when necessary, we use star superscripts to denote foreign variables. Hence, by symmetry, τ_i^* and s_i^* represent the trade policy instruments of the foreign country.

The budget constraint of the typical individual immediately follows:

$$X_0 + \sum_{i=1}^{n} \left(\int_0^{\lambda_i} p_{hi,k} x_{hi,k} dk + \int_0^{1-\lambda_i} \left(p_{fi,k} + \tau_i - s_i^*\right) x_{fi,k} dk \right) = Y. \tag{3}$$

Although parameters are sector-specific, henceforth for the sake of simplicity, we will assume that preference parameters α, β, γ are the same across sectors and drop the i-index. Solving

[2]As is well known the use of a quasi-linear utility function leads to neglect income effects.

the consumer's problem of utility maximization subject to the budget constraint yields, for each generic k variety of sector i, the following direct demand functions for home and foreign varieties:

$$x_{hi,k} = \frac{\alpha}{\beta} - \frac{1}{\beta - \gamma} p_{hi,k} + \frac{\gamma}{\beta \left(\beta - \gamma\right)} P_i, \tag{4}$$

$$x_{fi,k} = \frac{\alpha}{\beta} - \frac{1}{\beta - \gamma} \left(p_{fi,k} + \tau_i - s_i^*\right) + \frac{\gamma}{\beta \left(\beta - \gamma\right)} P_i, \tag{5}$$

where $P_i \equiv \int_0^{\lambda_i} p_{hi,k} dk + \int_0^{1-\lambda_i} \left(p_{fi,k} + \tau_i - s_i^*\right) dk$ is the consumer price index in the domestic market. By symmetry, in the foreign market we have:

$$x_{fi,k}^* = \frac{\alpha}{\beta} - \frac{1}{\beta - \gamma} p_{fi,k}^* + \frac{\gamma}{\beta \left(\beta - \gamma\right)} P_i^*, \tag{6}$$

$$x_{hi,k}^* = \frac{\alpha}{\beta} - \frac{1}{\beta - \gamma} \left(p_{hi,k}^* + \tau_i^* - s_i\right) + \frac{\gamma}{\beta \left(\beta - \gamma\right)} P_i^*, \tag{7}$$

where $P_i^* \equiv \int_0^{\lambda_i} \left(p_{hi,k}^* + \tau_i^* - s_i\right) dk + \int_0^{1-\lambda_i} p_{fi,k}^* dk$ is the consumer price index in the foreign market.

The numéraire good is produced with labor only under constant returns to scale and an input-output coefficient equal to one. We also assume that the aggregate supply of labor is large enough for the numéraire to be produced, which implies that the wage rate is equal to 1 for the economy. Differentiated goods require labor, with a unit cost c_i, and a sector-specific factor m_i, which is inelastically supplied.

Given the above assumptions, domestic firms profits for the firm operating in sector i and producing variety k can be written as:

$$\Pi_{i,k} = \left(p_{hi,k} - c_i\right) x_{hi,k} N + \left(p_{hi,k}^* - c_i\right) x_{hi,k}^* N^* - m_i, \tag{8}$$

where $\Pi_{hi,k}$ denotes profits, N (N^*) is the total population at home (abroad), $p_{hi,k}^*$ is the producer price in the foreign market.

The typical domestic firm will choose $p_{hi,k}$ and $p_{hi,k}^*$ so as to maximize profits, given the demand functions (4) and (7), but neglecting the impact of its decision over the two price indices P_i and P_i^* prevailing in both markets.

The first-order conditions to this optimization problem read as:

$$p_{hi} = \frac{\alpha\left(\beta-\gamma\right)+\beta c_i}{2\beta-\gamma\lambda_i} + \frac{\gamma(1-\lambda_i)}{2\beta-\gamma\lambda_i}\left(p_{fi}+\tau_i-s_i^*\right), \tag{9}$$

$$p_{hi}^* = \frac{\alpha\left(\beta-\gamma\right)+\beta c_i}{2\beta-\gamma\lambda_i} + \frac{\gamma\left(1-\lambda_i\right)}{2\beta-\gamma\lambda_i}p_{fi}^* - \frac{\beta-\gamma\lambda_i}{2\beta-\gamma\lambda_i}\left(\tau_i^*-s_i\right), \tag{10}$$

where we have imposed symmetry among varieties and made use of the definitions for P_i and P_i^*. Equations (9) and (10) can be interpreted as best reaction functions of the typical domestic producers to the prices set by foreign producers operating in the same sector. This is a specific feature of an economy with differentiated goods and quadratic utility function: on the one hand, each firm neglects the impact of its pricing decisions on the aggregate market variables, on the other is aware that the aggregate market variables may influence its behavior. The corresponding optimal conditions for foreign producers can be obtained by symmetry.

By combing the optimal conditions we obtain equilibrium prices:

$$p_{hi} = p_i^{FT} + \frac{\gamma\left(1-\lambda_i\right)}{2\left(2\beta-\gamma\right)}\left(\tau_i-s_i^*\right), \tag{11}$$

$$p_{fi} = p_i^{FT} - \frac{2\left(\beta-\gamma\right)+\gamma\lambda_i}{2\left(2\beta-\gamma\right)}\left(\tau_i-s_i^*\right), \tag{12}$$

$$p_{hi}^* = p_i^{FT} - \frac{2\left(\beta-\gamma\right)+\gamma\left(1-\lambda_i\right)}{2\left(2\beta-\gamma\right)}\left(\tau_i^*-s_i\right), \tag{13}$$

$$p_{fi}^* = p_i^{FT} + \frac{\gamma\lambda_i}{2\left(2\beta-\gamma\right)}\left(\tau_i^*-s_i\right), \tag{14}$$

where $p_i^{FT} = \frac{\alpha(\beta-\gamma)+\beta c_i}{2\beta-\gamma}$ denotes the price that would prevail under free trade or if import tariffs (subsidies) were set so as to countervail export subsidies (taxes), (i.e. $\tau_i = s_i^*$ and $\tau_i^* = s_i$, respectively). From (11)-(14) we observe that in this setting there are terms of trade effects from trade policy, so that domestic (foreign) producer prices in the home market are increasing (decreasing) in τ_i and decreasing (increasing) in s_i^*. Quadratic preferences in fact implies variable elasticity of substitution between pairs of different varieties so delivering variable markups.

Using these results into (4)-(7) gives the equilibrium quantities:

$$x_{hi} = x_i^{FT} + \frac{1}{\beta - \gamma} \frac{\gamma (1 - \lambda_i)}{2 (2\beta - \gamma)} (\tau_i - s_i^*), \tag{15}$$

$$x_{fi} = x_i^{FT} - \frac{1}{\beta - \gamma} \frac{2 (\beta - \gamma) + \gamma \lambda_i}{2 (2\beta - \gamma)} (\tau_i - s_i^*), \tag{16}$$

$$x_{hi}^* = x_i^{FT} - \frac{1}{\beta - \gamma} \frac{2 (\beta - \gamma) + \gamma (1 - \lambda_i)}{2 (2\beta - \gamma)} (\tau_i^* - s_i), \tag{17}$$

$$x_{fi}^* = x_i^{FT} + \frac{1}{\beta - \gamma} \frac{\gamma \lambda_i}{2 (2\beta - \gamma)} (\tau_i^* - s_i), \tag{18}$$

where $x_i^{FT} = \frac{\alpha - c_i}{2\beta - \gamma}$ is the equilibrium quantity for each generic variety k of sector i that would prevail under free trade or if import tariffs (subsidies) were set so as to countervail export subsidies (taxes), (i.e. $\tau_i = s_i^*$ and $\tau_i^* = s_i$). Foreign (domestic) firms' exports x_{fi} (x_{hi}^*), are positive if and only if $\tau_i - s_i^* < \frac{2(\beta-\gamma)(\alpha-c_i)}{2(\beta-\gamma)+\gamma\lambda_i}$ ($\tau_i^* - s_i < \frac{2(\beta-\gamma)(\alpha-c_i)}{2(\beta-\gamma)+\gamma(1-\lambda_i)}$). It can be easily shown that if these conditions hold then firms' export prices will be strictly larger than zero. Since these inequalities restrict the feasibility set of trade policy, in what follows we will restrict our analysis to trade policy parameter combinations satisfying these inequalities.

2.1. Government, Lobbies and Welfare Measures

Turning to the public sector, we constrain the set of policy instruments available to the government to import tariffs (or subsidy) and export subsidies (or tax). The net revenue expressed in per capita terms is found to be:

$$R(\tau, s) = \sum_{i=1}^{n} (1 - \lambda_i) \tau_i x_{fi} - \frac{N^*}{N} \sum_{i=1}^{n} \lambda_i s_i x_{hi}^*, \tag{19}$$

where τ and s denote n-dimension vectors of import and export policy instruments and the government is assumed to redistribute net revenue $R(\tau, s)$ to each individual .

Following GH the typical individual derives income from wages, public transfers and from the ownership of some sector-specific inputs, which are assumed to be indivisible and nontradable. Let L define the set of owners of the specific factors who have been able to form lobby groups. Lobbies compete with each other to attempt to influence government's decisions in the formulation of trade policy by offering political contributions. Let $C_i(\tau, s)$ denote the political contribution function of sector i contingent on the trade policy set by the government and $V_i = W_i - C_i$ denote the joint welfare where:

$$W_i(\tau, s) = l_i + \Pi_i(\tau_i, s_i) + \sigma_i N[R(\tau, s) + S(\tau)], \tag{20}$$

is the gross welfare of members of lobby i, where l_i denotes labor income of workers in sector i, $\Pi_i(\tau_i, s_i)$ represents the operational profits, σ_i is the fraction of population that owns the specific factor used in i and $S(\tau)$ denotes consumer surplus given by the utility derived from differentiated goods minus expenditure on differentiated goods. As is well known, in this policy game, contributions schedules are truthful that is, a group contribution reflects exactly the group's willingness to pay for a change in trade policy (see Bernheim and Whinston 1986). The policy objective function of the government immediately follows:

$$G(\tau, s) = \sum_{i \in L} C_i(\tau, s) + aW(\tau, s), \tag{21}$$

where the parameter $a > 0$ measures the relative weight the government attaches to aggregate welfare $W(\tau, s)$ (i.e. the lower a the higher the degree of corruption) which, in turn, is given by

$$W(\tau, s) = l + \sum_{i=1}^{n} \Pi_i(\tau_i, s_i) + N[R(\tau, s) + S(\tau)], \tag{22}$$

with l being aggregate labor income. Finally, since contribution schedules are truthful, the government objective function is equivalent to:

$$\widetilde{G}(\tau, s) = \sum_{i \in L} W_i(\tau, s) + aW(\tau, s). \tag{23}$$

3. THE EQUILIBRIUM LEVEL OF PROTECTION WITH VARIABLE MARKUPS

In this Section we derive the equilibrium structure of protection emerging in the domestic economy, taking as given the trade policy of the foreign country. Before doing so fully, we first analyze how trade policy is likely to affect individual lobbies welfare and aggregate welfare. For the sake of exposition, we first study the equilibrium import policy and then the equilibrium export policy.

3.1. Import Trade Policy

Consider the effects of import protection on the welfare of the generic individual lobby i. From (20) we have that the welfare effect for lobby i of a marginal increase in τ_j is

$$\begin{aligned}\frac{\partial W_i(\tau,s)}{\partial \tau_j} &= \delta_{ij}\frac{\Pi_i(\tau_i,s_i)}{\partial \tau_j}+\sigma_i N\left[\frac{\partial R(\tau,s)}{\partial \tau_j}+\frac{\partial S(\tau)}{\partial \tau_j}\right], \\ &= \delta_{ij}\lambda_j N\left[\frac{\partial p_{hj}}{\partial \tau_j}x_{hj}+(p_{hj}-c_j)\frac{\partial x_{hj}}{\partial \tau_j}\right]+ \\ &\quad +\sigma_i N\left[(1-\lambda_j)\left(\frac{\partial x_{fj}}{\partial \tau_j}\tau_j-\frac{\partial p_{fj}}{\partial \tau_j}x_{fj}\right)-\lambda_j\frac{\partial p_{hj}}{\partial \tau_j}x_{hj}\right],\end{aligned} \tag{24}$$

where δ_{ij} is an indicator variable, equal to 1 if $j=i$ and to zero otherwise, that is to say that import policy in other sectors affects the aggregate welfare of lobby i only through the effects that this policy entails on the redistributed revenues and on consumers' surplus. The first term refers to the welfare gains deriving from the ownership of the specific factor j consisting in increased revenues stemming from higher sales and higher prices. The second term refers to the losses suffered as consumers, deriving from lower consumption of the foreign varieties and higher prices on domestic varieties, net of the benefits deriving from the reduction of the producer prices on foreign varieties. Intuitively, given this terms of trade effect from trade policy, the sum of tariff revenues and consumer surplus is not maximized at zero import tariff.

Given the above expression we have the following result.

LEMMA 1. *Starting from zero restriction on imports (i.e. $\tau_j=0$): (i) A lobby would prefer an import tariff for its own sector for any feasible foreign export policy, i.e. $s_j^*>-\frac{2(\beta-\gamma)(\alpha-c_i)}{2(\beta-\gamma)+\gamma\lambda_j}$; (ii) a lobby would prefer an import tariff for other sectors if $s_j^*>-\frac{4(\beta-\gamma)^2(\alpha-c_j)}{4(\beta-\gamma)^2+\gamma\lambda_j(4\beta-3\gamma)}$ and a subsidy if $-\frac{2(\beta-\gamma)(\alpha-c_j)}{2(\beta-\gamma)+\gamma\lambda_j}<s_j^*<-\frac{4(\beta-\gamma)^2(\alpha-c_j)}{4(\beta-\gamma)^2+\gamma\lambda_j(4\beta-3\gamma)}$.*

Proof. See the Appendix. ∎

Thus as a corollary to Lemma 1, we get

COROLLARY 1. *Starting from free trade (i.e. $\tau_j=s_j^*=0$), a lobby would prefer an import* *tariff for its own sector as well as for the other sectors.*

The intuition for the above result is straightforward.

Starting from zero tariffs on imports for any feasible foreign export policy, a lobby i would benefit from import protection on its own sector through the positive effect that trade protection would have on its profits and on the sum of the redistributed tariff revenues and surplus gains due to the improvement in the terms of trade deriving from protection. Intuitively, the additional gains deriving from terms of trade effects ensure that even in the case of export taxes levied by the foreign country, it would be convenient to ask for a positive import tariff. According to the second part of the Lemma 1, the positive effects of terms of trade improvement also prevail with regards to the welfare implications of trade policy in sectors either than i, provided that the export subsidy set by the foreign country is higher than a certain critical level, otherwise an import subsidy for other sectors will be preferred by the organized sector i.

Note that in GH a lobby will always prefer an import subsidy for other sectors since this would reduce the price of imports as well as the price on domestically produced varieties. In Chang (2005), instead, since the price of the domestic output is not affected by an import subsidy a lobby always prefer a zero import tariff for the other sectors.

Consider now the impact on aggregate welfare of small changes in τ_j. From (22) we have:

$$\begin{aligned} \frac{\partial W(\tau,s)}{\partial \tau_j} &= \frac{\partial \Pi_j(\tau_j,s_j)}{\partial \tau_j} + N\left[\frac{\partial R(\tau,s)}{\partial \tau_j} + \frac{\partial S(\tau)}{\partial \tau_j}\right], \\ &= N\left[\lambda_j(p_{hj}-c_j)\frac{\partial x_{hj}}{\partial \tau_j} + (1-\lambda_j)\left(\frac{\partial x_{fj}}{\partial \tau_j}\tau_j - \frac{\partial p_{fj}}{\partial \tau_j}x_{fj}\right)\right]. \end{aligned} \tag{25}$$

Given the prices and quantities derived in the previous Section we have the following result:

LEMMA 2. *Starting from zero restrictions on imports (i.e. $\tau_j = 0$) aggregate welfare is increasing in import tariff in any sector for any feasible foreign export policy.*

Proof. See the Appendix. ∎

Lemma 2 simply states that the welfare-maximizing specific import tariff is positive for any feasible level of foreign export policy as a result of the beneficial effects that a tariff has on profits of domestic producers (due to imperfect competition) and on consumers' surplus, thank to the lower producer prices on foreign varieties (i.e. terms of trade gains). This result is consistent with Chang (2005), where the positive effect on profits makes a tariff always desirable.[3] However, the result is in contrast with GH, where the benchmark welfare-maximizing policy is free trade for all sectors, since their setup features perfect competition.

We are now ready to study the equilibrium structure of protection. First, consider the marginal effect of a tariff on the government objective function (23):

$$\begin{aligned}\frac{\partial \widetilde{G}\left(\tau,s\right)}{\partial \tau_j} &= \left(I_j+a\right)\frac{\partial \Pi_j\left(\tau_j,s_j\right)}{\partial \tau_j}+\left(a+\sigma_L\right)N\left[\frac{\partial R\left(\tau,s\right)}{\partial \tau_j}+\frac{\partial S(\tau)}{\partial \tau_j}\right], \\ &= \left(I_j+a\right)\lambda_j N\left[\frac{\partial p_{hj}}{\partial \tau_j}x_{hj}+\left(p_{hj}-c_j\right)\frac{\partial x_{hj}}{\partial \tau_j}\right]+ \\ &\quad +\left(a+\sigma_L\right)N\left[\left(1-\lambda_j\right)\left(\frac{\partial x_{fj}}{\partial \tau_j}\tau_j-\frac{\partial p_{fj}}{\partial \tau_j}x_{fj}\right)-\lambda_j\frac{\partial p_{hj}}{\partial \tau_j}x_{hj}\right],\end{aligned} \tag{26}$$

where $I_j=\sum_{i\in L}\delta_j$ is an indicator variable such that $I_j=1$ if $j\in L$ and $I_j=0$ if $j\notin L$, while $\sigma_L=\sum_{j\in L}\sigma_j$ is the fraction of the population represented by lobbies.

Let τ^o denote the equilibrium import policy, then one must have that $\frac{\partial \widetilde{G}(\tau^o,s)}{\partial \tau_j}=0$ and $\frac{\partial^2 \widetilde{G}(\tau^o,s)}{\partial \tau_j^2}<0$.

From (26) we have that the equilibrium tariff must satisfy the following first-order condition:

$$\tau_j^o\frac{\partial x_{fj}}{\partial \tau_j}=\frac{\partial p_{fj}}{\partial \tau_j}x_{fj}-\frac{I_j-\sigma_L}{a+\sigma_L}\frac{\lambda_j}{1-\lambda_j}\frac{\partial p_{hj}}{\partial \tau_j}x_{hj}-\frac{I_j+a}{a+\sigma_L}\frac{\lambda_j}{1-\lambda_j}\frac{\partial x_{hj}}{\partial \tau_j}\left(p_{hj}-c_j\right). \tag{27}$$

The second-order condition requires the following restriction on parameters:

$$\frac{I_j+a}{a+\sigma_L}<\frac{\left[2\left(\beta-\gamma\right)+\gamma\lambda_j\right]\left(6\beta-4\gamma+\gamma\lambda_j\right)}{2\lambda_j\gamma^2\left(1-\lambda_j\right)}+\frac{1}{2}. \tag{28}$$

Clearly the above condition always holds under the assumption that goods of the same sector are sufficiently differentiated. Henceforth, we assume that (28) always holds. Given these results the following proposition summarizes our findings.

Proposition 1. *If the contribution schedules of the lobbies are truthful, then starting from zero restrictions on imports (i.e.* $\tau_j=0$*): (i) The government will set an import tariff in*

[3] See also Gros (1987) and Flam and Helpman (1987) who show that in a small country the optimal tariff is strictly positive for a monopolistically competitive sector.

the organized sector; for $\sigma_L < a$, the government will set an import tariff in the unorganized sector; for $\sigma_L > a$, the government will set an import tariff (subsidy) in the unorganized sector if $s_j^* > (<) - \frac{4(\beta-\gamma)[(\beta-\gamma)(a+\sigma_L)+\gamma\lambda_j a](\alpha-c_j)}{\left[4(\beta-\gamma)^2+\gamma\lambda_j(4\beta-3\gamma)\right](a+\sigma_L)-2\gamma^2\lambda_j(1-\lambda_j)a}$.

Proof. *See the Appendix.* ∎

This corollary immediately follows:

COROLLARY 2. *Starting from free trade (i.e. $\tau_j = s_j^* = 0$), the government will set an import tariff in any sector whether organized or not.*

According to Proposition 1 the equilibrium import tariff is always positive for the organized sectors, while for the unorganized sectors the equilibrium import policy will depend on the level of the foreign export subsidy. In particular, an import tariff will be levied on imports in the unorganized sectors if the export subsidy set by the foreign country is higher than a certain critical level, otherwise an import subsidy will be set. Our results stand in contrast with those obtained in GH, where the endogenous import policy is always a subsidy for the unorganized sectors. In the monopolistic competition framework of Chang (1995), instead, the government will always choose to set an import tariff whether or not a sector is represented by a lobby.

To gain some intuition it is useful to express the equilibrium import policy for the home country (27) as follows:

$$\frac{\tau_j^o}{p_{f_j}} = \frac{1}{\varepsilon_{ff_j}} - \frac{I_j - \sigma_L}{a + \sigma_L}\frac{z_j}{\varepsilon_{fh_j}} - \frac{I_j + a}{a + \sigma_L}\frac{z_j}{\varepsilon_{ff_j}/\varepsilon_{hf_j}}\frac{\mu_j - 1}{\mu_j}, \tag{29}$$

where $z_j = \frac{p_{hj}x_{hj}}{p_{fj}x_{fj}}\frac{\lambda_j}{1-\lambda_j}$ is the inverse import penetration ratio in equilibrium, that is the equilibrium market share of domestic products relative to that of the imported products at producer price, $\varepsilon_{ff_j} = \left(\frac{\partial x_{fj}}{\partial \tau_j}/\frac{\partial p_{fj}}{\partial \tau_j}\right)\frac{p_{fj}}{x_{fj}} > 0$, $\varepsilon_{fh_j} = \left(\frac{\partial x_{fj}}{\partial \tau_j}/\frac{\partial p_{hj}}{\partial \tau_j}\right)\frac{p_{hj}}{x_{fj}} < 0$, $\varepsilon_{hf_j} = \left(\frac{\partial x_{hj}}{\partial \tau_j}/\frac{\partial p_{fj}}{\partial \tau_j}\right)\frac{p_{fj}}{x_{hj}} < 0$ and $\mu = p_{hj}/c_j$ is the (variable) gross markup on domestic sales. Equation (29) expresses the equilibrium import policy as the sum of three components. The first component captures the terms-of-trade motive for trade protection and represents an additional motive for deviating from free trade. In an environment with differentiated goods and variable markups, in fact, there is an additional argument in favor of trade protection similar to that of a large country with homogenous goods and perfect competition. The second component captures the political support motive for trade interventions and has the same nature of the expression for the equilibrium import policy in GH resulting from the balance between the losses associated to trade policies and the income gains that organized sectors can obtain from such policies. Finally, the third component can be interpreted as the imperfect-competition motive for trade protection reflecting the positive effects on profits derived from the imposition of an import tariff. This last component is in fact increasing in the markup on domestic sales.

From the above expression it is clear that having higher domestic production relative to foreign production (low level of import penetration) will imply higher import tariffs for organized sectors, while the effect on import tariffs or subsidies for unorganized sectors is likely to be negative only if the relative weight the government attaches to aggregate welfare a is relatively low and/or the gross markup on domestic sales is low.

3.2. Export Trade Policy

Consider the effects of an export subsidy on the welfare of the generic individual lobby i. From (20) we have that the welfare effect for lobby i of a marginal increase in s_j is

$$\begin{aligned} \frac{\partial W_i(\tau, s)}{\partial s_j} &= \delta_{ij} \frac{\Pi_i(\tau_i, s_i)}{\partial s_j} + \sigma_i N \left[\frac{\partial R(\tau, s)}{\partial s_j} + \frac{\partial S(\tau)}{\partial s_j} \right], \\ &= \delta_{ij} \lambda_j N^* \left[\frac{\partial p^*_{hj}}{\partial s_j} x^*_{hj} + \left(p^*_{hj} - c_j \right) \frac{\partial x^*_{hj}}{\partial s_j} \right] + \\ & \quad -\lambda_j \sigma_i N^* \left(x^*_{hj} + s_j \frac{\partial x^*_{hj}}{\partial s_j} \right), \end{aligned} \tag{30}$$

As in the case of a tariff, the first term refers to the welfare gains deriving from the ownership of the specific factor j consisting in increased revenues stemming from higher sales and higher prices. On the contrary, within the second term the effect on domestic consumers surplus is zero, while the export subsidy entails a cost on each exported unit.

Given the above expression we have the following result.

Lemma 3. *Starting from a zero subsidy on exports (i.e. $s_j = 0$), for any feasible foreign import tariff (i.e. $\tau^*_j < \frac{2(\beta-\gamma)}{2(\beta-\gamma)+\gamma(1-\lambda_j)} (\alpha - c_i)$): (i) a lobby would prefer an export subsidy for its own sector, if goods are sufficiently differentiated; (ii) a lobby would prefer an export tax for other sectors.*

Proof. see the Appendix. ∎

The intuition is straightforward. An export subsidy on sector i makes exporting more profitable for sector i only, while its cost is spread across the entire population. A lobby will hence ask an export subsidy for its own sector, since it will get all the profits while paying only a fraction of the cost. On the other hand, by asking for an export tax for the other sector, the lobby will get part of the tax income. This result is in line with the findings of Chang (2005) and GH.

Consider now the impact on aggregate welfare of small changes in s_j. From (22) we have:

$$\begin{aligned} \frac{\partial W(\tau, s)}{\partial s_j} &= \frac{\partial \sum_{i=1}^{n} \Pi_i(\tau_i, s_i)}{\partial s_j} + N\left[\frac{\partial R(\tau, s)}{\partial s_j} + \frac{\partial S(\tau)}{\partial s_j}\right], \\ &= \lambda_j N^* \left[\frac{\partial p^*_{hj}}{\partial s_j} x^*_{hj} + \left(p^*_{hj} - c_j\right)\frac{\partial x^*_{hj}}{\partial s_j}\right] - \lambda_j N^* \left(x^*_{hj} + s_j \frac{\partial x^*_{hj}}{\partial s_j}\right) \end{aligned} \tag{31}$$

which implies the following result.

Lemma 4. *Starting from a zero subsidy on exports (i.e. $s_j = 0$) aggregate welfare is decreasing in export subsidy in any sector for any feasible foreign import policy.*

Proof. see the Appendix. ∎

Intuitively, an export tax is socially desirable, as it generates a fiscal revenue that outweighs the profit loss from exporters, while not affecting domestic consumers. Again this result is similar to that found in Chang (2005), while under perfect competition free trade is still the first best, as in GH.

Consider now the marginal effect of an export subsidy on the government objective function (23):

$$\begin{aligned} \frac{\partial \widetilde{G}(\tau, s)}{\partial s_j} &= (I_j + a)\frac{\partial \Pi_i(\tau_i, s_i)}{\partial s_j} + (a + \sigma_L) N \left(\frac{\partial R(\tau, s)}{\partial s_j} + \frac{\partial S(\tau)}{\partial s_j}\right), \\ &= (I_j + a)\lambda_j N^* \left[\frac{\partial p^*_{hj}}{\partial s_j} x^*_{hj} + \left(p^*_{hj} - c_j\right)\frac{\partial x^*_{hj}}{\partial s_j}\right] - (a + \sigma_L)\lambda_j N^* \left(x^*_{hj} + s_j \frac{\partial x^*_{hj}}{\partial s_j}\right). \end{aligned} \tag{32}$$

Let s^o denote the equilibrium export policy, then one must have that $\frac{\partial \widetilde{G}(\tau, s^o)}{\partial s_j} = 0$ and $\frac{\partial^2 \widetilde{G}(\tau, s^o)}{\partial s_j^2} <$

0. Then, the equilibrium tariff must satisfy the following first-order condition:

$$s_j^o \frac{\partial x_{hj}^*}{\partial s_j} = \frac{I_j + a}{a + \sigma_L} \left[\frac{\partial p_{hj}^*}{\partial s_j} x_{hj}^* + \left(p_{hj}^* - c_j \right) \frac{\partial x_{hj}^*}{\partial s_j} \right] - x_{hj}^*. \tag{33}$$

The second-order condition requires the following restriction on parameters:

$$\frac{I_j + a}{a + \sigma_L} < 2 \frac{2\beta - \gamma}{2\beta - \gamma - \gamma \lambda_j}. \tag{34}$$

Note that the above condition poses a limit both on the degree of product differentiation (i.e. $\beta - \gamma$) and on the bias the government has towards lobby interests (i.e. a not too small).

Given the above expressions, we are now ready to characterize the equilibrium trade policy for the exporting sectors. In particular, we have the following result.

Proposition 2. *If the contribution schedules of the lobbies are truthful, then starting from zero restrictions on exports (i.e.* $s_j = 0$*): (i) the government will set an export subsidy for organized sectors, if goods are sufficiently differentiated; (ii) the government will set an export tax for unorganized sectors.*

Proof. See the Appendix ∎

This result is consistent with GH's results. The interpretation for the export tax in unorganized sectors is straightforward as the governments has only a relatively small incentive to deviate from what is socially optimal. For the organized sectors, instead, a positive export subsidy will be chosen due to government interest in campaign contributions, provided that products are sufficiently differentiated. In the case of low differentiation, however, a positive export subsidy may still emerge in the political equilibrium for the organized sectors, provided that lobbies represent a small fraction of the population and the weight government attaches to campaign contributions is high otherwise the endogenous export policy will consist in a export tax also for the sectors organized into lobbies. This last result is consistent with Chang (2005). Condition (33) can, in fact, be rewritten as:

$$\frac{s_j^o}{p_{hj}^*} = - \left(\frac{\partial p_{hj}^*}{\partial s_j} \right)^{-1} \frac{1}{\varepsilon_{hh}^*} + \frac{I_j + a}{a + \sigma_L} \frac{1}{\varepsilon_{hh}^*} + \frac{I_j + a}{a + \sigma_L} \frac{\mu^* - 1}{\mu^*}, \tag{35}$$

where $\varepsilon^*_{hh} = \left(\frac{\partial x^*_{hj}}{\partial s_j} / \frac{\partial p^*_{hj}}{\partial s_j}\right) \frac{p^*_{hi}}{x^*_{hj}} > 0$ and $\mu^* = p^*_{hj}/c_j$ is the (variable) gross markup set by exporters. From (35) the equilibrium subsidy is expressed as the sum of three components.

The first component captures the familiar terms-of-trade motive for trade policy. In particular, it corresponds to the optimum export tax that applies in a large country when trade policy is decided by a benevolent government. The second component refers to the political calculus motive for trade protection due to the existence of lobbies. The last component refers to the imperfect-competition motive for trade protection reflecting the positive effects on profits that can be obtained from subsidizing exportations. This last term is in fact increasing in the markup charged on foreign sales.

3.3. Comparative Statics

[to be written]

4. THE STRUCTURE OF PROTECTION IN A NON-COOPERATIVE INTERNATIONAL EQUILIBRIUM

[to be written]

5. CONCLUSIONS

[to be written]

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APPENDIX

Proof of Lemma 1

Starting from zero restriction on imports (i.e. $\tau_j = 0$), given the expressions for equilibrium prices (11)-(14) and quantities (15)-(18), a lobby's marginal welfare (24) is found to be

$$\begin{aligned}\frac{\partial W_i(\tau,s)}{\partial \tau_j} &= (\delta_j - \sigma_i)\lambda_j N \frac{\gamma(1-\lambda_j)}{2(2\beta-\gamma)}\left[\frac{\alpha - c_j}{2\beta-\gamma} - \frac{\gamma(1-\lambda_j)}{2(\beta-\gamma)(2\beta-\gamma)}s_j^*\right] + \\ &+\delta_j\lambda_j N \frac{\gamma(1-\lambda_j)}{2(\beta-\gamma)(2\beta-\gamma)}\left[\frac{\alpha(\beta-\gamma)+\beta c_j}{2\beta-\gamma} - \frac{\gamma(1-\lambda_j)}{2(2\beta-\gamma)}s_j^* - c_j\right] + \\ &+\sigma_i N(1-\lambda_j)\frac{2(\beta-\gamma)+\gamma\lambda_j}{2(2\beta-\gamma)}\left[\frac{\alpha-c_j}{2\beta-\gamma} + \frac{2(\beta-\gamma)+\gamma\lambda_j}{2(\beta-\gamma)(2\beta-\gamma)}s_j^*\right],\end{aligned} \tag{A.1}$$

where for organized sectors (i.e. $j = i$ and $\delta_i = 1$) we have that $\frac{\partial W_i(\tau,s)}{\partial \tau_i} > 0$ if $s_i^* > \overline{s}_i^* = -\frac{4(\beta-\gamma)[\sigma_i(\beta-\gamma)+\gamma\lambda_i](\alpha-c_i)}{2\gamma^2\lambda_i(\lambda_i-1)+\sigma_i\left[4(\beta-\gamma)^2+\gamma\lambda_i(4\beta-3\gamma)\right]}$. Since this critical value for the foreign export tax, $\overline{s}_i^*$, is strictly lower than its prohibitive counterpart under the assumption that $\tau_i = 0$, namely $s_i^{*NT}[\tau_i = 0] = -\frac{2(\beta-\gamma)(\alpha-c_i)}{2(\beta-\gamma)+\gamma\lambda_i}$, the first part of Lemma 1 is proved. For unorganized sectors (i.e. $j \neq i$ and $\delta_j = 0$), $\frac{\partial W_i(\tau,s)}{\partial \tau_j} > 0$ if $s_j^* > \overline{\overline{s}}_j^* = -\frac{4(\beta-\gamma)^2(\alpha-c_j)}{4(\beta-\gamma)^2+\gamma\lambda_j(4\beta-3\gamma)}$. Since this critical value for the foreign export tax, $\overline{\overline{s}}_j^*$ is strictly larger that its prohibitive counterpart under the assumption that $\tau_i = 0$, namely $s_i^{*NT}[\tau_i = 0] = -\frac{2(\beta-\gamma)(\alpha-c_i)}{2(\beta-\gamma)+\gamma\lambda_i}$, the second part of Lemma 1 is proved. ■

Proof of Lemma 2

Starting from zero restriction on imports (i.e. $\tau_j = 0$), given the expressions for equilibrium prices (11)-(14) and quantities (15)-(18), the social marginal welfare is

$$\begin{aligned}\frac{\partial W(\tau,s)}{\partial \tau_j} &= N\lambda_j \frac{\gamma(1-\lambda_j)}{2(\beta-\gamma)(2\beta-\gamma)}\left[\frac{\alpha(\beta-\gamma)+\beta c_j}{2\beta-\gamma} - \frac{\gamma(1-\lambda_j)}{2(2\beta-\gamma)}s_j^* - c_j\right] + \\ &+N(1-\lambda_j)\frac{2(\beta-\gamma)+\gamma\lambda_j}{2(2\beta-\gamma)}\left[\frac{\alpha-c_j}{2\beta-\gamma} + \frac{2(\beta-\gamma)+\gamma\lambda_j}{2(\beta-\gamma)(2\beta-\gamma)}s_j^*\right].\end{aligned} \tag{A.2}$$

which is increasing in tariff only if $s_j^* > \widetilde{s}_j^* = -\frac{4(\beta-\gamma)[(\beta-\gamma)+\gamma\lambda_j](\alpha-c_j)}{4(\beta-\gamma)^2+\gamma\lambda_j(4\beta-3\gamma)-2\gamma^2\lambda_j(1-\lambda_j)}$. Since this critical value for the foreign export tax, $\widetilde{s}_j^*$, is strictly lower than its prohibitive counterpart under the assumption that $\tau_j = 0$, namely $\widetilde{s}_j^* < s_j^{*NT}[\tau_j = 0] < 0$, Lemma 2 is proved. ■

Proof of Proposition 1

Starting from zero restriction on imports (i.e. $\tau_j = 0$), given the expressions for equilibrium prices (11)-(14) and quantities (15)-(18), then the marginal effect of a tariff on government's welfare can be written as:

$$
\begin{aligned}
\frac{\partial \widetilde{G}(\tau,s)}{\partial \tau_j} &= (I_j - \sigma_L)\lambda_j N \frac{\gamma(1-\lambda_j)}{2(2\beta-\gamma)}\left[\frac{\alpha - c_j}{2\beta-\gamma} - \frac{\gamma(1-\lambda_j)}{2(\beta-\gamma)(2\beta-\gamma)}s_j^*\right] + \\
&+ (I_j + a)\lambda_j N \frac{\gamma(1-\lambda_j)}{2(\beta-\gamma)(2\beta-\gamma)}\left[\frac{\alpha(\beta-\gamma)+\beta c_j}{2\beta-\gamma} - \frac{\gamma(1-\lambda_j)}{2(2\beta-\gamma)}s_j^* - c_j\right] + \\
&+ (a+\sigma_L)N(1-\lambda_j)\frac{2(\beta-\gamma)+\gamma\lambda_j}{2(2\beta-\gamma)}\left[\frac{\alpha-c_j}{2\beta-\gamma} + \frac{2(\beta-\gamma)+\gamma\lambda_j}{2(\beta-\gamma)(2\beta-\gamma)}s_j^*\right],
\end{aligned} \tag{A.3}
$$

which is increasing in an import tariff only if $s_j^* > \widehat{s}_j^* = -\frac{4(\beta-\gamma)[(\beta-\gamma)(a+\sigma_L)+\gamma\lambda_j(a+I_j)](\alpha-c_j)}{\left[4(\beta-\gamma)^2+\gamma\lambda_j(4\beta-3\gamma)\right](a+\sigma_L)-2\gamma^2\lambda_j(1-\lambda_j)(a+I_j)}$, *where* $\widehat{s}_j^* < s_j^{*NT}[\tau_j = 0] < 0$ *if* $\frac{a+\sigma_L}{a+I_j} < 2$. *This last inequality holds for organized sectors since* $I_j = 1$ *so showing the result in the first part of the Proposition. For unorganized sectors, since* $I_j = 0$, $\frac{\partial \widetilde{G}(\tau,s)}{\partial \tau_j}$ *is strictly positive provided that* $\sigma_L < a$, *so proving the second part of the Proposition. If, instead* $\sigma_L > a$, *the government welfare is increasing (decreasing),* $\frac{\partial \widetilde{G}(\tau,s)}{\partial \tau_j} > (<) 0$, *in an import tariff if* $s_j^* > (<) \widehat{s}_j^*$. *This proves the third part of the Proposition.* ■

Proof of Lemma 3

Starting from zero subsidy on exports (i.e. $s_j = 0$*), given the expressions for equilibrium prices (11)-(14) and quantities (15)-(18), a lobby's marginal welfare (24) is found to be*

$$
\frac{\partial W_i(\tau,s)}{\partial s_j} = \lambda_j N^* \left(\frac{2\beta-\gamma-\gamma\lambda_j}{2\beta-\gamma}\delta_j - \sigma_i\right)\left[\frac{\alpha-c_j}{2\beta-\gamma} - \frac{2\beta-\gamma-\gamma\lambda_j}{2(\beta-\gamma)(2\beta-\gamma)}\tau_j^*\right]. \tag{A.4}
$$

Since the second term of the above expression is always positive for any feasible foreign import tariff, namely for $\tau_j^* < \tau_j^{*NT}[s_j = 0]$, *where* $\tau_i^{*NT}[s_i = 0] = \frac{2(\beta-\gamma)(\alpha-c_i)}{2(\beta-\gamma)+\gamma(1-\lambda_i)}$ *is the prohibitive foreign import tariff at* $s_j = 0$, *then* $\frac{\partial W_i(\tau,s)}{\partial s_j} > 0$ *if* $\frac{2\beta-\gamma-\gamma\lambda_j}{2\beta-\gamma}\delta_j - \sigma_i > 0$. *For organized sectors (i.e.* $j = i$ *and* $\delta_i = 1$*), this condition is satisfied provided that goods are sufficiently differentiated (i.e.* $\beta - \gamma$ *is large enough), so proving the first part of the Lemma. For unorganized sectors* *(i.e. $j \neq i$ and $\delta_j = 0$), the condition is never satisfied and* $\frac{\partial W_i(\tau,s)}{\partial s_j} < 0$ *for any feasible foreign import tariff.* ■

Proof of Lemma 4

Starting from zero subsidy on exports (i.e. $s_j = 0$), given the expressions for equilibrium prices (11)-(14) and quantities (15)-(18), the social marginal welfare is

$$\frac{\partial W(\tau,s)}{\partial s_j} = N^* \frac{\gamma \lambda_j^2}{2\beta - \gamma} \left[\frac{2\beta - \gamma - \gamma\lambda_j}{2(\beta - \gamma)(2\beta - \gamma)} \tau_j^* - \frac{\alpha - c_j}{2\beta - \gamma} \right], \tag{A.5}$$

from which immediately follows that for any feasible foreign import tariff, $\tau_j^* < \tau_j^{*NT}[s_j = 0]$, *the model displays a negative marginal effect on aggregate welfare of an export subsidy, i.e.* $\frac{\partial W(\tau,s)}{\partial s_j} < 0$, *so implying that a tax on exports is welfare improving.* ■

Proof of Proposition 2

Starting from zero restriction on exports (i.e. $s_j = 0$), given the expressions for equilibrium prices (11)-(14) and quantities (15)-(18), then the marginal effect of a subsidy on government's welfare can be written as:

$$\frac{\partial \widetilde{G}(\tau,s)}{\partial s_j} = \lambda_j N^* \left[(I_j + a) \frac{2\beta - \gamma - \gamma\lambda_j}{2\beta - \gamma} - (a + \sigma_L) \right] \left[\frac{\alpha - c_j}{2\beta - \gamma} - \frac{2\beta - \gamma - \gamma\lambda_j}{2(\beta - \gamma)(2\beta - \gamma)} \tau_j^* \right], \tag{A.6}$$

Since the second term of the above expression is always positive for any feasible foreign import tariff, namely for $\tau_j^* < \tau_j^{*NT}[s_j = 0]$, *where* $\tau_i^{*NT}[s_i = 0] = \frac{2(\beta-\gamma)(\alpha-c_i)}{2(\beta-\gamma)+\gamma(1-\lambda_i)}$ *is the prohibitive foreign import tariff at $s_j = 0$, then* $\frac{\partial \widetilde{G}(\tau,s)}{\partial s_j} > 0$ *if* $\frac{a+\sigma_L}{I_j+a} < \frac{2\beta-\gamma-\gamma\lambda_j}{2\beta-\gamma}$. *For organized sectors, since $I_j = 1$, this condition holds provided that goods are sufficiently differentiated (i.e. $\beta - \gamma$ is large enough) so proving the first part of the Proposition. For unorganized sectors since $I_j = 0$ this condition is never satisfied so implying that the equilibrium export policy will consist in a tax. This proves the second part of the Proposition* ■