

Live or Let Die: Intra-Sectoral Lobbying on Entry *

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Abstract

This paper builds on Grossman and Helpman (1994) and develops a political economy framework to examine the endogenous implementation of Technical Barriers to Trade. These barriers, as every domestic regulation, have also to be borne by domestic producers. The higher cost they imply may induce firms to lobby against the implementation of such barriers. On the other hand, highly productive firms may benefit from these regulations because of the weaker competition they imply. Those barriers are thus able to create conflicts of interests *within* sectors. In this paper, intra-sectoral firm heterogeneity is the *unique* driving force of the political game and competition among lobbies. We show that the political competition opposes productive versus non productive firms rather than domestic versus foreign ones, contrasting with the literature. As a consequence the correlation between protection and lobbies' contributions may actually be negative.

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1 Introduction

"When asked why free trade is so often preached and so rarely practiced, most international economists blame "politics". In representative democracies, governments shape trade policy in response not only to the concerns of the general electorate, but also to the pressures applied by special interest." (Grossman and Helpman 1994).

An important question for theoretical and applied research in international economics is related to the difficulty of implementing free trade. In a seminal paper that encompasses the main mechanisms of the *New Political Economy*, Grossman and Helpman (1994) (henceforth GH) have proposed a clear-cut model of lobbying (the "Protection For Sale" model, hereafter the PFS model) that provides the micro-foundations to the political motives for protection. They show how a policy maker's affinity for private gains leads him to design protectionist trade policies against unorganized population. In this context, trade policy is understood in the most common way as a vector of tariffs and subsidies that a government implements to protect some domestic industries. An important literature has emerged following this paper, which has been extended to study the political economy of Free Trade Agreements (FTA) (Ornelas, 2005; Grossman and Helpman, 1995, among others) and the endogenous formation of lobbies (Bombardini, 2008; Mitra, 1999). On the empirical side, Goldberg and Maggi (1999) have pioneered a literature focusing on the empirical validity of the PFS model (see Gawande and Bandyopadhyay (2000), Bombardini (2008) and more recently Imai *et al.* (2008)).

However, the nature of the trade policy instrument has not been questioned in the literature. Yet, the tremendous decrease of tariff barriers throughout GATT and WTO negotiations over the past 60 years renders unilateral tariffs manipulation extremely difficult. Moreover, the creation of the Dispute Settlement Body (DSB) associated to the WTO hinders permanent deviations from negotiated tariff levels. One consequence is that current negotiations at the WTO now focus on the increasing role of non tariff barriers (NTBs) and technical barriers to trade (TBTs) to lower trade frictions. These NTBs dramatically lack transparency, which makes WTO much

less operative to resolve disputes related to such protection.¹

In addition, the recent literature in international trade has put forward two sources of trade growth (see Bernard *et al.* (2003), Melitz (2003), Chaney (2008)): the decrease in per unit trade costs through the reduction of tariffs and transport costs and the decrease of sunk costs associated with production and export. As a result of the reduction of these sunk costs, economies are more integrated. It thus seems reasonable that protectionist policies should also consist in manipulating these sunk costs rather than tariffs. Moreover, sunk costs heavily depend on the regulations and standards applied in a country and thus directly depend on government's decisions. At least part of these sunk costs are directly related to TBTs.²

In this paper, we study the incentive for policy makers to implement new regulations and standards that increase sunk costs associated with production for a protectionist motive. To that purpose, we adapt the lobbying model of GH, based on the common agency game under complete information first developed by Bernheim and Whinston (1986) (henceforth BW), in order to determine the underlying political motives and how they differ from those that arise with implementation of tariffs, as in the PFS framework.

Considering these regulations and standards as a protection tool raises some new questions. The implementation of a standard cannot only be applied to foreign competitors but must also be applied to domestic producers. As stated by the national treatment principle of the WTO, a country cannot grant a preferential treatment to domestic firms compared to their foreign counterparts. The reasons for a positive demand of TBTs from domestic producers are therefore not obvious. While these regulations raise the cost of all producers, the literature often refers to these standards and regulations as protectionist policies in the sense that they might raise more the cost of foreign producers than the cost of domestic producers in some cases. This protects domestic producers from the competition of foreign producers, as long as we consider

¹See for example Horn and Weiler (2004) on the WTO dispute concerning the French regulation on asbestos. They show the inherent ambiguity surrounding the question of the appreciation of the effects and the purposes of such socially beneficial regulation.

²Trade literature generally sees these sunk costs as a combination of costs associated with collecting information on export market, launching a distribution network, but also with meeting country specific standards and norms, i.e. our interpretation of TBTs.

firms that are identical. However, if we consider in addition that firms differ in productivity, these regulations generate another effect *among* domestic producers.³ Since the least efficient domestic producers cannot bear these additional costs, i.e. their profits are then negative, they are forced to exit, leaving their market shares to the most efficient producers that therefore may benefit from the implementation of a TBT. It is important to notice that this effect is at work even in the absence of *any* competition from abroad.

To highlight this issue, we consider first a closed economy framework, postponing the discussion on the consequences of a TBT implementation in a small open economy framework (as in the PFS framework) to the end of this paper. This allows us to concentrate on the potential intra-sectoral conflicts of interests among domestic producers within a defined industry.

In order to focus on the political determinants of such regulations, we also assume that they have no enhancing effect on social welfare. Suppressing any positive welfare effect allows to shed a light on the way these regulations may be turned away from their “official” social objective. Since there is no social interest in the implementation of a new regulation in our model, the unique explanation for any regulation would be based on the political influence of lobbies. In the following, we will thus refer to this kind of regulations as an entry tax, since the sole effect is an additional fixed cost for firms.⁴ Following the PFS framework, we will assume that a government that has public and private concerns receives contribution schedules from all active lobbies in the economy. The government then chooses the level of the endogenous variable that maximizes its objective function. The difference between the PFS framework and ours is therefore the decision variable of the government.

Our main contribution is to show that this new policy instrument shifts the competition between active lobbies from an inter-sectoral to an intra-sectoral competition, which brings new insights on the determinants of competition among lobbies. Indeed, the core mechanism that

³We have now clear evidence among countries and industries that firms differ in productivity within sectors (see for instance Eaton *et al.*, 2004).

⁴Allowing these regulations to affect also the variable cost would not alter our qualitative results, this extension of the model is available upon request.

we want to put forward in order to explain the conflicts of interests among lobbies is based on a profit shifting effect from small unproductive firms towards large productive firms, *within* a defined industry. This result has to be opposed to the conflicts of interests between national and foreign firms that arise under manipulation of tariffs. Another interesting aspect of this new type of competition is that it gives a rationale for the existence of producer unions formed on a firm's size basis and not on a sectoral basis.⁵

Finally, we claim that the present contribution also raises a new issue from an empirical perspective. The wide literature aiming at testing empirically the relevance of the PFS model has extensively used protection measures constructed on NTBs coverage ratios (Goldberg and Maggi, 1999; Gawande and Bandyopadhyay, 2000; Bombardini, 2008; Imai *et al.*, 2008). These authors often argue that this kind of trade barriers is well suited for their analysis because of the difficulty for governments to manipulate tariffs relatively to NTBs, which is precisely our motivation to study the lobbying incentive over TBTs.⁶ Our model makes clear that the motives to “protect” industries with TBTs greatly differ from those with tariffs, which lead to be cautious with protection measures based on NTBs coverage ratios that potentially take into account some cost creating regulations.⁷ We show that organized sectors (i.e. sectors with active lobbies) may contribute for the *non* implementation of TBTs, which is at odds with the empirical tests, since the prediction of the PFS model is that politically organized industries should benefit from a higher protection than unorganized ones, given the import penetration ratio.

In the last section of this paper, we present the extension of our framework to a small open economy. The main prediction is that the level of protection in organized industries, as well as the correlation between the level of protection and the import penetration ratio, depend on the

⁵For instance, large French firms founded the Association des Grandes Entreprises Francaises (AGREF) in 1967, which is not a representative organization but rather a corporate think tank based on firm's size.

⁶Bombardini (2008): “*Although the model deals with tariffs, there are two reasons to use NTBs in the empirical analysis. First, tariffs are low and the use of instruments such as anti-dumping, countervailing duties and tariff rate quotas are on the rise. Second, interest groups are aware that NTBs are easier for a country to manipulate unilaterally, as opposed to tariffs, which are set through multilateral rounds of negotiations.*”

⁷Papers using NTBs coverage ratio as a proxy for the level of protection often give examples of NTBs that could be easily compared to tariffs (quotas, VER, countervailing duties). However, they use the UNCTAD data base (TRAINS) on trade control measures. This data base also make a census of “technical measures” (code: 8000), that are clearly TBTs.

relative productivity of foreign suppliers compared to domestic producers. This is due to the fact that the profit shifting effect would benefit to either the domestic or the foreign producers, depending on their relative productivity levels.

Admittedly, the profit shifting mechanism we put forward is not new and has been studied in the literature, addressing other issues. For instance, Bliss and Di Tella (1997) analyze the relationship between competition and corruption, showing that competition does not necessarily reduce corruption. Their argument is based on a profit shifting effect similar to ours (that they call surplus-shifting effect). Corruption, by increasing the fixed cost active firms have to pay to corrupt officials, may endogenously generate surplus by concentrating profits in a smaller number of active firms, allowing them to pay the bribe. They do not consider however any political game behind the decision of the corrupt officials.

Maybe more importantly, in a recent paper, Do and Levchenko (2008) also put forward this profit-shifting mechanism, where they interpret the fixed cost of production as the inverse of institutional quality. Their analysis highlights the possibility that trade liberalization may deter institutional quality, since trade liberalization increases the relative size of the most productive firms compared to the least productive firms (through the selection effect put forward by Melitz, 2003), and by this the political demand for high fixed costs. But they do not endogenize trade opening. In contrast, our aim in this paper is to characterize the political motives for some protectionist policies (against trade opening) to be implemented. Moreover, their political game, which is a reduced form of the median-voter model of Benabou (2000), simply assumes that larger firms have higher political power (larger number of votes). We show that this is not necessarily true in the more general setting we use; the PFS framework. Precisely we show that large firms may contribute more, but these higher contributions do not necessarily lead to a greater influence.

The remainder of this paper is organized as follows. In section 2, we describe the structure of our simple economy. In section 3, we show the way the implementation of an entry tax generates conflicts of interest among domestic producers. We detail the political game and the properties

of the equilibrium in section 4. In section 5, we examine the determinants of the competition among lobbies. In section 6, we present the extension of our model to a small open economy. Section 7 concludes.

2 Model Setup: The Economic Structure

Our model describes a static closed economy. The simple extensions of our results to a small open economy are relegated in section 5.1.

We assume two sectors: M and A . Labor (l) is the only factor of production. The M sector is characterized by increasing returns to scale in the production of a continuum of varieties and is subject to monopolistic competition *à la* Dixit-Stiglitz. The A sector produces a homogeneous good under perfect competition and constant returns to scale, and serves as a numeraire. Firms are owned by workers.

Demand

The preferences of a representative consumer are depicted by a quasi-linear utility function U , with a CES sub-utility function over the continuum of manufacturing varieties:

$$U = A + \mu \ln C_M \quad C_M = \left(\int c_i^{1-\frac{1}{\sigma}} \right)^{\frac{1}{1-\frac{1}{\sigma}}}, \text{ with } \sigma > 1 \quad (1)$$

C_M and A denote consumption for the M composite good and the numeraire good, respectively. σ is the constant elasticity of substitution between any two varieties and μ the preference parameter over manufactured goods.

The maximization of the representative consumer utility yields the following demand for variety i :

$$c_i = \frac{\mu l}{\int_{h \in \Theta} p_h^{1-\sigma} d_h} p_i^{1-\sigma} \quad (2)$$

where p_i is the price of variety i , Θ being the set of all available varieties h in this economy. Without loss of generality, we normalize labor endowment such that $l = 1$.

Production

The numeraire good (A) is produced with one unit of labor per unit of output and we normalize the wage rate to one.

Any active firm i in the M sector bears a fixed overhead production cost F , which could reflect the costs implied by the legal system and standards in force in the country, and a constant marginal production cost a_i . The cost of producing q units of good i with marginal cost a_i is thus: $C_i(q) = a_i q + F$. Given the demand function (2), the optimal price charged by a firm i is a constant mark-up over its marginal cost. Hence, a firm whose marginal cost is a_i will charge price $p_i = \frac{\sigma}{\sigma-1} a_i$. It follows that profits of a firm with marginal cost a_i are:

$$\pi_i = \frac{\mu}{\sigma} \left(\frac{\sigma}{\sigma-1} \right)^{1-\sigma} P^{\sigma-1} a_i^{1-\sigma} - F \quad (3)$$

where $P = \left(\int_{i \in \Theta} p_i^{1-\sigma} di \right)^{\frac{1}{1-\sigma}}$ is the perfect price index.

Firm heterogeneity

As informally explained in the introduction, the potential conflicts of interest within a sector with respect to the implementation of an entry tax are due to the presence of firms that differ in size and productivity. Following this consideration, we assume that firms differ in their productivity. While the existence of conflicts of interests do not depend on a specific distribution of productivity among firms, we assume here that firms' marginal costs are drawn from a Pareto distribution. Importantly, this assumption is made because the Pareto distribution has the convenient feature that we will make explicit below, that the sum of profits of all firms in this economy is independent of the number of active firms as well as the level of the entry tax. It thus allows us to focus on a specific case where the motive for lobbying *exclusively* comes from a "profit shifting" effect.

Specifically, we assume that marginal costs a are comprised between 0 and a_0 , and that these

marginal costs are drawn from a Pareto distribution $F(a)$ with a shape parameter κ such that

$$F(a) = \left(\frac{a}{a_0}\right)^\kappa, \text{ with } 0 < a < a_0 \quad (4)$$

We further define $x_i \equiv a_i^{\sigma-1}$. We can define the ratio of two firms revenues by:

$$\frac{r(x_1)}{r(x_2)} = \frac{x_2}{x_1} \quad (5)$$

where x may be understood as an index of the inverse of firm size, which is in turn proportional to productivity. Indeed, this index perfectly follows the inverse of the firm size distribution in our economy. In the following, we will refer to x_i as the efficiency index of firm i .

We will thus consider x rather than a and assume that x is drawn from a Pareto distribution $G(x)$, with a shape parameter $\rho > 1$.⁸

$$G(x) = \left(\frac{x}{x_0}\right)^\rho, \text{ with } 0 < x \leq x_0 \quad (6)$$

Without loss of generality, we normalize $x_0 = 1$. Finally, since our framework is static, we assume as in Chaney (2008) that there is a group of entrepreneurs proportional to country size. Hence, the total mass of entrants is proportional to l .⁹

Equilibrium

The profit of firm i is given by:

$$\pi_i = \frac{\mu}{\sigma} \int p_i^{1-\sigma} p_i^{1-\sigma} - F \quad (7)$$

The computation of the price index ultimately depends on the efficiency index of the least efficient firm able to enter the market, since all firms with an x below this threshold are active in this market and make positive profits. Let x_E denote the index of the least efficient active firm (E

⁸It can be easily shown that $\rho = \frac{\kappa}{\sigma-1}$. Therefore, $\rho > 1$ when the standard regularity condition is satisfied: $\kappa - (\sigma - 1) > 0$.

⁹Recall that l is normalized to 1.

for entry). We compute the price index with respect to x_E :

$$\int_0^{x_E} p(x)^{1-\sigma} G(x) dx = \left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} \lambda x_E^{\rho-1} \quad \text{with } \lambda \equiv \frac{\rho}{\rho-1}$$

To get the simplest possible benchmark (i.e. without any lobbying activity), we further normalize the value of the fixed entry cost:

$$F = \frac{\mu}{\sigma\lambda}$$

This last normalization pins down the efficiency index of the least efficient active firm to one, i.e. $x_E = 1$.

In this very simple economy, firms first observe their efficiency index drawn from the specified distribution $G(x)$ and then decide whether to produce or not. All the firms with an efficiency index $x_i < x_E$ are able to cover the fixed cost F with their operational profits and thus decide to produce and make pure profits. Conversely, all the firms with an efficiency index $x_i > x_E$ do not enter the market, as they would make negative profits in that case. In our benchmark case, the total mass of active firms is equal to 1.

3 Lobbying on tax entry

Any change in the level of the fixed cost F affects the number of active firms in equilibrium. A marginal increase of F indeed forces the least efficient firms to exit the market. We suppose that any additional fixed entry cost to our benchmark reflects the implementation of a new regulation or standard producers have to comply with. However, our interpretation is rather restrictive since we assume no positive social effect from the implementation of new standards.

There are some reasons to suppose that new standards can be beneficial. For instance, some new standards such as sanitary or environmental regulations might increase aggregate social welfare by reducing the size of some negative production externalities. These possible positive effects make these regulations potentially desirable from a social perspective and may thus generate a social demand for these new regulations. We want however to focus on the private

motives to implement such new regulations. In order to make these new motives explicit in our analysis, we assume away any positive effect from an increase in the fixed cost firms have to pay, which thus does not affect consumers' utility. We will therefore refer to the implementation of such policy as the implementation of an entry tax for firms, since their only effect is to increase the fixed cost of all active firms. By suppressing their social desirability, it may seem that the incentives to promote these regulations are off as they hinder entry and thus competition. We however argue that there are still some private incentives to lobby for the implementation of new regulations. Many individual producers complain about these regulations because of their capacity to hinder entry. We show that what is denounced by some producers is the reason why some others promote such policies.¹⁰

Before turning to the political game itself, we first present the consequences of an increase in the fixed cost of production on the market structure of our simple economy, to highlight how this generates conflicts of interest among producers and a reason for some of them to lobby for the implementation of new entry taxes.

3.1 Impact of setting an entry tax: intra-sectoral conflicts of interest

Formally, we assume that the implementation of an entry tax raises the fixed cost of entry by an amount of βF , such that any active firm has to pay a total fixed cost of $(1 + \beta) F$. The crucial variable in this model and the only endogenous instrument for a policy maker is thus β . The larger β is, the more stringent the regulation.

Here, we develop the intuition of the conflicts of interests among producers that arise when an entry tax is set-up. First, an additional fixed cost reduces the profitability of all firms. On the one hand, this lower profitability forces the least efficient firms to exit the market since they would make negative profits in this situation. On the other hand, the most efficient firms may

¹⁰Examples of TBTs that recover our definition of an entry tax include the necessary administrative steps to create a firm, to obtain the authorization to sell a product. The recent European decree called REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) now forces *all* firms within the chemical industry to pay for the necessary tests to sell their products. We have implicit evidence that large firms did not lobby against this decree (for instance, Total claims that it has anticipated this decree) while we have clear evidence that many small firms did (in France, they are gathered in a sector union, the UIC).

be competitive enough to make positive profits. The impact of the entry tax on these firms is thus ambiguous. Their profits are reduced by the larger entry cost. But market competition is weakened since some less efficient firms are forced to exit. This effect increases the market shares and profits of all firms that are able to bear the larger entry cost. Importantly, this second effect may be larger than the first one for the most productive firms. As a consequence, the implementation of an entry tax leads to a profit shifting effect from small to large firms, compared to the benchmark case where $\beta = 0$.

The implementation of a positive entry tax splits the mass of firms into three groups. The first group is composed of firms that are forced to exit the market. The second is composed of firms that can bear the larger entry cost but make smaller profits than in the benchmark case. For these firms, the first effect of the entry tax overcomes the second one. Finally the last group is composed of firms that make larger profits. For this last group, the second effect of the tax entry outweighs the first one.

It is important to notice that the profit shifting effect at the basis of our political game is not specific to our framework. Importantly, this mechanism also holds if we introduce free entry in the model. The introduction of free entry would lead to an additional profit shifting: from exiting firms towards entrants. This additional profit shifting would make the political game more difficult to analyze, especially because we would have to deal with the entry and exit of firms in the different lobbies. But the profit shifting from small to large firms would still always be present. Indeed, this effect does not require the average profit in this economy to rise. We only need the demand per active firm to increase ($\mu P^{\sigma-1}$) when the fixed cost of production increases, which will induce a positive effect on firms profits. This is the case, for any distribution of marginal costs.¹¹

We now turn to the formal definition of these three groups in our setting with respect to β and the induced profit shifting effect.

Suppose that a tax entry is set-up which raises the entry fixed cost to $(1 + \beta) F$. The profits

¹¹Helpman *et al.* (2003) give a formal proof for this result, see equations 7 to 10 and footnote 21.

of an active firm i thus becomes:

$$\pi_i = \frac{\mu}{\sigma \lambda \left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} x_E^{\rho-1}} p_i^{1-\sigma} - (1 + \beta) F \quad (8)$$

It is straightforward to determine the efficiency index (x_E) of the least efficient firm able to be active in this market. All firms characterized by a $x_i > x_E$ exit the market and compose the first group of firms. The "new" least efficient firm makes no pure profits. Its operational profits are just sufficient to cover the entry fixed cost $(1 + \beta) F$. This allows to define x_E :

$$\pi_E = \frac{\mu}{\sigma \lambda x_E^{\rho-1}} x_E^{-1} - (1 + \beta) F = 0 \quad (9)$$

$$\Leftrightarrow x_E = (1 + \beta)^{-1/\rho} < 1 \quad (10)$$

The firm that makes exactly the same profits with or without the entry tax defines the separation between the two remaining groups. We call the efficiency index of this "indifferent" firm x_C . Formally, x_C is given by:

$$\Delta \pi_{x_C} = \pi_{x_C}^{\beta>0} - \pi_{x_C}^{\beta=0} = 0 \quad (11)$$

$$\Leftrightarrow x_C = \beta^{-1} \left((1 + \beta)^{\frac{\rho-1}{\rho}} - 1 \right) \quad (12)$$

The conflicts of interests among producers induced by the entry tax generates however only two groups of firms. One is composed of firms that are hurt by the new regulation (firms between x_C and $x_i = 1$) and those that benefit from it (i.e. $x_i < x_C$). Indeed, the increase in the entry tax generates one positive effect (on the per firm demand) and one negative effect (on the fixed cost):

$$\frac{\partial \pi_i}{\partial \beta} = \underbrace{\frac{\mu}{\sigma \lambda} \frac{\rho-1}{\rho} (1 + \beta)^{\frac{-1}{\rho}} x_i^{1-\sigma}}_{\text{positive effect}} - \underbrace{F}_{\text{negative effect}}$$

The conflicts of interests arise as soon as the positive effect overcome the negative effect for

some firms, which is always true as long as some firms are productive enough. In order to assess the extent of conflicts of interests among producers, we next evaluate the profit shifting induced by the entry tax.

One convenient aspect of the quasi-linear utility function is that the total amount of expenditure spent over manufactured goods is constant and does not depend on consumer income. As a result, market shares lost by small firms are exactly equal to market shares won by large firms. Besides, the Pareto distribution induces the particular (and convenient) feature that the sum of entry fixed costs saved due to the non entry of some small firms is exactly equal to the extra fixed entry costs paid by the remaining active firms. Consequently, the sum of pure profits in this economy is constant, no matter the level of the tax entry implemented. To show this, we compute the sum of all pure profits with respect to x_E (and thus with respect to β). The aggregate pure profit in this sector is independent of β :

$$\int_0^{x_E} \pi(x)G(x)dx = \frac{\mu}{\sigma\lambda} \frac{1}{x_E^{\rho-1}} \int_0^{x_E} x^{-1}G(x)dx - \int_0^{x_E} (1 + \beta) FG(x)dx = \frac{\mu}{\sigma\rho} \quad (13)$$

It follows:

Lemma 1 *In this economy, the pure profit variation of any group of firms due to any entry tax is equal to the inverse of pure profit variation of all other firms.*

This lemma ensures that the increased pure profits of any group of firms is exactly equal to the pure profit loss of all other firms, which allows to focus on a profit shifting effect as the *unique* reason for private producers to lobby for the implementation of an entry tax. As a consequence, gains and losses of our two groups of firms can be summarized by computing the aggregate profit shifting in this sector with respect to β . This aggregate profit shifting shows how the conflicts of interest are stronger, the larger the entry tax, since this aggregate profit shifting is increasing

in β . We label $\Delta\pi_i(\beta)$ the variation of firm i 's pure profits from $\beta = 0$ to $\beta > 0$ and we get:

$$\int_{i \in \Theta} \Delta\pi_i(\beta) = 0 \quad \forall \Theta \quad (14)$$

$$\int_0^{x^C} \Delta\pi_i(\beta) = \frac{\mu}{\sigma\rho} \left((1 + \beta)^{\frac{\rho-1}{\rho}} - 1 \right)^\rho \beta^{1-\rho} > 0 \quad (15)$$

4 The political game

In order to make a clear comparison with the results obtained by GH and to assess the differences between the implementation of an entry tax and a vector of tariffs, we keep the same framework they have used for the political game. We thus consider a common agency game under complete information, with transferable utility, where the decision of the agent (here the government) affects its well-being as well as the well-being of the L set of principals (here the lobbies), when each of whom offers a menu of payments contingent on the action chosen by the government. This kind of game has first been introduced and analyzed by BW and has been further developed to model strategic lobbying to influence trade policy formation by GH. This framework is thus well-suited to study the incentives to lobby for the new kind of trade barriers. The aim is therefore to show how the properties of the equilibrium of this political game differ when studying a lobbying activity on an entry tax in a given sector with no specific inputs instead of a lobbying activity on tariffs in a multi-sector case with specific inputs, as in the PFS framework.

We first characterize each player, namely the government and the lobbies. We then present the equilibrium.

4.1 Government

As standard in this literature, the government maximizes an objective function, namely G , composed by the aggregate social welfare and the contributions effectively paid by the exogenous L organized lobbies. The objective function is benthamite. The coefficient “ ϕ ” is a measure of the relative weight of social welfare compared to private revenue. If $\phi \rightarrow \infty$, the government only

cares about social welfare and is totally insensitive to influence or bribes. In contrast, if $\phi = 0$, the government only cares about its private revenue. The objective function of the government is thus given by:

$$G(\beta) = \sum_{j \in L} C_j(\beta) + \phi W(\beta) \quad (16)$$

Where $\sum_{j \in L} C_j(\beta)$ represents the sum of contributions paid by the L active lobbies. The aggregate social welfare ($W(\beta)$), gross-of-contributions, is standardly defined as the sum of the aggregate income, plus the entry tax revenues, plus consumer surplus:¹²

$$W(\beta) = \left(\int_0^{x^E} \pi_i(\beta) + 1 \right) + \left(\beta F \frac{1}{(1 + \beta)} \right) + \left(\mu \ln \mu - \mu + \frac{\mu}{\sigma - 1} \ln \lambda \frac{\sigma}{\sigma - 1} (1 + \beta)^{\frac{1 - \rho}{\rho}} \right) \quad (17)$$

According to Lemma 1, the sum of pure profits ($\int_0^{x^E} \pi_i(\beta)$) in this framework is constant and independent of β . The aggregate income, net of entry tax revenues, thus remains unaffected by the implementation of an entry tax. An entry tax has thus only two effects on the social welfare: first, an entry tax hinders entry for the least efficient firms, which reduces the number of varieties available for consumers and thus has a negative impact on consumer utility. Second, the entry tax revenues raise consumers' income and thus reduces the negative effect of the entry tax on consumers' utility and social welfare.¹³ However, it is important to notice that the first (negative) effect always outweighs the second (positive) one, i.e. $\frac{\partial W(\beta)}{\partial \beta} < 0$ for any $\beta > 0$. It follows that an entry tax always reduces the aggregate social welfare, and the larger the entry tax implemented is, the larger the welfare loss. Formally, from a pure social perspective, there is thus no reason to implement a positive entry tax in this very simple framework.

The government has a direct interest for social welfare but is also concerned by its private revenue (the lobbies' contributions). The government evaluates all lobbies' proposals included in

¹²The number of active firms in equilibrium is simply given by $\frac{1}{(1 + \beta)}$

¹³We have decided to follow GH and the literature in assuming that the government earns the revenues from the entry tax. There are, however, TBTs that induce sunk costs for firms that the government cannot capture. We could have therefore assumed instead that the government cannot earn any revenue from the implementation of an entry tax. This alternative assumption would only increase the negative impact of the entry tax on the welfare but, in any case, it would not change the qualitative results presented in this paper, based on the profit shifting effect.

their contribution schedules and finally chooses the entry tax level that maximizes its objective function $G(\beta)$. Assuming that political contributions are differentiable around the equilibrium, this maximization implies that in equilibrium:

$$\sum_{j \in L} \frac{\partial C_j(\beta^*)}{\partial \beta^*} + \phi \frac{\partial W(\beta^*)}{\partial \beta^*} = 0 \quad (18)$$

where β^* denotes the equilibrium value of the entry tax.

4.2 Lobbies

We assume that there are L exogenous organized lobbies. Any lobby j ($j \in L$) maximizes its objective function G_j , which is simply the sum of the joint welfare of the lobby members, $W_j(\beta)$, net of the contributions paid to the government, $C_j(\beta)$:

$$G_j = W_j(\beta) - C_j(\beta)$$

where $W_j(\beta)$ is defined in the same way as the aggregate social welfare:

$$W_j(\beta) = \left(\sum_{i \in j} \pi_i(\beta) + \alpha_j \right) + \left(\alpha_j F \frac{\beta}{(1 + \beta)} \right) + \alpha_j \left(\mu \ln \mu - \mu + \frac{\mu}{\sigma - 1} \ln \lambda \frac{\sigma}{\sigma - 1} (1 + \beta)^{\frac{1 - \rho}{\rho}} \right)$$

The objective function of any lobby j is composed of a producer interest which depends on the composition of its ownership and a consumer interest that has the same shape for all active lobbies. α_j represents the fraction of the total population represented by lobby j and defines the relative weight of the producer and consumer interests in the lobby's objective function. No assumption is made on the type or the number of firms represented by lobby j . Indeed, since we assume that there is no specific factor of production, we have *a priori* no reason to gather some particular firms together into the lobby.

As shown above, large firms have opposed interests to small firms over the implementation of an entry tax. However, the definition of large and small firms (given by $x_c(\beta)$), depends *in fine*

on the level of the entry tax, which ultimately depends on the government's decision and cannot be given *ex ante*. Put differently, we make no assumption on the shape of $\sum_{i \in j} \pi_i(\beta)$, which could therefore be potentially strictly increasing, strictly decreasing or non-monotonic in β . This depends on the size of firms represented by lobby j . It is worth noting that this contrasts with a tariff, since the producer interest of the lobby (represented by $\sum_{i \in j} \pi_i(\beta)$) is not necessarily strictly increasing in the level of the entry tax.

4.3 Equilibrium: Cannibalism and lobbying

In this simple setup, the incentive to lobby for the implementation of a positive entry tax only comes from the possibility for some large firms to absorb market shares of other smaller firms that would be forced to exit. Lobbies that are biased towards large firms would thus lobby for a positive entry tax, which creates a motive for lobbies biased towards small firms to propose contributions so as to make this entry tax as small as possible.

We refer to this mechanism as cannibalism since competition among lobbies arises *within* a given sector, which deeply contrasts with the exogenous convergence of interests of firms within sectors with respect to the implementation of a tariff.

4.3.1 Timing of events

The chronology of the game is the following. First, the efficiency index of each firm is drawn from the distribution $G(x)$. The L exogenous lobbies are then formed. The lobbying activity is perfectly free and costless. Each lobby proposes a contingent monetary contribution to the government for each possible level of the entry tax. This defines a contribution schedule. The equilibrium level of the entry tax (β^*) is then decided by the government. The government receives all contributions for the chosen level of β . To remain consistent with the PFS framework, we further assume that the government finally pays back to consumers revenues induced by the implemented policy. Finally, firms which can make positive profits produce.

4.3.2 Equilibrium

The equilibrium of this entry tax setting game is characterized by a set of conditions. The interpretation of these conditions is given below. We denote by L the set of all active lobbies in the sector and by Ξ the set of possible entry taxes.

BW have shown that the equilibrium of such a game characterized by:¹⁴

$\{C_j^*(\beta)_{j \in L}, \beta^*\}$ is a subgame-perfect Nash equilibrium of the entry tax policy game if and only if:

- (a) $C_j^*(\beta)$ is feasible for all $j \in L$.
- (b) β^* maximizes $\sum_{j \in L} C_j^*(\beta) + \phi W(\beta)$ on Ξ
- (c) β^* maximizes $\sum_{j \in L} C_j^*(\beta) + \phi W(\beta) + W_j(\beta) - C_j(\beta)$ on Ξ for every $j \in L$.
- (d) for every $j \in L$ there exists a $\beta^j \in \Xi$ that maximizes $\sum_{i \in L} C_i^*(\beta) + \phi W(\beta)$ on Ξ such that $C_j^*(\beta^j) = 0$

Condition (a) ensures that contributions can be neither negative nor greater than the total income of lobby members. Condition (b) states that the government chooses the level of the entry tax β so as to maximize its own welfare given the contributions of all lobbies. Condition (c) states that the joint surplus of the government and lobby j is maximized at β^* , otherwise lobby j could modify its contribution schedule so as to increase the joint surplus and would retain a fraction of this increased surplus. Finally, condition (d) states that lobby j contributes just enough to provide the government with the same welfare it would achieve if lobby j were not participating in the political game.

Condition (c) implies that the following first-order condition is satisfied at β^* :

$$\sum_{j \in L} \frac{\partial C_j(\beta^*)}{\partial \beta} + \phi \frac{\partial W(\beta^*)}{\partial \beta} + \frac{\partial W_j(\beta^*)}{\partial \beta} - \frac{\partial C_j(\beta^*)}{\partial \beta} = 0 \quad (19)$$

¹⁴See Lemma 2 in BW.

Condition (b) further implies that the following first-order condition is also satisfied:

$$\sum_{j \in L} \frac{\partial C_j(\beta^*)}{\partial \beta} + \phi \frac{\partial W(\beta^*)}{\partial \beta} = 0 \quad (20)$$

Taken together, these two conditions lead to:

$$\frac{\partial C_j(\beta^*)}{\partial \beta} - \frac{\partial W_j(\beta^*)}{\partial \beta} = 0 \quad (21)$$

This equation establishes that the contribution schedules are locally truthful around the equilibrium entry tax β^* . Each lobby sets a contribution schedule such that the marginal change in its contribution around the equilibrium β^* perfectly offsets the effect of the policy change on the lobby's gross welfare. Finally, substituting equation (21) into (20) allows us to get:

$$\sum_{j \in L} \frac{\partial W_j(\beta^*)}{\partial \beta} + \phi \frac{\partial W(\beta^*)}{\partial \beta} = 0 \quad (22)$$

This expression shows that the equilibrium of the game may be interpreted as the government maximizing the aggregate social welfare with weighting individuals represented by a lobby by a parameter $(1 + \phi)$ and the other unorganized individuals by a simple weight 1. This last equilibrium condition may be rewritten so as to isolate the total marginal gain and the total marginal loss of the lobbying activity in equilibrium:

$$\underbrace{\frac{\partial \sum_{j \in L} \sum_{i \in j} \pi_i(\beta)}{\partial \beta}}_{\text{marginal gain}} = \underbrace{\frac{F}{(1 + \beta)} \left(\frac{\sigma}{\sigma - 1} - \frac{1}{(1 + \beta)} \right)}_{\text{marginal loss}} \left(\sum_{j \in L} \alpha_j + \phi \right) \quad (23)$$

Any increase in $\sum_{j \in L} \alpha_j$ or ϕ reduces the equilibrium entry tax, everything else being equal, since they both increase the marginal loss induced for a given β . These effects are those expected since a higher ϕ increases the concern of the government for social welfare. Similarly, a larger $\sum_{j \in L} \alpha_j$ implies that the L lobbies represent a larger share of the total population. The weight of their consumer interest in their objective function is thus larger, and their motivation to get a large β

smaller.

Lemma 2 *The equilibrium entry tax β^* is larger, the lower $\sum_{j \in L} \alpha_j$ and ϕ .*

This comparative statics result is very intuitive. Since an entry tax necessarily lowers consumers' surplus, the more the lobbies and the government weigh the interest of consumers, the less inclined they are to accept a large entry tax. This result does not diverge from the conclusions of GH. However, while the impact of the share of population represented by lobbies is similar on the equilibrium of the political game, it has some distinct features on the competition among lobbies, as we will highlight in the next section.

The definition of the equilibrium entry tax in (22) also illustrates that if all firms were represented in equilibrium by a lobby, the equilibrium level of entry tax would be $\beta^* = 0$, due to the fact that $\sum_{j \in L} \sum_{i \in j} \Delta\pi_i(\beta) = \sum_{i \in \Theta} \Delta\pi_i(\beta) = 0, \forall \beta$. Therefore, large firms must be over-represented by lobbies for a positive entry tax to be possible.

Lemma 3 *The equilibrium entry tax is positive if and only if $\sum_{j \in L} \sum_{i \in j} \Delta\pi_i(\beta) > 0$.*

This result relies on the assumption that a TBT does not improve social welfare. In this set-up, the only motive for lobbying is the profit shifting effect, which has to be positive on aggregate to make possible a positive entry tax. The introduction of a social positive effect would temperate this result.¹⁵

Our results may be compared to those of Bombardini (2008). In a set-up similar to GH, she shows that a greater heterogeneity among firms implies *larger contributions*, which results in a greater *effective protection*. It is however worth noticing that in her model, there is a demand for implementing a tariff even absent any firm heterogeneity. In contrast, the incentive to lobby is uniquely based on the presence of heterogeneous firms in our framework. Indeed, if all firms

¹⁵In the remainder of the paper, we will focus on equilibria with a positive entry tax. Note that, instead of Do and Levchenko (2008), we do not assume that all firms are necessarily politically organized and that larger firms have an exogenous higher political power. We rather follow Bombardini (2008), who shows empirically that larger firms are more likely to be politically active than smaller ones.

were identical, they would be similarly affected by an additional entry tax. It would therefore be impossible to determine which firms would gain market shares and which firms would be forced to exit. As a consequence, it would be impossible to determine the incentives to lobby for or against a positive entry tax. The presence of heterogeneous firms therefore provides micro-foundations for such lobbying.

Proposition 1 *The only incentive to lobby for an entry tax is driven by the presence of heterogeneous firms.*

Firm heterogeneity is here the sole motivation for proposing *positive contributions*. However, it does not mean that the level of *effective protection* would be larger.¹⁶ To see this, note that lobbies with ownership biased towards large firms would contribute for a positive and potentially large entry tax. But lobbies with ownership biased towards small firms would contribute so as to make the entry tax as small as possible. It follows that the level of effective protection only comes from the relative strength of these two groups of lobbies, and nothing ensures that large positive contributions would generate a large effective protection.¹⁷

Proposition 2 *The level of effective protection is only determined by the bias of active lobbies towards large firms and is independent of the amount of positive contributions.*

It follows that an apparently organized sector (i.e. with large positive contributions according to Goldberg and Maggi, 1999) in the PFS framework could correspond to a sector with organized lobbies that are biased on aggregate *against* a given policy in our framework. This result is interesting to underline from an empirical point of view, since the interpretation of the correlation between the level of contributions made by a sector and its level of protection might be spurious if we consider other policy instruments than tariffs. This is important since empirical studies that have tested the PFS framework use data on NTBs (see Goldberg and Maggi, 1999; Gawande and

¹⁶We interpret the level of effective protection as the level of the entry tax which does not necessarily leads to protect domestic firms from the competition of foreign firms. See section 6 for details.

¹⁷In the PFS framework, the level of protection in a sector increases with the level of contributions, given the contributions made by the lobbies of the other sectors, which is not true here.

Bandyopadhyay, 2000; Mitra *et al.*, 2002; Bombardini, 2008) considering this kind of protection as *equivalent* to a tariff, which is shown here to be wrong as soon as at least part of NTBs apply to *all* producers, independently of their nationality.

An important point has to be made here. According to Bombardini (2008), large firms are more likely to make positive contributions, which is an argument used by Do and Levchenko (2008) to justify their assumption that larger firms have higher political power.¹⁸ The more general framework we use induces however a discrepancy between the level of lobbies' contributions and their political power, i.e. their weight in the determination of policies. Assume for instance that at the equilibrium β^* , there are two active lobbies p and u , such that $\frac{\partial W_p(\beta^*)}{\partial \beta} > 0$ and $\frac{\partial W_u(\beta^*)}{\partial \beta} < 0$. It follows that lobby p gathers some large productive firms while lobby u gathers smaller firms. Lobby p would benefit from a marginal increase in β while lobby u would benefit from a marginal decrease in β . Here, it is important to notice that, around β^* , there is a convergence of interest between lobby u and the government (since $\frac{\partial W(\beta^*)}{\partial \beta} < 0$). It follows, according to (22), that lobby p should compensate the government *and* lobby u welfare losses to increase marginally β , while lobby u should compensate lobby p welfare loss *minus* the government welfare gain to marginally decrease β . This asymmetry implies that the effectiveness of lobbies contributions differ as long as, around the equilibrium, some have convergence of interests with the government and others do not. It follows that large firms may contribute more, but this does not imply that they will have a higher political power. We therefore consider the assumption of the Do and Levchenko's political game as quite restrictive.

5 Competition among lobbies

As pointed out in the previous section, the equilibrium level of the entry tax is positively related to the aggregate bias of lobbies towards large firms and the bias of the lobbies and the government

¹⁸Do and Levchenko (2008), p12: "Bombardini (2008) documents that larger firms are more involved in lobbying activity, and thus one would expect them to have a higher weight in the determination of policies. Rather than assuming a specific bargaining game, this paper [...] modifies the basic median voter setup to allow for a connection between income and the effective number of votes".

towards their producer and private interests. However, this equilibrium level remains independent of the total amount of contributions received by the government, so we have *a priori* no clue on the way the surplus of this game is shared. As shown by Laussel and Breton (2001), the share of the surplus captured by the government is the result of the competition among lobbies. In this section, we show that the determinants of competition differ from those of the PFS framework, which results in a different sharing of the surplus.

In order to examine the equilibrium level of contributions, we must make an additional assumption on the shape of the lobbies' contribution schedules. The equilibrium presented in the section 3.3.2 can indeed be supported by many contribution schedules.¹⁹ For a clear comparison with the previous literature, we follow BW and GH and assume that lobbies propose contribution schedules to the government that are all truthful everywhere. This assumption is equivalent to:

$$\frac{\partial C_j(\beta)}{\partial \beta} - \frac{\partial W_j(\beta)}{\partial \beta} = 0 \quad \forall \beta \in \Xi \quad (24)$$

As shown by BW and further argued by GH, there are some reasons to focus on such contribution schedules. BW have shown that *“the set of best responses to any strategies played by one’s opponents includes a strategy that is truthful”*(GH). Besides, truthful strategies induce equilibria that are stable to non-binding communication among players, i.e. they are “coalition-proof”.

The truthfulness of the contribution schedule of any lobby j implies that this lobby chooses its contribution schedule such that:

$$C_j(\beta, B_j) = \max[W_j(\beta) - B_j, 0]$$

where B_j is a constant and can be interpreted as the net welfare of lobby j whenever this lobby makes a positive contribution to the government in equilibrium. As pointed out by GH, *“the lobby therefore wishes to make B_j as large as possible (and the contribution as small as possible), but without going so far as to induce the government to deviate from p^o [for us β^*] to some*

¹⁹The only requirement is that contribution schedules are locally differentiable around β^* .

alternative policy that might be damaging to its interests”.²⁰

BW have shown that the equilibrium level of each B_j , which ultimately determines how the surplus of the game between the government and the lobbies is shared, is chosen by each lobby j so as to make the government indifferent between the equilibrium entry tax β^* chosen if lobby j is active in the political game and the entry tax chosen by the government if lobby j was not active.

In the latter case, the government chooses an alternative entry tax $\hat{\beta}$ that maximizes its objective function, with a subset of active lobbies $S \subseteq L$ and $j \notin S$. The government chooses a level of tax entry $\hat{\beta}$ that maximizes its objective function for each possible coalition of lobbies belonging to the subset S . The contribution of lobby j must be such that the government receives a net payoff if lobby j is active that is at least equal to any net payoff it would get when contracting with any subset of lobbies in S .

Formally, we define $\overline{G}_L(\beta)$ as the highest net payoff the government could get when there is L active lobbies

$$\overline{G}_L(\beta) = \arg \max_{\beta} G_L(\beta)$$

We further define $\overline{\psi}_j \equiv \{S \subseteq L : j \notin S\}$. According to BW, it follows that each lobby j chooses its B_j such that the following equation is verified:

$$\overline{G}_L(\beta) = \max_{S \in \overline{\psi}_j} \overline{G}_S(\beta) \text{ for all } j \in L \quad (25)$$

Contributions of the L lobbies must thus satisfy a system of L simultaneous equations with L unknowns. Laussel and Breton (2001) call these L equations the fundamental equations. They provide a set of theoretical results to identify the structure of equilibrium payoffs (here the B_j s and G) in common agency games under complete information. The game we present here is just an application of this more general class of games. Their contribution emphasizes that the surplus of the game captured by the government comes from the competition among

²⁰In the original quote, B_i replaces B_j .

lobbies. "*...the agent's rent in this framework is the pure result of conflicting preferences among principals*".

In the PFS framework, the presence of factors of production specific to each sector together with the assumption that consumers own at most one specific factor leads to the presence of lobby-sectors. It follows that these lobbies have different interests *by definition* since each lobby asks for protection of its specific sector. However, the conflicts of interests among active lobbies only comes from a general equilibrium effect induced by their consumer interest, which provides an incentive to lobby for free trade policies (or even subsidies) in all other sectors. As a consequence, lobbies have divergent interests but the rivalry between them only comes from their consumer interests (what Baldwin and Robert-Nicoud (2006), call the 'ice-cream clause'). Their producer interests, while different, are never conflicting and except this 'ice-cream clause', the model could be thought as a juxtaposition of partial equilibria in each sector. As a consequence, the possibility that active lobbies represent only a negligible share of the population avoids any conflict of interests among them and they thus capture all the surplus of the political game (example 3 in GH). It follows that if lobbies represent a non-negligible share of the population, competition among lobbies necessarily increases with the number of active lobbies (i.e. the number of organized sectors). The two key determinants of competition among lobbies in the PFS framework are thus the share of the population represented by the lobbies and the number of active lobbies. Both increase the degree of rivalry between lobbies and thus the share of the surplus of the game captured by the government.

However, those determinants depend on the nature of the endogenous policy instrument studied by GH. Our framework indeed only differs from the PFS framework in the policy instrument considered. This unique difference however drastically alters the determinants of competition among lobbies.

Since we consider the incentives to lobby on an entry tax within a unique sector, the presence of a factor of production specific to this sector cannot help in defining an exogenous divergence of interest among lobbies. The conflicts of interests among them thus do not depend on the number of active lobbies *per se*. Besides, the endogenous instrument of protection simultaneously affects

their producer and consumer interests. It follows that in contrast to the multi-sectoral analysis developed in GH, the producer interest of the lobby is *by construction* in opposition with its consumer interest. Therefore, a larger share of the population represented by the active lobbies does not increase the degree of rivalry among them, and may even weaken it. Competition between lobbies thus only increases through a divergence in the lobbies' producer interests, which only depends on the composition of their ownership. It follows:

Proposition 3 *The competition among lobbies only comes from the divergence in the composition of their ownership. Assuming that $\sum_{j \in L} \alpha_j = 0$ does not suppress competition among active lobbies and could even foster it.*²¹

We have assumed so far no specific ownership composition for lobbies in our analysis. This has been motivated by the fact that the definition of large versus small firms (i.e. $x_C(\beta)$) cannot be given *ex ante*. This assumption allows to get general results that do not depend on lobbies' ownership composition, but this in turn avoids any possibility to solve for the fundamental equations. We therefore discuss few examples to foster intuition.

We first could consider that each lobby represents the interests of a firm at most. This would further imply, as in Bombardini (2008), that there are factors of production that are specific *to firms* and that consumers cannot hold more than one factor of production. In this case, if all firms are organized, all the surplus of the political game is captured by the government, since the conflicts of interests are maximum.

In contrast, we could rather consider that consumers are able to perfectly diversify their portfolio. In this case, there would be no competition among lobbies, whatever the number of active lobbies and the firms they represent, and they would capture all the surplus of this game.

It is however interesting to notice that, as Bombardini (2008) shows, “*both at the industry level and over all sectors, larger firms are more likely to participate in the political game and make larger contributions. The model predicts that larger firms are more likely to take part in the lobby. Making use of firm-level data, I show that this prediction is confirmed.*” Accordingly,

²¹See details in appendix A.

large firms are likely to be better organized than small firms, resulting in a positive protection because lobbies would be biased towards large firms. Our theoretical results are thus in line with her findings.

Maybe more interestingly, our model also provides another interpretation to the empirical result that larger firms, that are more likely to take part in the lobby, may also contribute more than small firms. This does not mean, however, that they will get more political power. Contributions of large firms are indeed less effective marginally than contributions of small firms and on aggregate, despite they may devote more resources to the lobbying activity, they may pay more without enjoying a larger political power.²²

A last but important consideration on lobbies' ownership composition is related to a possible endogenous lobbies formation, independent of any fixed cost in participating to the lobbying activity. As we mentioned earlier, it is not possible to *ex ante* define large versus small firms. However, in international negotiations, countries generally bargain over the adoption of a given standard. Therefore, lobbying activity simply consists in supporting or opposing this adoption. If this would had been the case in our game setting, the game would had been necessarily two-sided, inducing two groups of lobbies with comonotonic preferences.²³ In this situation, each firm's owner would be able to *ex ante* know its preferred outcome because the level of the potential β is known. Each firm would then join the lobby that is the most congruent with its interests. The lobbies' composition would then depend on the level of the potential entry tax. It is finally worth noting that the government has an interest in announcing first a precise level of entry tax since this would trigger competition among lobbies, and as a result, would increase the rent captured by the government.

²²Appendix B provides an example for this possibility.

²³The definition of a two-sided common agency game is (see Laussel and Breton (2001)):

Definition 1 *A common agency game is two-sided if there exists a partition of L in two sets l and s such that for all $\beta_1, \beta_2 \in \Xi$: $[W_i(\beta_1) - W_i(\beta_2)][W_k(\beta_1) - W_k(\beta_2)] \geq 0$ if $i, k \in l$ or $i, k \in s$ and $[W_i(\beta_1) - W_i(\beta_2)][W_k(\beta_1) - W_k(\beta_2)] \leq 0$ if $i \in l$ and $k \in s$.*

6 Small open economy

The framework we have developed throughout this paper can be easily extended to a small open economy framework in line of the PFS model. Here, we present the main implications of the profit shifting effect for the determinants of protection in a small open economy.²⁴

In this situation, a subset of goods sold in this economy would be produced by foreign suppliers. As mentioned in the introduction, the implementation of a TBT cannot only be applied to foreign suppliers and must also affect domestic producers. We have however some reasons to think that most TBTs do not induce the same cost increase for domestic and foreign producers. There is indeed a clear incentive for governments to choose standards that are costlier for foreign suppliers, which would induce a protection of domestic producers from foreign competition. But it seems unlikely that such new standards induce new costs for foreign firms while being absolutely costless for domestic producers. It is important to notice that as long as the introduction of a standard induces an extra cost (even small) for domestic producers as well, the intra-sectoral conflicts of interests we underlined in the closed economy framework are still at work. As a consequence, there is no perfect convergence of interests among domestic producers and the assumption of a lobby-sector is still not valid. Since a difference in the extra cost domestic and foreign firms have to pay does not suppress the conflicts of interests among domestic producers, we will assume in the following, and for simplicity, that the implementation of the entry tax generates the same extra cost for domestic and foreign producers.

The presence of foreign suppliers on the domestic market induces a new effect compared to our closed economy setting: while the sum of all profits made by active firms is still constant, whatever the level of β , nothing ensures that this is true for the sum of all profits made by domestic firms. In this small open economy setting, we thus have two profit shifting effects induced by a positive entry tax: one from small to large firms, whatever their country of origin, and one that can go in either way; from domestic to foreign firms or vice versa. This only depends on the productivity of foreign firms compared to domestic firms. Since the sum of

²⁴For a somehow equivalent set-up fully developed in a general equilibrium with two countries, see Do and Levchenko (2008).

profits earned by domestic firms is no more constant, we have to rewrite the objective function of the government, taking into account this new effect. The social part of G becomes:

$$W(\beta) = \left(\sum_{i \in D} \pi_i(\beta) + 1 \right) + \beta F \frac{1}{(1 + \beta)} + \left(\mu \ln \mu - \mu + \frac{\mu}{\sigma-1} \ln \lambda \frac{\sigma}{\sigma-1} (1 + \beta)^{\frac{1-\rho}{\rho}} \right) \quad (26)$$

where D denotes the set of active firms owned by domestic households.

Hence, the implementation of an entry tax may increase or decrease the share of total profits earned by domestic suppliers. The sharing of total profits between domestic and foreign suppliers therefore depends on the productivity of domestic firms compared to the one of foreign firms.

To highlight this issue, we develop two extreme examples in appendixes C and D where foreign firms are either the most productive producers or the least productive producers.

In appendix C, we show that the possible profit shifting effect from foreign producers to domestic producer may generate, even in the absence of a positive direct social effect for consumers, the existence of a social optimum with a positive β .

In appendix D, we show that the opposite possible profit shifting effect may induce the import penetration ratio to be positively correlated with the level of the entry tax. Indeed, if foreign firms are the most productive and if among domestic firms, only the more productive are organized, they will benefit from the profit shifting effect at the expense of domestic firms. This will increase their market shares and by this the import penetration ratio. A TBT implementation might thus be positively correlated with the import penetration ratio. This possibility is at odds with the logic of the empirical tests of the PFS framework.

This new effect (a profit shifting effect that can go in either way) leads to new considerations when setting up an entry tax or other forms of regulations that induce a profit shifting effect. The crucial question is thus what the productivity of foreign suppliers is, i.e. do they benefit more from the profit shifting effect than domestic producers? It follows that the level of protection does not only depend on the import penetration ratio, as put forward by the literature, but also on the productivity of foreign suppliers. Moreover, this highlights the difficulty to assess whether a new standard has been implemented for a protectionist motive or not.

7 Conclusion

The New Political Economy literature has extensively studied the case of tariff negotiations. However a focus on Technical Barriers to Trade is of interest as their importance in governments' trade policies is on the rise. The model developed in this paper adapts the common agency game under complete information pioneered by Bernheim and Whinston (1986) and further extended by Grossman and Helpman (1994), to this new policy instrument.

Our results show that the underlying motives for lobbies to influence government's decisions over a level of TBTs largely differ from those that arise over tariffs. We first show that the motives for lobbying to set up TBTs still exist in a closed economy setting, since the lobbying activity over this instrument is motivated by a profit shifting effect. This new instrument thus shifts the competition among active lobbies from an inter-sectoral to an intra-sectoral competition, which leads to give up the "lobby sector" assumption.

While the model developed in this paper mainly relies on a closed economy analysis, we show that the main qualitative results can be easily extended to a small open economy. This leads to reconsider the determinants of the level of protection, since it is not only influenced negatively by the import penetration ratio in the sector, but also by the productivity of foreign competitors.

This paper therefore contributes to clarify the differences between tariffs and TBTs and the differences in the underlying political motives to implement them.

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A Decrease in $\sum_{j \in L} \alpha_j$ increases competition

Here, for simplicity, we assume there are only two lobbies, one gathering only highly productive firms, indexed by p and the other gathering only unproductive firms, indexed by u . According to (24), truthful contribution schedules are thus such that:

$$\begin{aligned}\frac{\partial C_p(\beta)}{\partial \beta} &= \frac{\partial \sum_{i \in p} \pi_i(\beta)}{\partial \beta} - \alpha_p \frac{F}{(1+\beta)} \left(\frac{\sigma}{\sigma-1} - \frac{1}{(1+\beta)} \right) \\ \frac{\partial C_u(\beta)}{\partial \beta} &= \frac{\partial \sum_{i \in u} \pi_i(\beta)}{\partial \beta} - \alpha_u \frac{F}{(1+\beta)} \left(\frac{\sigma}{\sigma-1} - \frac{1}{(1+\beta)} \right)\end{aligned}$$

We call $\widehat{\beta}_u$ the alternative entry tax that would prevail if lobby p was not active and $\widehat{\beta}_p$ if lobby u was not active. Our assumptions on the ownership composition of each lobby imply that $\widehat{\beta}_p > \beta^* > \widehat{\beta}_u$. Following Laussel and Breton (2001), each lobby's contribution is aimed at compensating the government for what it would have had otherwise. This yields a system of two fundamental equations.

From (25), assuming that both contributions are positive at β^* , we get $C_p(\beta^*, B_p^*)$ and $C_u(\beta^*, B_u^*)$:

$$\begin{aligned}C_p(\beta^*, B_p^*) &= \phi \left(W(\widehat{\beta}_u) - W(\beta^*) \right) + \left(C_u(\widehat{\beta}_u, B_u^*) - C_u(\beta^*, B_u^*) \right) \\ C_u(\beta^*, B_u^*) &= \phi \left(W(\widehat{\beta}_p) - W(\beta^*) \right) + \left(C_p(\widehat{\beta}_p, B_p^*) - C_p(\beta^*, B_p^*) \right)\end{aligned}$$

The equilibrium contribution of lobby j (with $j = p, u$) must indeed compensate the government for the welfare variation induced by its participation, plus the variation of the other lobby's contribution compared to the situation where lobby j would not have been active.

It is immediate that the larger the gap between $\widehat{\beta}_p$ and $\widehat{\beta}_u$, the larger the two outside options of the government, the larger the contributions it receives and so tougher the competition between lobbies is. This depends on the divergence in lobbies' ownership composition, which ultimately defines their preferred entry tax level.

Assume next that $\alpha_u = 0$ and that $\alpha_p > 0$ ($\sum_{j \in L} \alpha_j > 0$) and that there exists an equilibrium

with $\beta^* > 0$. Then, turn to a situation where $\sum_{j \in L} \alpha_j = 0$. This yields to an increase of $\hat{\beta}_p$ (since $\frac{\partial W_p(\beta)}{\partial \beta} \Big|_{\alpha_p=0} > \frac{\partial W_p(\beta)}{\partial \beta} \Big|_{\alpha_p>0}$) with no change of $\hat{\beta}_u$. As a consequence, this increases competition between the two lobbies.

B Larger firms pay more and may not have more political power

We keep the framework previously presented in which two lobbies, one gathering large firms and one gathering small firms, are active. Using the equilibrium contributions defined in appendix A, the condition $C_p(\beta^*) > C_u(\beta^*)$, assuming that both contributions are non nil at β^* , may be rewritten as:

$$\phi \left[W(\hat{\beta}_p) - W(\hat{\beta}_u) \right] - W_u(\hat{\beta}_u) + W_p(\hat{\beta}_p) > W_p(\beta^*) - W_u(\beta^*)$$

Where $W_j(\beta)$, $j = u, p$, represents welfare of lobby j .

We further provide one definition of the relative political power of two lobbies, based on their relative ability to capture a larger share of the rent:

Definition 2 (Rent extraction) *A lobby i is assumed to have more political power than a lobby j iff $B_i > B_j$.*

The condition $B_p < B_u$ corresponds to the following inequality:

$$\phi \left[W(\hat{\beta}_p) - W(\hat{\beta}_u) \right] - W_u(\hat{\beta}_u) + W_p(\hat{\beta}_p) < 0$$

If $W_p(\beta^*) - W_u(\beta^*) < \phi \left[W(\hat{\beta}_p) - W(\hat{\beta}_u) \right] - W_u(\hat{\beta}_u) - W_p(\hat{\beta}_p) < 0$, the lobby gathering large firms will contribute more, while it will capture a lower share of the rent.

There is therefore no reason to assume that larger contributions necessarily lead to a higher political power.

C Possible existence of a social optimum in a small open economy

We consider a simple stylized situation where we assume that all firms ranging from a given level x_F to 1 are foreign firms, whereas all the other are domestic firms (from 0 to x_F). We assume that foreign firms' profits are not valued by the domestic government. Consequently, the total profits earned by domestic firms is increasing in β .

The total profit earned by domestic firms if all firms ranging from x_f to 1 are foreign is given by

$$\begin{aligned} \sum_{i \in D} \pi_i(\beta) &= \int_0^{x_F} \pi_i(\beta) = \int_0^{x_F} F \frac{x_i^{-1}}{x_E^{\rho-1}} - (1 + \beta)G(x) dx \\ &\Leftrightarrow \\ \int_0^{x_F} \pi_i(\beta) &= F \left[\frac{1}{\rho-1} (x_F(1 + \beta)^{1/\rho})^{\rho-1} \rho - (1 + \beta)x_F^\rho \right] \end{aligned} \quad (27)$$

Given the effect of β on the total domestic profits, we obtain the derivative of the social welfare with respect to β (see 26):

$$\frac{\partial W(\beta)}{\partial \beta} = F \left[x_F^{\rho-1} (1 + \beta)^{-1/\rho} - x_F^\rho - \frac{\sigma}{(\sigma-1)(1+\beta)} + \frac{1}{(1+\beta)^2} \right]$$

As soon as $\lim_{\beta \rightarrow 0} \frac{\partial W(\beta)}{\partial \beta} > 0$, a social optimum exists.

$$\begin{aligned} \lim_{\beta \rightarrow 0} \frac{\partial W(\beta)}{\partial \beta} &= F \left[x_F^{\rho-1} (1 - x_F) - \frac{1}{\sigma-1} \right] \\ \lim_{\beta \rightarrow 0} \frac{\partial W(\beta)}{\partial \beta} &> 0 \text{ iff } x_F^{\rho-1} (1 - x_F) > \frac{1}{\sigma-1} \end{aligned}$$

Taking a large enough σ is sufficient for this last condition to hold.

This result is important as it unambiguously shows that a country could have an incentive to set a positive level of protection through TBT's, even if they do not have any positive direct effect

on social welfare. This possibility only depends on the productivity of foreign firms compared to the productivity of domestic firms. A testable implication would be that one would observe more stringent regulations in more remote countries. Indeed, the higher the transport costs are, the higher the probability that foreign firms are among the least productive active firms in this market.

D Rise in the import penetration ratio

Here we assume there is only one organized lobby. We further assume, instead of appendix C, that all firms comprised between $x_i = 0$ and $x_i = x_F$ are foreign firms. Foreign firms are thus the most productive. We further assume that all firms between x_F and x_T are domestic and organized in one lobby, labeled d, with $\alpha_d = 0$. The other domestic firms are unorganized.

The equilibrium β^* is such that:

$$\frac{\partial W_d(\beta^*)}{\partial \beta} + \phi \frac{\partial W(\beta^*)}{\partial \beta} = 0$$

It is possible to compute the gross of contributions welfare of the lobby:

$$W_d(\beta) = \sum_{i \in d} \pi_i(\beta) = \int_{x_F}^{x_T} \pi_i = F \left[\frac{\rho}{\rho - 1} (1 + \beta)^{\frac{\rho-1}{\rho}} [x_T^{\rho-1} - x_F^{\rho-1}] - (1 + \beta) [x_T^\rho - x_F^\rho] \right]$$

The derivative of lobby's welfare with respect to β is:

$$\frac{\partial W_d(\beta^*)}{\partial \beta} = \frac{\partial \int_{x_F}^{x_T} \pi_i}{\partial \beta} = F \left[(x_T^{\rho-1} - x_F^{\rho-1}) (1 + \beta)^{-\frac{1}{\rho}} - (x_T^\rho - x_F^\rho) \right]$$

As soon as ϕ is small enough, a positive β^* exists. Moreover, the range of β for which profits of the domestic lobby (and so its welfare) are increasing is $\beta \in [0; \beta_d]$ with β_d given by:

$$1 + \beta_d = \left[\frac{x_T^\rho - x_F^\rho}{x_T^{\rho-1} - x_F^{\rho-1}} \right]^{-\rho}$$

From appendix C, we know that the derivative of the total profits of foreign firms is:

$$\frac{\partial \int_0^{x_F} \pi_i}{\partial \beta} = F(x_F^{\rho-1}((1+\beta)^{-1/\rho} - x_F))$$

which is increasing on the range $\beta \in [0; \beta_F]$ with β_F given by: $1 + \beta_F = x_F^{-\rho}$. The condition that ensures that $\beta_d < \beta_F$ is simply $x_F < x_T$, which holds by assumption. Hence it is sure that $\beta^* \in [0; \beta_F]$. As a consequence, foreign profits rise whereas the total profits are constant. This corresponds to an increase in both imports and the import penetration ratio.