Profit shifting and Foreign entry restrictions

– Job Market paper –

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November 15, 2015

Abstract

Tariffs have almost completely disappeared but various foreign entry restrictions remain for multinationals. Many trade agreements and Bilateral Investment Treaties (BITs) have been signed to lower tariffs and reduce the risks of expropriation. Why do we see so few agreements removing FDI entry barriers? In this paper I develop a model in which governments can restrict the entry of foreign affiliates and multinationals can shift their profits across countries. I first demonstrate that the possibility for multinationals to repatriate their profits is a determinant of foreign entry restrictions. An agreement can solve for the resulting inefficiency. However, I show that an agreement is made unnecessary when (i) there is foreign lobbying that pushes for more entry, or when (ii) multinationals can use transfer pricing to shift profits to tax havens. Tax treaties that reduce profit shifting to tax havens are a first step towards agreements that reduce FDI barriers in the future. I conclude by providing empirical evidence that profit shifting affects the choice of FDI restrictions.

1 Introduction

Tariffs have almost completely disappeared but various foreign entry restrictions remain for multinationals (OECD 2010). A large number of trade agreements and Bilateral investment treaties (BITs) have been signed whereas few agreements reduce barriers to FDI. FDI is not covered by the WTO and BITs only deal with the risks once a multinational has established. Why do we see so few agreements removing FDI restrictions? While the determinants of tariffs and of trade agreements have been largely studied, there is little analysis of the determinants of barriers to FDI and of investment agreements. In this paper I focus on investment agreements that reduce direct FDI entry barriers whereas most existing investment agreements and BITs focus on equitable treatment and expropriation protection once the foreign affiliate has entered. I first demonstrate that the possibility for multinationals to repatriate their profits is a determinant of foreign entry restrictions. These profits are not taken into account by governments when choosing their policies. I show that an agreement can solve for the resulting inefficiency. However the presence of foreign lobbying and of tax havens can make an agreement unnecessary to reduce FDI barriers. Foreign lobbying pushes for more entry and can lead to the same outcome as an agreement. The possibility for multinationals to shift profits using transfer pricing towards tax havens makes the non-cooperative outcome always Pareto-efficient. There is no scope for cooperation any more. Profit shifting towards tax havens has been extensively used by multinationals in recent years. In addition to reducing governments' tax revenues, I show that it can lead to high FDI barriers and makes an agreement unnecessary. Both foreign lobbying and tax havens can explain why we observe so few agreements that reduce FDI barriers.

I proceed in four steps. First I develop a model to study the economic and political determinants of foreign restrictions. Governments can restrict the entry of foreign affiliates and multinationals can shift their profits. I allow both national firms and foreign affiliates to give contributions to the government to influence its policy choice. I define the non-cooperative game between the two governments and find an economic rationale for foreign entry restrictions. Foreign affiliates decrease national firms' profits and relocate their profits abroad. However these profits are not taken into account by governments when choosing their FDI policies. Countries are trapped in a prisoner's dilemma when they set optimal restrictions non-cooperatively. Finally an agreement can help countries to internalize this inefficiency.

Second I show that foreign lobbying can lead to the same policy outcome as the terms of an agreement. Repatriation should be sufficiently limited and governments' valuation of foreign contributions sufficiently high. I also extend models that take foreign lobbying as given and I study the endogenous formation of sub-coalitions. I use a coalitional bargaining model and show that sub-coalitions can form between the government and one lobby only. When only national firms lobby, high restrictions are chosen and an agreement is always necessary to reduce barriers. On the contrary when only foreign firms lobby, lobbying is more likely to lead to the same outcome as in the agreement.

Third I study the role of transfer pricing that allows firms to shift part of their profits towards tax havens. Firms can choose an intra-firm price to shift their profits and avoid corporate taxation from the host country and the country of origin. I show that the non-cooperative outcome in a

world with tax havens is Pareto-efficient. There is no scope for cooperation given that firms do not repatriate profits in their country of origin any more. An agreement is always unnecessary. Tax havens can also explain why we observe few agreements that reduce barriers to FDI. Tax agreements that reduce the role of transfer pricing to tax havens are a first step towards more investment agreements.

I conclude by providing empirical evidence for the channel described in the first part. Profits relocation by multinationals affects FDI restrictions. I use two datasets that quantify restrictions: the OECD index of FDI restrictions and the World Bank index of foreign restrictions in the services sector. I build two proxies for the multinationals' behaviour: a weighted index of corporate tax rates and a weighted index of growth rates. I show that they significantly affect the level of restrictions. When studying both OECD and non-OECD countries, I show that corporate tax rates and growth opportunities in the host country are complement. Lower corporate tax rates only lead to higher policies if growth opportunities are present.

I contribute first to the literature about trade policies and trade agreements. Motives behind tariffs and trade agreements have been extensively studied through the terms-of-trade literature (Johnson (1953-54), Grossman and Helpman (1995), Bagwell and Staiger (1999)) and the commitment literature (Maggi and Rodriguez-Clare (1998, 2007)). More recently Ossa (2011) build on the Krugman 'new trade' model to show that countries impose inefficiently high tariffs in order to attract firms to locate and increase employment.Mrazova (2009, 2011) use oligopolistic models and show that profit-shifting from the foreign firms towards the domestic firms is a rationale for protectionism. I use a similar oligopolistic model to study the impact of consumer's taste for variety and firms' repatriation on FDI restrictions. Blanchard (2010) shows that international ownership can mitigate the reasons why countries choose inefficient policies such that a trade agreement can become unnecessary. In my paper I study direct barriers to FDI rather than tariffs and the role of investment agreements rather than trade agreements. Similarly to previous works, profit shifting is a determinant for trade barriers but it here happens inside multinationals that relocate profits from their affiliates towards the parents.

Lobbying as a determinant for trade policies and agreements has been extensively studied (Maggi and Rodriguez-Clare (1998, 2007), Grossman and Helpman (1994), Gawande et al. (2012))[1] but few papers focus on foreign lobbying. Several papers Conconi (2003), Antràs and Padró i Miquel (2011), Aidt and Hwang (2008) and Aidt and Hwang (2014) have highlighted the positive role of foreign influence on trade policies. Compared to the others Antràs and Padró i Miquel (2011) develops a political model with a voting mechanism and considers government to government pressures instead of a foreign lobbying channel. Empirical papers have shown the positive impact of foreign lobbying on trade barriers in the US (Gawande et al. (2006)) and on tourism and development in the Caribbean (Gawande et al. (2009)). In my paper I derive the conditions under which foreign lobbying can make an agreement unnecessary by pushing for more entry. Another contribution of the paper is to consider endogenous sub-coalitions between

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[1]Compared to Grossman and Helpman (1994) I show that governments might prefer an agreement over lobbying. Compared to Maggi and Rodriguez-Clare (1998, 2007), lobbying can do better than agreement through the presence of foreign lobbying.

some lobbies and the government.[2] Compared to Maggi and Rodriguez-Clare (1998), bargaining with more than two players is more difficult to model. I use the concept of "coalition bargaining equilibrium" from Compte and Jehiel (2010) and study the possible outcomes depending on which coalition emerges from the game.

Finally I discuss the effects of tax agreements on FDI. Evidence of a positive effect has proven elusive (Blonigen and Davies (2001), di Giovanni (2005), Davies (2004), Blonigen and Davies (2004), Blonigen et al. (2014)). In this paper I study the effect of profit shifting on FDI policies rather than on FDI flows. Profit shifting through transfer pricing has been shown to mainly benefit a few tax havens (Davies et al. (2014), Vicard (2015), Zucman (2014)). I show that the existence of tax havens lead to high FDI barriers and few agreements to reduce these barriers. Tax treaties that curb the few main tax havens or make transfer pricing very expensive are shown to reduce FDI barriers and make agreements more likely.

The paper is organized in four parts. After detailing the model, I first describe the non-cooperative game between the two countries when governments simultaneously choose their polices through a bargaining game with their lobbies. Then I discuss whether an agreement is necessary when foreign lobbying pushes for more entry. I then consider the possibility for firms to shift profits towards tax havens through transfer pricing. Finally the last part provides empirical evidence that higher profit shifting affects foreign restrictions.

2   A model of foreign entry restrictions

I consider two countries, Home and Foreign(*). The countries have symmetric economic and political structures. I first describe the economic and political system of country Home in detail.

2.1   Preferences, technology and industry equilibrium

Preferences   Demand functions are identical across countries. There are M firms that produce one good each in country Home. The number of firms is here determined by the government. The representative consumer of country Home has a quasilinear-quadratic preference of the form:

$$\mathbb{U}(q_0, \bar{q}) = q_0 + AQ - \frac{\delta}{2}Q^2 - \frac{1-\delta}{2}\sum_{i=1}^{M}q_i^2 \tag{2.1}$$

where q_i is the consumption of firm i's product, $\bar{q} = (q_1, ..., q_M)$ is Home's consumption vector, $Q = \sum_{i=1}^{M}q_i$ and q_0 is Home consumption of the numeraire good. The parameter δ is the substitution index between goods which ranges form 0 to 1. Consumers decreasingly value variety for higher value of the substitution index. When $\delta = 0$ goods are independent and consumers value a balanced consumption bundle. When $\delta = 1$ goods are homogenous and consumers do not care about variety. Maximizing utility, the inverse demand for firm i's good is

$$p_i = A - (1-\delta)q_i - \delta Q \tag{2.2}$$

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[2]In the paper I do not tackle the issue of lobby formation and the free-rider problem like Bombardini (2008). Considering that foreign affiliates and national firms can both form a lobby, I focus on the issue of endogenous sub-coalitions between the government and one lobby only.

with q_i the consumption of firm i's good and Q the aggregate consumption of all firms' goods.

Technology   The homogenous good is produced in the two countries but tariffs are assumed to be prohibitive or the goods are assumed to be non-tradable. Firms are born in a certain country and can open an affiliate in the other country to access foreign markets[3]. All firms are assumed tohave identical production capacity and sell the good at a same price. There is a total number of firms M from which M_n are national firms and the rest $M_f = M - M_n$ are affiliates from Foreign firms. In the rest of the paper I focus on the short-term equilibrium and assume that the number M_n of national firms is given at the beginning of the period and is exogenous. I follow the model of trade with oligopoly in Mrazova (2011) such that individual profits are positive.The strategic interaction between firms depends on the substitution index δ: the higher δ, the more direct is the competition between firms.

Each firm, either a national firm or a foreign affiliate, produces an individual quantity $q(M)$ and the total production is given by $Q = M \times q(M)$. All firms produce with constant returns to scale at the same marginal cost z in terms of the numeraire good. All firms are similar and solve $\max_q \pi = (p - z)q$. The first-order condition is

$$p - z - q = 0 \tag{2.3}$$

In the Cournot equilibrium,

$$p = \frac{A + z(1 + \delta(M - 1))}{2 + \delta(M - 1)} \quad \text{and} \quad q = \frac{A - z}{2 + \delta(M - 1)} \tag{2.4}$$

Prices and individual quantities are decreasing in the total number of firms and the substitution index.

Repatriation of profits   Foreign affiliates can repatriate part of their profits towards their country of origin. I denote by ϕ the fixed amount per unit of sales that is repatriated. A higher ϕ results in more repatriation. I do not explicitly model the choice of repatriation by multinationals[4]. In order to reptariate profits firms buy a certain input produced in their country of origin[5] or pay for intangible goods such as managerial oversight and planning, marketing know-how, intellectual property, or R&D capital (Atalay et al. (2014)).

The individual domestic profit of a Home firm is

$$\pi(M) = (P(M) - z)q(M) = \left(\frac{A - z}{2 + \delta(M - 1)}\right)^2 \tag{2.5}$$

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[3]Horizontal FDI especially applies for non-tradable goods ans services. The "non-tradability" of services has been quantified by "Jensen (2011). The paper uses the location of firms and their distance to consumers in the US to build such an index.

[4]In the last section I study the particular case of transfer pricing. The parameter ϕ is then defined as the intra-firm price that allows firms to shift profits for tax reasons. The level of corporate taxes and the existence or not of treaties about double taxation can affect the level of repatriated profits. The presence of tax havens also affects the level of profits that is redistributed in the host country. The growth opportunities in the host country can also push the multinational to decrease the share of repatriated profits. Foreign affiliates reinvest part of these profits to benefit from the future economic opportunities.

[5]This covers the provision of non-tradable services such as insurance, hotels, restaurants and retail for which a licence is required from the parent.

with $q(M)$ the individual production per firm when there are M producers and $P(M)$ the price of the good in the Home country.

The individual domestic profit of a Home affiliate from sales abroad that is redistributed at Home is

$$\pi^{rep}(M^*) = (\phi - z)q^*(M^*) = \frac{(\phi - z)(A - z)}{2 + \delta(M^* - 1)} \tag{2.6}$$

with $q^*(M^*)$ the individual production per firm when there are M^* producers and $P(M^*)$ the price given the policy M^* in the Foreign country.

The individual profit of an affiliate of a Foreign firm that is redistributed in the Home country is

$$\pi^{*f}(M) = (P(M) - \phi^*)q(M) = \frac{[(A - \phi^*) + (z - \phi^*)(1 + \delta(M - 1))][A - z]}{(2 + \delta(M - 1))^2} \tag{2.7}$$

with ϕ^* the parameter that defines the location of profits for a foreign affiliate.
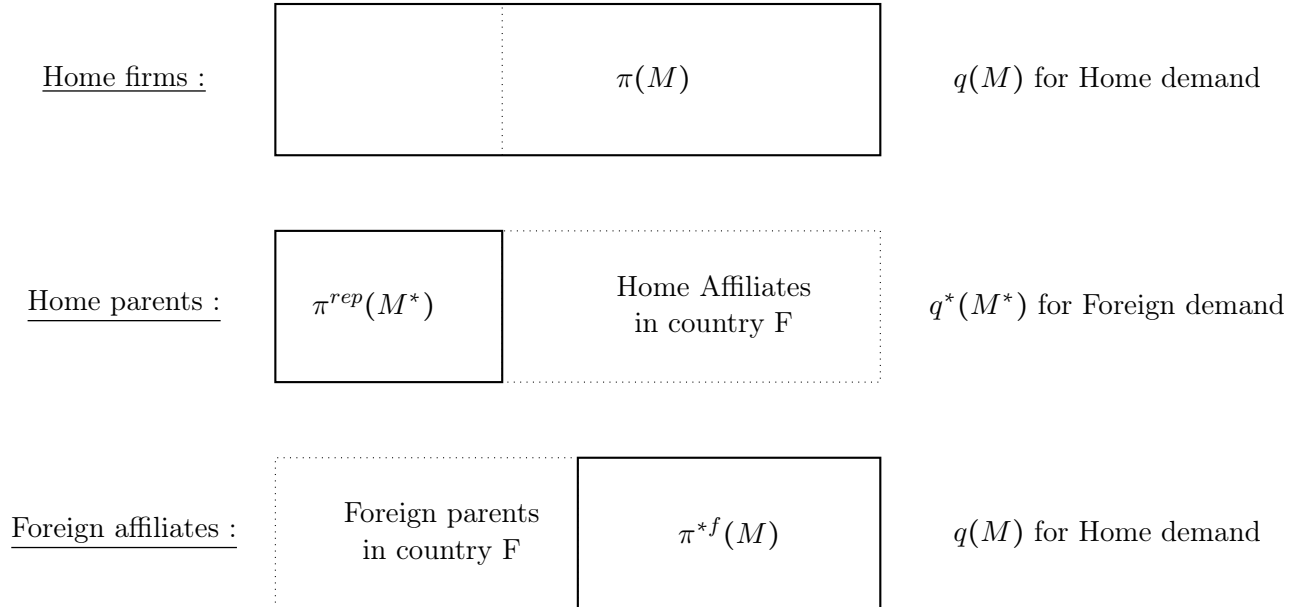
The individual profit of an affiliate of a Home firm that is redistributed in the Foreign country is

$$\pi^{f}(M^*) = (P^*(M^*) - \phi)q^*(M^*) = \frac{[(A - \phi) + (z - \phi)(1 + \delta(M^* - 1))][A - z]}{(2 + \delta(M^* - 1))^2} \tag{2.8}$$

with $q^*(M^*)$ the individual production per firm in the Foreign country and $P^*(M^*)$ the price given the policy M^* in the Foreign country.

The following figure represents the profits that are located at Home. National firms leave all their profits at Home, Home parents get a share of the sales from their affiliates abroad, and Foreign affiliates leave part of their profits in the host country.

Figure 1: Profits redistributed at Home

The location of profits by multinationals creates a difference between national firms and foreign affiliates. All firms have the same individual production, sell at a same price but do not redistribute the same amount of profits at Home.

For the rest of the paper I assume $M_n = M_n^*$ and $\phi = \phi^*$.

The FDI policy   The only policy instrument of the government is a market access restriction in the production sector. The government chooses the final number M of firms to restrict the entry of foreign producers that directly compete with national producers. More precisely, the government takes as given the number of national firms M_n and sets a value for M which directly determines the number of foreign affiliates allowed to produce in the country.

2.2   The political game

In this paper I introduce the possibility for lobbies to be formed and exert an influence on the government.

2.2.1   The lobbies

I assume that firms are able to coalesce in a lobby in order to affect the FDI policy chosen by the government. I assume that there are two lobbies in each country, the lobby of national firms ("the national lobby") and the lobby of foreign affiliates ("the foreign lobby"). Each lobby can give contributions to the government at the time when the government chooses the FDI policy. The national and foreign lobbies have different objective functions.

The national lobby's objective is given by:

$$L(M, c) = M_n \pi(M) - c$$

with c its contribution to the government. National firms value protection against foreign entry at Home. Indeed a higher number of total firms M producing at Home implies a lower price and therefore a lower profit for national firms at Home ($\frac{d\pi(M)}{dM} < 0$). The national lobby gives contributions in order to increase the restrictions on foreign entry and lower the choice of the final number M.

The foreign lobby's objective is given by:

$$L^f(M, c^f) = (M - M_n)\pi^{*f}(M) - c^f$$

with c^f its contribution to the government. On the contrary, foreign affiliates value either less or more protection. More entry increases the number of foreign affiliates. However individual affiliates' profits decrease in the number of total firms M. The foreign lobby represents the sum of all foreign affiliates' profits and might decrease in the number of firms if individual profits decrease too quickly. Foreign lobby might either push towards more protection like national firms or value more foreign entry.

The intuitions that are not explicitly modelled are the following. Foreign firms do not enter a foreign market at the same time. Multinationals that enter first lobby value more restrictions whereas those that are among the last want to decrease restrictions to enter the market. The presence of conflicting interests is here represented by a foreign lobby that maximises the aggregate profit of all potential affiliates. The lobby pushes for more entry when an additional entry creates more than the sum of the individual loses due to the decreasing profit. On the contrary

it pushes for less entry if the sum of the individual loses is higher than one more entry. Lower barriers are preferred if :

$$\underbrace{\pi^{*f}(M)}_{\text{extensive margin}} \geq \underbrace{-(M - M_n)\pi^{*f'}(M)}_{\text{intensive margin}}$$

2.2.2   The government

The government chooses the FDI policy, i.e. the number of total firms, and whether to bargain with the two lobbies or not. When there is no lobby, the government maximizes the utility of the consumer. The social welfare is given by

$$W(M, M^*) = CS(M) + \underbrace{\widetilde{\Pi}(M, M^*)}_{\text{national PS}} + \underbrace{\Pi^{*f}(M)}_{\text{foreign affiliates' PS}}$$

The producer surpluses are the profits that are redistributed to the domestic consumer. The profits from domestic sales that are repatriated are redistributed to the foreign consumer and do not enter the social welfare W. $\widetilde{\Pi}(M, M^*)$ denotes the sum of the profits from the domestic sales of the M_n national firms and the repatriated profits from the foreign sales of their affiliates abroad ($\widetilde{\Pi}(M, M^*) = M_n\pi(M) + (M^* - M_n^*)\pi^{rep}(M^*)$). $\Pi^{f*}(M)$ denotes the aggregate profits of the foreign affiliates that are not repatriated ($\Pi^{f*}(M) = (M - M_n)\pi^{*f}(M)$).

Following Grossman and Helpman (1994), I assume that the government differently values the domestic social welfare and the political contributions. An additional difference between national and foreign affiliates is introduced here. I assume a preference or an aversion towards foreign influence. Following Gawande et al. (2006), I model this preference/aversion by a government's valuation of contributions that differs across lobbies.

When the government accepts contributions from the lobbies, his objective is a weighted average of his previous social welfare and the contributions:[6]

$$\mathbb{G}(M, M^*, c, c^f) = aW(M, M^*) + c + \gamma c^f$$

with γ is the government's valuation of foreign contributions with $\gamma \geq 0$.

In this part, firms' nationality is the source of another difference between national and foreign firms. The first difference comes from the location of redistributed profits that differs between national firms and foreign affiliates. The second difference comes from the different government's valuation of contributions. A unit of contributions is differently valued by the government. Several explanations can be given to support this assumption. First governments might be averse to foreign influence. Foreign contributions might receive more media coverage and hurt the future political opportunities of a government. In that case the weight γ can be seen as a probability to be punished for receiving foreign contributions. Nationals firms might also be more efficient at influencing the government (same networks, same backgrounds, same codes, etc.) such that one unit of contribution from national firms has more value. On the contrary governments

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[6]Similarly to Grossman and Helpman (1994), I rewrite the initial weights (A, B, D) to have the following expression. Initially the expression is given by $G = AW() + Bc + Dc^f$ and is then rewritten $G = aW() + c + \gamma c^f$ with $a = \frac{A}{B-A}$ and $\gamma = \frac{D-A}{B-A}$ with $B > A$.

might value foreign influence more than national pressure. This happens when multinationals are from an influential country or from a country that the government might want to please. In this paper I study the impact of different government's valuation on the outcome of the political game.

This part ends the description of the economic and political structure of country Home. The two countries, Home (no *) and Foreign (*), are symmetric. I now consider the games played by the two countries to decide their FDI policies.

3 The non-cooperative game between the two governments

In this section, countries simultaneously decide their FDI policy (M) in a non-cooperative way. The policy is chosen through either a simple maximisation of the social welfare or a lobbying game. I describe here the outcome in country Home.

The timing There are two periods in this game. At the beginning, the number of national firms born in each country (M_n) is fixed. At $t = 1$ the government chooses the FDI policy, i.e the number of foreign affiliates that can enter the country, when playing the political game with the two lobbies or not. At $t = 2$, given the total numbers of firms (M), production and consumption happen.

The equilibrium is solved by backward induction starting from the production/consumption equilibrium at $t = 2$. There are no exports such that the price only depends on the domestic policy. The solutions are those of an oligopolistic setting with M firms. I now focus on the policy choice of the government at the period $t = 1$.

3.1 The non-cooperative game with no lobbying

I first consider the non-cooperative game when there is no lobbying. There is no contributions and lobbies do not exert an influence on the government. The FDI policy is chosen by maximizing the social welfare W. In this game, the government does not consider the impact of its choice on the policy of the other country. Given the policy in the other country M^*,

$$M_0 = \operatorname*{argmax}_{M} \quad W(M, M^*) \qquad \text{st.} \qquad M_n \leq M \leq 2M_n \qquad (3.1)$$

M_0 does not depend on M^* because of the linearity of the profits.

Lemma 1 *In the non-cooperative game with no lobbying, FDI policies are increasing in the taste for variety (i.e decreasing in the substitution index δ) and*

$$\text{if } \delta = 1 \ (homogenous \ goods) \quad , \quad M_0 = M_0^* = \min\left(2M_n, \max\left(\frac{(A - \phi) - M_n(\phi - z)}{(1 + M_n)(\phi - z)}, M_n\right)\right)$$
$$\text{if } \delta = 0 \ (independent \ goods) \quad , \quad M_0 = M_0^* = 2M_n$$

There exists a threshold δ_0 such that FDI policies are always free-entry ($= 2M_n$) when consumers sufficiently care for variety ($\delta \leq \delta_0$).

Proof. Existence of δ_0 comes from $\frac{\partial M_0}{\partial \delta} < 0$. ∎

Lemma 1 provides a necessary condition for restrictions to be chosen. Consumers that care a lot about variety have a low substitution index. For $\delta = 0$, every firm is a monopolist in its own market and profits do not decrease in the number of firms any more. Governments then choose high entry which increases the consumer surplus and the foreign producers' surplus without decreasing the national producers' surplus. For $\delta = 1$ profits decrease in the number of firms and the government takes into account the producers' loses.

For the rest of the paper I focus on homogenous goods ($\delta = 1$). Consumer have little taste for variety and competition between firms is high. FDI might be restricted.

Lemma 2 *In the non-cooperative game with no lobbying, FDI policies are decreasing in the repatriation of profits (ϕ). There exists a threshold ϕ_0 such that FDI policies are not restricted when repatriation is sufficiently low ($\phi \leq \phi_0$).*

Proof. Existence of ϕ_0 comes from $\frac{\partial M_0}{\partial \phi} < 0$. I have $\phi_0 = z + \frac{A + z(M_n + 1)}{1 + 2M_n(1 + M_n)}$. ∎

Repatriation of profits defines a first economic motive for foreign restrictions. Foreign affiliates enter the country, compete with national firms and therefore decrease national firms' individual profits. In addition foreign affiliates only redistribute a share of the profits coming from Home sales. The revenue of the Home consumer might decrease if the additional revenues from foreign firms do not compensate the loses from the national firms. The rest of foreign affiliates' profits is repatriated and benefits the Foreign consumer. In the absence of repatriation of profits ($\phi = z$), governments always choose free-entry to tend towards perfect competition. However the number of affiliates is restricted by the number of foreign firms (M_n) that can open an affiliate. In this paper, for simplicity, I assume that there is no cost of opening an affiliate[7]. Here governments choose to restrict entry to balance the benefits from more entry which decreases prices and the revenue loses due to the repatriation of profits. However entry is not restricted if repatriation of profits is low enough.

Entry decreases in the number of national firms (M_n). A larger number of national firms M_n increases the weight on individual profits, which decrease in the number of foreign firms. The government values more individual profits and tend to decrease entry.

Definition 1 *Internationally efficient FDI policies maximise world welfare (the sum of the two countries' welfare): $max_{(M, M^*)} W(M, M^*) + W^*(M^*, M)$ where W is the welfare of country H and W^* the welfare of country F.*

Proposition 1 *The non-cooperative equilibrium with no lobbying is inefficient when profits are largely repatriated ($\phi \geq \phi_0$).*

Proof. The set of Pareto-improving outcomes is given by the interval $[M_0, 2M_n]^2$. ∎

In the non-cooperative game, governments do not internalize the impact of their policy on the utility of the other government. The Home government only considers foreign affiliates' profits that benefit the Home consumer. However the Home consumer benefits from repatriated profits

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[7]This assumption does not affect the results of this paper given that all firms are the same. Further work should be done to relax this assumption and study heterogenous firms when a cost affects entry. It would also change the objective of the lobby.

from abroad that are not taken into account. Higher entry in the Foreign country implies more Home firms opening an affiliate abroad and therefore more repatriated profits. Both consumers could then benefit from higher entries in the two countries. This leads the equilibrium to be inefficient However, the number of additional foreign firms that enter the country is limited by the number of firms abroad ($M \leq 2M_n$). When the constraint is binding ($M_0 = 2M_n$), the equilibrium is efficient.

3.2 The non-cooperative game with lobbying

I now consider the non-cooperative game between the two governments when each government plays a political game. At $t = 1$, the government and the two lobbies can bargain to determine the policy M. The lobbies give contributions to exert an influence on the government. In addition I assume that foreign and national contributions can be differently valued.

3.2.1 The bargaining game

Following Maggi and Rodriguez-Clare (1998)[8] I model the political game as a bargaining game between the government and the lobbies. I choose a bargaining game rather than a menu-auction game and study equilibria where not all players bargain. I could have considered different cases in which foreign firms are allowed or not to lobby the government. However, the presence of foreign lobbying is important in my paper and the endogenous formation of bargaining coalitions enriches the results.

Whereas it is easy to model a bargaining game between two players, a game with three players is more demanding. I then use the concept of "coalitional bargaining" developed in Compte and Jehiel (2010). This definition can be applied to bargaining games with any number of players and is conceptually close to the definition used for two players. The difference comes from the possibility for any subset of players to deviate from the grand coalition and form a sub-coalition. In my paper, there are three possible outcomes: the grand coalition with the three players, the sub-coalition between the government and the national lobby called "the national sub-coalition" and the sub-coalition between the government and the foreign lobby called "the foreign sub-coalition". The two lobbies cannot coordinate not to participate in the bargaining game. The grand coalition solution maximises the Nash product for the three players, and additional constraints on the final allocations verify that none of the subsets of two players wants to deviate. The equilibrium is the solution of the Nash product maximisation given these constraints that allow the grand coalition to be stable. A sub-coalition can therefore form if the grand coalition equilibrium has no solution. I discuss these possibilities later.

Definition 2 (Bargaining in the grand coalition) *Given the policy in the other country M^*, the policy and contributions that are solutions of the bargaining game between the government*

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[8]There are two possibilities to model this political game: the menu-auction game or the bargaining game. They are relatively close and differ only in the way to divide the joint surplus between the different players. In the menu-auction game, the government always gets his outside option, whereas in the bargaining game he gets a share of the joint surplus that depends on his bargaining power.

and the two lobbies maximise the following constrained Nash product:

$$(M^G, c^G, c^{fG}) = \quad \text{argmax} \quad [G(M, M^*, c, c^f) - M_0]^{\sigma_G} [L(M, c) - L_0]^{\sigma_N} [L^f(M, c^f) - L_0^f]^{\sigma_F}$$

$$st. \quad G(.) + L(.) \geq \mathbb{J}^{\mathbb{N}} \quad \textit{(binding national sub-coalition)}$$

$$G(.) + L^f(.) \geq \mathbb{J}^{\mathbb{F}} \quad \textit{(binding foreign sub-coalition)}$$

with M_0 the outside option of the government, L_0 (L_0^f) the outside option of the national lobby (of the foreign lobby) and $\mathbb{J}^{\mathbb{N}}$ $(\mathbb{J}^{\mathbb{F}})$ the joint surplus of the two players in the national sub-coalition (in the foreign sub-coalition). σ_G is the bargaining power of the government.

In the grand coalition, the solution of the Nash product is efficient and maximizes the joint surplus of the grand coalition[9]:

$$M^G \quad st. \quad aW'(M^G) + \Pi'(M^G) + \gamma \Pi^{*f'}(M^G) = 0 \quad \wedge \quad M_n \leq M^G \leq 2M_n \qquad (3.2)$$

I then define the policies in the sub-coalitions in order to get the outside options and the joint surpluses of the sub-coalitions ($\mathbb{J}^{\mathbb{N}}$ and $\mathbb{J}^{\mathbb{F}}$) in the constraints.

Lemma 3 *The solution in the bargaining game with the national sub-coalition maximizes the joint surplus of the sub-coalition and is given by:*

$$M^N \quad st. \quad aW'(M^N, M^*) + \Pi'(M^N) = 0 \quad \wedge \quad M_n \leq M^N \leq 2M_n \qquad (3.3)$$

The solution in the bargaining game with foreign sub-coalition maximizes the joint surplus of the sub-coalition and is given by:

$$M^F \quad st. \quad aW'(M^F, M^*) + \gamma \Pi^{*f'}(M^F) = 0 \quad \wedge \quad M_n \leq M^F \leq 2M_n \qquad (3.4)$$

Proof. Details about the bargaining games in the sub-coalitions and the full expressions of the policies are in Annex 8.3.1. ∎

The bargaining game is defined by the FDI policy M^G and the allocations $(G(.), L(.), L^f(.))$ for the three players that depend on the contributions (c^G, c^{fG}). These allocations are defined either through the maximization of the Nash product according to each player's bargaining power or through the binding constraints. The final allocations depend both on the bargaining powers of the government and the two lobbies, and on the outside options of each player. The outside option of the government is given by the FDI policy M_0 defined previously. The outside option of the national lobby is given by the utility obtained when it does not participate to the lobbying game. Its outside option is $L_0 = M_n \pi(M^F)$ with M^F the policy chosen in the foreign sub-coalition from Lemma 3. The outside option of the foreign lobby is similarly defined by $L_0^f = (M^N - M_n)\pi^{*f}(M^N))$ with M_N the policy chosen by the national sub-coalition.

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[9]The joint surplus of the grand coalition needs to be clarified given that it depends on the level of foreign contributions c^f. The joint surplus is $aW() + \Pi() + (\gamma - 1)c^f + \Pi^f()$. The details for the full expression of the joint surplus are given in the Appendix.

3.2.2 Equilibrium when contributions are equally valued ($\gamma = 1$)

I present here the outcome of the non-cooperative equilibrium between the two governments when each government can play a bargaining game. I assume first that foreign and national contributions are equally valued ($\gamma = 1$) then I relax this assumption in the next part. For simplicity I also assume that the government's bargaining power is null ($\sigma_G = 0$)[10].

Definition 3 *The equilibrium is defined by a pair of FDI policies, national and foreign contributions for each government that are solutions of the two bargaining games, and by prices and quantities defined previously in the Cournot equilibrium.*

Proposition 2 *The equilibrium when contributions are equally valued ($\gamma = 1$) has a solution with the grand-coalition bargaining. The FDI policies are given by:*

$$M^G = M^{\star G} = \min\left(2M_n, \max\left(\frac{(a+1)[(A-\phi) + M_n(z-\phi)]}{(A-z) + (1+M_n)(a+1)(\phi-z)}, M_n\right)\right) \qquad (3.5)$$

The Home government's allocation is given by: $G(M^G, M^{\star G}, c^G, c^{fG})$

$$= \begin{cases} aW(M_0, M_0^*) \wedge c^G, c^{fG} \geq 0 & \text{if at most one sub-coalition is binding and } M^G < M_0 \\ aW(M^G, M^{\star G}) \wedge c^G, c^{fG} = 0 & \text{if at most one sub-coalition is binding and } M^G \geq M_0 \\ \mathbb{J}^{\mathbb{N}} + \mathbb{J}^{\mathbb{F}} - \mathbb{J}^{\mathbb{G}} & \text{if the two sub-coalitions are binding.} \end{cases}$$

The Foreign government's allocation is symmetric.

Proof. The grand coalition is always the solution for $\gamma = 1$. A sub-coalition can not lead to a higher total surplus: $\mathbb{J}^{\mathbb{N}}(M^N, M^*) + \Pi^{*f}(M^N) < \mathbb{J}^{\mathbb{N}}(M^G, M^*) + \Pi^{*f}(M^G)$ and $\mathbb{J}^{\mathbb{F}}(M^F, M^*) + \Pi^{*f}(M^F) < \mathbb{J}^{\mathbb{F}}(M^G, M^*) + \Pi(M^G)$. More details in Appendix 8.3.1. $\blacksquare$

The grand coalition with the three players is the equilibrium coalition when both national and foreign contributions are equally valued ($\gamma = 1$). In the previous part restrictions were chosen because of repatriation of profits. I now also consider political forces that can exert an influence on governments. The absence of repatriation of profits is not sufficient to have free-entry any more. The effect of lobbying mainly depends on the foreign affiliates' lobby that can strive for two opposite objectives: more entry or higher restrictions to increase individual profits. The government has a null bargaining power ($\sigma_G = 0$) and only gets its outside option defined in the game with no lobbying. However entry in the grand coalition can be higher than entry when there is no lobbying ($M^G \geq M_0$) which was restricted because of the repatriation of profits. The utility of the government is then higher than in its outside option ($aW(M^G, M^{\star G}) > aW(M_0, M_0^*)$) and contributions are not necessary to compensate the governments for playing the political game.

Lemma 4 *A higher level of repatriation of profits results in lower entry, i.e. higher restrictions, in the two countries.*

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[10]This assumption is not restrictive. In this paper I do not discuss whether governments prefer either playing the political game to receive contributions or committing in an agreement. Maggi and Rodriguez-Clare (1998) show that there exists a threshold that can explain why some governments sign agreements or not.

Proof. I show that $\frac{\partial M^G}{\partial \phi} \geq 0$[11]. ∎

The economic motive for restrictions also applies when the government plays a political game. A higher repatriation of profits provides incentives for the governments to restrict foreign entry. I now compare the FDI policies in the game without lobbying M_0 and the game with lobbying M^G. The outcome depends on the extent to which foreign lobbying counteracts national lobbying.

Proposition 3 *There exist a thresholds ϕ_L such that entry in the lobbying game is higher than entry in the no-lobbying game ($M^G \geq M_0$) when the repatriation of profits is limited $\phi < \phi_L$. Lobbying is then Pareto-improving compared to no lobbying.*

Proof. ϕ_L is defined by $M^G|_{\phi_L} = M_0$ given that $M^G|_{\phi=P(M^G)} < M_0$ and $M^G|_{\phi=z} > M_0$. When all profits are repatriated, foreign lobbying does not have an influence on the government. ∎

Proposition 3 defines the levels of repatriation for which foreign lobbying leads to higher entry than the outcome of the non-political game. According to Proposition 2, governments' allocations are given by their outside options and contributions are positive when foreign entry is lower than in the game without lobbying ($M^G < M_0$). On the contrary, the government gets more than his outside option if entry is higher ($M^G \geq M_0$). A higher entry is also chosen in the other symmetric country. The consumer then benefits from the higher number of parents that repatriate part of their profits. This is the source of the inefficiency described in Proposition 1. The government can then be strictly better-off by playing the lobbying game. Foreign lobbying helps the government to internalize the inefficiency of proposition 1.

3.2.3 Equilibrium when contributions are differently valued ($\gamma \neq 1$)

I now consider that governments differently value foreign and national contributions. I discuss whether bargaining in the grand coalition always has a solution. Different valuations directly affect the impact of foreign lobbying in helping governments to decrease their FDI restrictions. Similarly to Gawande et al. (2006) I study the case of foreign contributions being differently valued than national contributions. In their paper all lobbies participate in the political game. I extend the model by assuming a bargaining game which brings more possibilities. Bargaining sub-coalitions can be formed in which not all firms participate in the political game. The definition of "coalitional bargaining" from Compte and Jehiel (2010) allows for the formation of sub-coalitions if there is no solution in the grand coalition bargaining equilibrium. However a cost of redistributing the surplus between the players, which is not considered in the paper, emerge when foreign and national contributions are not equally valued ($\gamma = 1$). I provide the conditions for sub-coalitions to emerge.

Lemma 5 *For $\gamma \neq 1$, subcoalitions can form when there is no equilibrium in the grand coalition equilibrium. I show that (i) the national sub-coalition forms when the total surplus for the three players is larger when only the government and the national lobby bargain:*

$$\mathbb{J}^{\mathbb{N}}(M^N, M^*) + \Pi^{*f}(M^N) \geq \mathbb{J}^G(M^G, M^*) \tag{3.6}$$

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[11]When the solution is binding ($M_n = M^G$ or $M^G = 2M_n$), a higher level of repatriation of profits might not affect the FDI policy.

and that (ii) the foreign sub-coalition forms when the total surplus for the three players is larger when only the government and the foreign lobby bargain:

$$\mathbb{J}^F(M^F, M^*) + \Pi(M^F) \geq \mathbb{J}^G(M^G, M^*) \tag{3.7}$$

Proof. I first show that the total surpluses from the sub-coalitions can be larger than the total surplus in the grand coalition, which was never possible for $\gamma = 1$. The amount of optimal foreign contributions affects the size of the surplus and the total surplus functions can differ form the surplus in the grand coalition[12]:

$$\gamma \neq 1 \quad \Rightarrow \quad \begin{cases} \mathbb{J}^N(M, M^*) + \Pi^{*f}(M) \neq \mathbb{J}^G(M, M^*) & \text{if the national sub-coalition bargains,} \\ \mathbb{J}^F(M, M^*) + \Pi(M^F) \neq \mathbb{J}^G(M, M^*) & \text{if the foreign sub-coalition bargains} \end{cases}$$

Contrary to Proposition 2, it is now possible that the surplus is higher when a sub-coalition bargains. Second I show that the grand coalition equilibrium does not have a solution if the total surplus for the three players from either the national sub-coalition or the foreign sub-coalition is larger than the total surplus of the grand coalition. The proof comes from the constraints in the grand coalition bargaining. I denote by $G(), L(), L^*()$ the allocations for the government and the two lobbies in the grand coalition. Let's take the case of a surplus strictly higher with the national sub-coalition. If a solution exists in the grand coalition, it should respect the following constraints: $G() + L() \geq \mathbb{J}^{\mathbb{N}}(M^N, M^*)$ and $L^*() \geq \Pi^{*f}(M^N)$. This leads to a contradiction because $G() + L() + L^*() = \mathbb{J}^G(M^G, M^*) \geq \mathbb{J}^{\mathbb{N}}(M^N, M^*) + \Pi^{*f}(M^N)$ and by assumption $\mathbb{J}^G(M^G, M^*) < \mathbb{J}^{\mathbb{N}}(M^N, M^*) + \Pi^{*f}(M^N)$. ∎

Proposition 4 (Sub-coalitions) *The conditions for sub-coalitions to emerge are the following.*

- *When the total surplus of the national sub-coalition is larger than the total surplus of the foreign sub-coalition, there exists a threshold $\gamma^N \in (0,1)$ such that (i) the grand coalition equilibrium has a solution for $\gamma \geq \gamma^N$, and (ii) the grand coalition equilibrium has no solution such that the national sub-coalition bargains for $\gamma \leq \gamma^N$. The FDI policies are given by:*

$$(M, M^*) \quad = \quad \begin{cases} (M^G, M^{*G}) & \text{for } \gamma \geq \gamma^N \\ (M^N, M^{*N}) & \text{for } \gamma \leq \gamma^N \end{cases}$$

- *When the total surplus of the foreign sub-coalition is larger than the total surplus of the national sub-coalition, there exists a threshold $\gamma^F \in (0,1)$ such that (i) the grand coalition equilibrium has a solution for $\gamma \geq \gamma^F$, and (ii) the grand coalition equilibrium has no solution such that the foreign sub-coalition bargains for $\gamma \leq \gamma^F$. The FDI policies are given by:*

$$(M, M^*) \quad = \quad \begin{cases} (M^G, M^{*G}) & \text{for } \gamma \geq \gamma^F \\ (M^F, M^{*F}) & \text{for } \gamma \leq \gamma^F \end{cases}$$

The condition for the first part of the proposition, which is that the total surplus of the national sub-coalition is larger than the total surplus of the foreign sub-coalition, is given by

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[12]All surplus functions were the same for $\gamma = 1$. The grand coalition that maximizes this joint surplus always maximises the joint surplus for the three players.

$\mathbb{J}^N(M, M^*) + \Pi^{*f}(M^N) \geq \mathbb{J}^F(M, M^*) + \Pi(M^F)$. The full expressions of the sub-coalition policies are given in Appendix 8.3.1. In order to show that equilibrium with sub-coalitions can emerge I show that the surplus for all three players can be larger in a sub-coalition formation than in the grand coalition. This implies that there is not enough surplus generated in the grand coalition to find allocations that verify the contraints. A unit of contribution from the foreign lobby is redistributed to the government and the size of the surplus does not vary with the amount of contributions. When governments differently values national and foreign contributions, the way to share the surplus affects its total size. When $\gamma < 1$, the surplus that is shared between the three players is decreasing in foreign contributions. Only a percentage γ of what is given by the foreign lobby benefits the government. Therefore there is a loss of surplus due to this difference in valuation. However the policy chosen in the bargaining process remains efficient and maximises the surplus given that this surplus decreases in the equilibrium level of foreign contributions. Proposition 4 defines some valuation thresholds under which a low valuation leads sub-coalitions can be the equilibrium.

For the rest of the paper I want to focus on the interesting case when foreign lobbying pushes for more entry and counteracts national lobbying[13].

Lemma 6 *There exists a threshold $\tilde{M}_n$ such that $\frac{\partial M^G}{\partial \gamma}\big|_{\tilde{M}_n} = 0$ and*

$$M_n \leq \tilde{M}_n \implies \frac{\partial M^G}{\partial \gamma} \leq 0 \quad \wedge \quad M_n \geq \tilde{M}_n \implies \frac{\partial M^G}{\partial \gamma} \geq 0$$

For the rest of the paper I restrict the set of numbers of national firms such that $M_n \geq \tilde{M}_n$.

The number of national firms M_n determines the objective of the foreign lobby and its impact on the policy. When there are few national firms, the FDI policy chosen by the government is relatively large and the individual profits relatively small. The lobby of foreign firms then pushes for more restrictions to increase individual profits at the cost of reducing the number of affiliates that enter. When there are many national firms, the restrictions and the individual profits are higher. The lobby of foreign firms pushes for more entry at the cost of reducing the individual profits of each affiliate. In the first case, foreign lobbying exerts an influence for higher restrictions. In the rest of the paper, I restrict my analysis to the case of a number of national firms large enough so that a higher valuation of foreign contributions leads to more entry.

Lemma 7 *Compared to the policy in the grand coalition, entry is lower in the national sub-coalition ($M^N \leq M^G$) and higher in the foreign sub-coalition ($M^G \leq M^F$).*

Such ranking directly results from Lemma 6. National lobbying pushes towards lower entry whereas foreign lobbying pushes towards higher entry. In the grand coalition the two lobbies bargain and the solution is a compromise between national and foreign interests.

Lemma 8 *There exist a thresholds γ_0 such that entry in the lobbying game is higher than entry in the no-lobbying game ($M^G \geq M_0$) when governments sufficiently value foreign contributions ($\gamma \geq \gamma_L$). Lobbying is then Pareto-improving compared to no lobbying.*

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[13]When foreign lobbying supports restrictions and

Lemma 6 says that a higher government's valuation of foreign contributions γ results in higher entry, i.e. fewer restrictions. By increasingly valuing foreign contributions, the government puts a higher weight on the aggregate profits of the foreign affiliates. The previous parameter restriction implies that the number of affiliates allowed to enter the market increases. Similarly to Proposition 3, the levels of government's valuation of foreign contributions for which foreign lobbying leads to higher entry are defined. Foreign lobbying helps governments to internalize the inefficiency when foreign contributions are sufficiently valued.

In this section, I have shown the existence of an inefficiency in the non-cooperative game given that foreign firms repatriate part of their profits in their country of origin. This leads the government to restrict entry. Depending on the degree of repatriation and of governments' valuation of foreign contributions, foreign lobbying can push for higher entry and help the government to internalize the inefficiency.

4   Foreign lobbying and FDI agreements

The presence of repatriation of profits by multinationals is a source of inefficiency when governments non-cooperatively choose their policies. Following Grossman and Helpman (1994), an agreement can solve for the inefficiency and help governments to internalize the externality. I first study the equilibrium when governments cooperatively choose their policy. However foreign lobbying also helps countries to indirectly internalize the externality. Could foreign lobbying then make an agreement unnecessary?

4.1   The cooperative game between the two governments

Following Grossman and Helpman (1995) and Maggi and Rodriguez-Clare (2007) I assume that the two symmetric countries play a bargaining game to choose the terms of the agreement[14]. There is no lobbying at the time when countries negotiate for an agreement.

Definition 4 *An agreement is defined by the outcome of the cooperative game without lobbying.*

The terms of the agreement are defined by

$$(M^{ag}, M^{*ag}) \;=\; \arg\max_{M, M^*} \; W(M, M^*) + W^*(M^*, M) \quad \wedge \quad (M^{ag}, M^{*ag}) \in [M_n, 2M_n]^2 \quad (4.1)$$

and consist of $M^{ag} = M^{*ag} = 2M_n$.

The externality problem is internalized by governments in the cooperative game such that an agreement helps governments to choose efficient policies. The repatriated profits of the Home affiliates $(M^* - M_n)[(\phi - z)q^*(M^*)]$ are now taken into account by the Foreign government when choosing M^*, and vice versa.

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[14]I follow Grossman and Helpman (1995) to model bargaining between the two governments using their result that having a transfer payment between the two governments or not gives the same results. I assume here that there is no transfer payments.

4.2 Foreign lobbying and FDI agreements

Contrary to Grossman and Helpman (1994) and Maggi and Rodriguez-Clare (1998), the paper does not argue that agreements are not observed because governments prefer playing a domestic political game. Lobbying leads to higher trade barriers in a world where free trade is the optimal solution but is chosen because of the positive political contributions. The same reasoning can be applied here but I ruled out such conclusions by assuming $\sigma_G = 0$[15]. I here discuss whether agreements are not observed because lobbying can also help governments to reduce their FDI barriers. I consider foreign and national contributions first to be equally valued and second to be differently valued.

4.2.1 Foreign contributions are equally valued ($\gamma = 1$)

I now discuss whether foreign lobbying can lead to the efficient policies that define the outcome of the agreement when foreign and national contributions are equally valued ($\gamma \neq 1$). I focus on the impact of the level of repatriation on the equilibria.

Proposition 5 *There exists a threshold $\widetilde{\phi}$ such that the non-cooperative entries are equal than the terms of the agreement when the repatriation of profits is sufficiently low ($\phi \leq \widetilde{\phi}$).*

Proof. $\widetilde{\phi}$ is defined such that $M^G\big|_{\widetilde{\phi}} = M^{ag} = 2M_n$. Existence given by $M^G\big|_{\phi=z} = 2M_n$. ∎

A limited repatriation of profits allows foreign lobbying to push towards high entry. The policy chosen in the lobbying game can be equal to the terms of the agreement if the foreign affiliates redistribute enough to the domestic consumer such that the governments value their profits. An agreement can be unnecessary to help governments to internalize the externality and foreign lobbying is another channel for governments to choose not to restrict foreign entry. If foreign firms repatriate a lot of their profits, foreign lobbying can not push the government to choose the cooperative outcome. An agreement is therefore needed to fully internalize the inefficiency. This proposition suggests that the economic parameter ϕ can define the situations in which an agreement is necessary compared to the outcome of foreign lobbying.

4.2.2 Foreign contributions are differently valued ($\gamma \neq 1$)

I now discuss whether foreign lobbying can lead to the optimal entries when foreign and national contributions are differently valued ($\gamma = 1$). I focus on the government's valuation of foreign contributions.

Proposition 6 *There exists a threshold $\widetilde{\gamma^G}$ defined by $M^G\big|_{\widetilde{\gamma}} = M^{ag}$ for which the non-cooperative entries are equal to the terms of the agreement if governments sufficiently value foreign contributions ($\gamma \geq \widetilde{\gamma}$) and if the grand coalition equilibrium has a solution (cf Proposition 4). Otherwise there exists a threshold $\widetilde{\gamma^F}$ defined by $M^F\big|_{\widetilde{\gamma}} = M^{ag}$ if the foreign sub-coalition is the solution (cf Proposition 4). In the case of the national sub-coalition, entries are never equal to the terms of the agreement.*

A high government's valuation of foreign contributions allows foreign lobbying to exert an influence on the government towards high entry. The policy chosen in the lobbying game can be equal to the terms of the agreement if foreign contributions are sufficiently valued. An agreement is therefore not necessary to help governments to internalize the externality. If foreign contributions are not highly valued, foreign lobbying can not push the government to choose the cooperative outcome. An agreement is therefore needed to fully internalize the inefficiency. This proposition suggests that the political parameter γ can define a set of countries for which an agreement is not necessary to internalize the externality. Countries where foreign firms have no influence should rather sign an agreement to lower their restrictions. Foreign lobbying might be a good substitute to an agreement in countries where foreign influence is sufficiently valued[16].

The following proposition compares the outcomes for the different sub-coalitions.

Proposition 7 *When foreign and national contributions are differently valued ($\gamma \neq 1$), I show that*

   i) the set of government's valuations of foreign contributions γ for which the non-cooperative entry is equal than the terms of an agreement is larger in the foreign sub-coalition equilibrium than in the grand coalition equilibrium ($[\widetilde{\gamma}^G, +\infty) \subset [\widetilde{\gamma}^F, +\infty)$),

   ii) the set of share of profits that is repatriated in the country of origin ϕ for which the non-cooperative entry is equal than the terms of an agreement is larger in the foreign sub-coalition equilibrium than in the grand coalition equilibrium ($[z, \widetilde{\phi}^G] \subset [z, \widetilde{\phi}^F]$),

   iii) the non-cooperative entry in the national sub-coalition is always lower than the terms of the agreement.
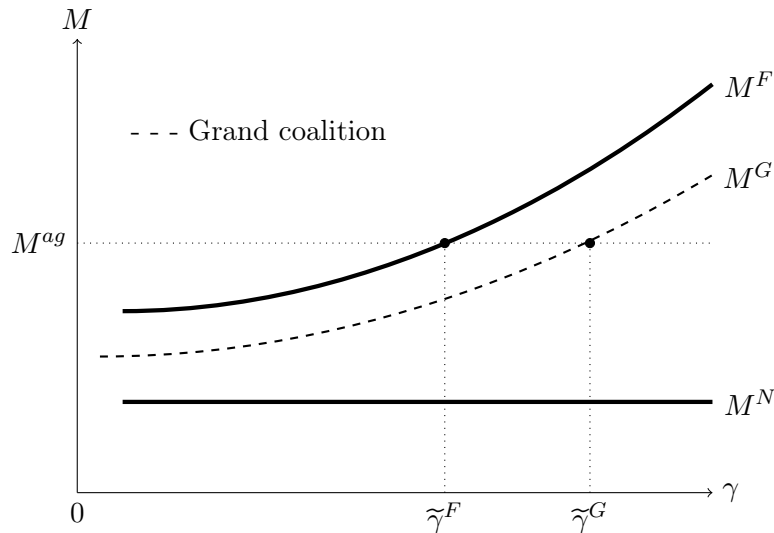
Proof. More details in Appendix 8.3.2. ■

Figure 2: The thresholds for which the non-cooperative outcome with lobbying is equivalent to the agreement outcome for a given ϕ.

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[16]This is a result that I do not test in the paper but could lead to further empirical work.
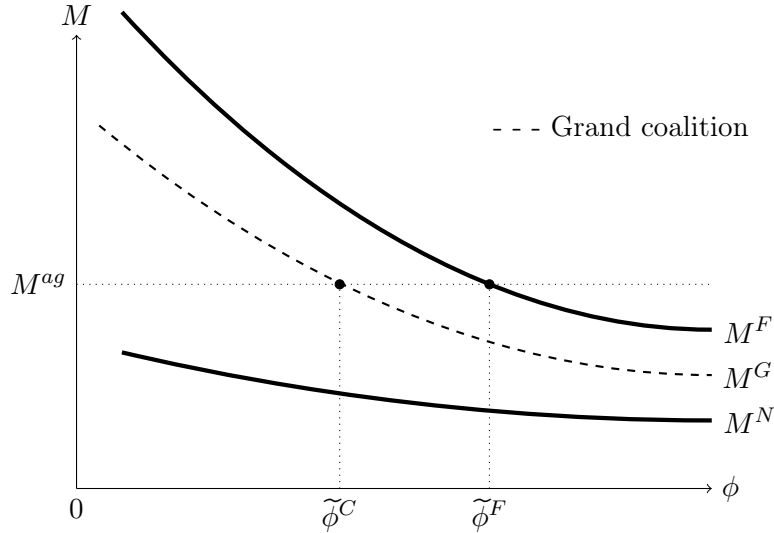
Figure 3: The thresholds for which the non-cooperative outcome with lobbying is equivalent to the agreement outcome for a given γ.

Figures 2 and 3 illustrate Proposition 7. Proposition 7 implies that the outcome in the foreign sub-coalition is more likely to be Pareto-efficient given that it requires a government's preference for foreign contributions that is lower than in the case of the grand coalitions. Finally bargaining in the national sub-coalition leads to a very restrictive policy which is never equal to the Pareto-efficient policy. Foreign lobbying does not compensate for the inefficiency.

5 Tax havens and FDI agreements

In this part I consider the opportunity for multinationals to use transfert pricing to shift profits towards tax havens. All firms can shift profits in order to decrease the share of profits that is taxed in the country of origin and in the host country. This possibility affects the choice of FDI policies as well as the role of FDI agreements.
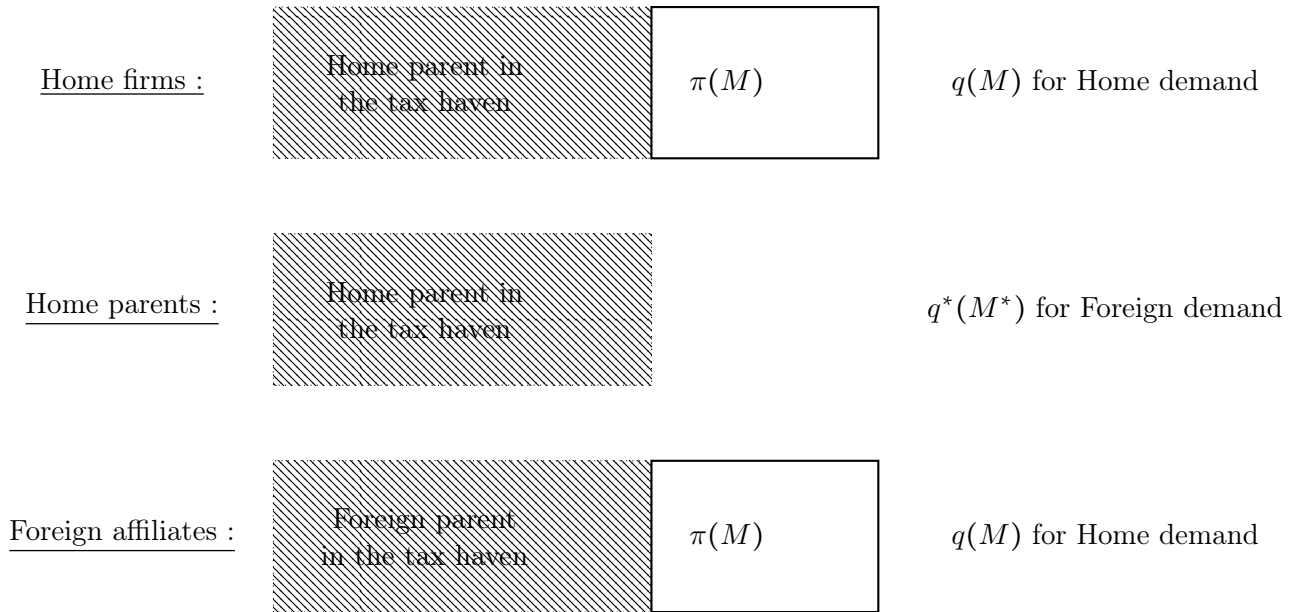
5.1 Transfer pricing towards tax havens

I now assume that all firms can locate the parents' profits in a tax haven. A tax haven is defined here as a place where corporate taxes are null and where firms can easily shift profits to. A tax haven has no consumer and profits that shifted there are assumed not to benefit any country. This assumption can be discussed given that profits in tax havens have been shown to be partly reinvested and to indirectly benefit consumers from the country of origin. For simplicity I assume that these profits are not redistributed to consumers in the short-term. Firms can legally shift profits towards a tax haven if they locate the parents of the firm there. The parents can then provide inputs to the affiliates in the host country where consumers are. These inputs are usually services or intangible goods paid at a price chosen by the multinationals. This intra-firm price determines the share of profits that is located in the two countries which then determines the FDI policies. Several papers (Davies et al. (2014), Vicard (2015)) have provided empirical proofs of the use of transfer pricing by multinationals to shift profits toward tax havens. Davies et al.

(2014) especially finds out that profit shifting through transfer pricing mainly happens towards a few tax havens atht are very small countries where no or few consumers live.

I add the possibility for transfer pricing to the previous model[17]. Firms choose an intra-firm price p_{mne}, which corresponds to the previous ϕ parameter. This price can differ from the arm's length price p_{arm} which is the price at which the same firms would sell the input to a third party[18]. The intra-firm price defines the transfer pricing strategy that allows multinationals to shift profits towards tax havens. A high intra-firm price ($p_{mne} > p_{arm}$) allows them to shift a large part of their profits. I do not model the firms' choice of their intra-firm price which depends on the corporate tax rate of the country and the concealment costs from shifting profits towards tax havens[19] . The intra-firm price is assumed to increase in the tax rate of the host country. A higher corporate tax rate in the host country leads firms to shift more profits in the tax haven ($\frac{\partial p_{mne}}{\partial T} \leq 0$).

I provide here a similar figure to Figure 2.1 in the first section. Firms can now locate part of their profits in a third country. The shaded areas represent the shares of total profits located in a tax haven that are assumed not to be redistributed to consumers.

Figure 4: Profits redistributed at Home

Home firms :   Home parent in the tax haven $\pi(M)$ $q(M)$ for Home demand

Home parents :   Home parent in the tax haven $q^*(M^*)$ for Foreign demand

Foreign affiliates :   Foreign parent in the tax haven $\pi(M)$ $q(M)$ for Home demand

Similarly to the previous section, I find the equilibrium policies in the non-cooperative game without lobbying and then with lobbying in the grand coalition. In case of no lobbying, the

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[17]I follow the model of transfer pricing in Davies et al. (2014).

[18]The arm's length price p_{arm} is taken as exogenous as it depends on other parameters, like the outside demand for the same good, that are not in the model.

[19]Firms that choose an intra-firm price (p_{mne}) different from the arm's length price (p_{arm}) have to incur a concealment cost. The concealment cost depends on the gap price only and is interpreted as the cost of hiring accountants or the fine that a firm pays when it is caught. It might vary across countries.

government chooses the following policy:

$$M_0^{tax} = \frac{A - p_{mne}}{p_{mne}} \tag{5.1}$$

For simplicity I only look at the case of equal valuations of contributions ($\gamma = 1$) which implies that the non-cooperative game equilibrium with bargaining in the grand coalition has a solution. The government chooses the following FDI policy:

$$M^G = \frac{2(A - p_{mne})}{(p_{mne} - z) - 3(A - p_{mne})} \tag{5.2}$$

Proposition 8 *I can show that (i) the non-cooperative outcome without or with lobbying is always Pareto-efficient and that (ii) free-entry is not the solution of the game without lobbying if the intra-firm price is high enough ($p_{mne} \geq \frac{A}{2M_n + 1}$).*

In the previous sections, the externality problem is explained by the repatriation of profits which determines where profits are redistributed. In a world with tax havens, the location of profits is the same for national firms and foreign affiliates. Governments then choose to restrict foreign entry and increase profits given that only a small part of the total profits made from domestic sales stay in the country. Given that most of the profits "disappear" in tax havens, governments choose restrictions that result from the trade-off between higher prices and higher revenues for consumers.

Previously I show that an agreement allows each government to take into account the domestic profits due to the presence of affiliates abroad. In the non-cooperative game these profits are not considered because they are located in tax havens. Governments only benefit from the profits from sales happening in their country and the policy of the other country does not affect the objective function of the government any more. Therefore an agreement is not necessary in a world with tax havens and foreign lobbying is the only channel to lower restrictions. However given that foreign affiliates shift a large part of their profits abroad foreign lobbying might not be able to lower restrictions.

Proposition 9 *Tax treaties that increase the cost of shifting profits or curb tax havens are a first step towards agreements that reduce FDI barriers.*

This proposition contributes to the debate on the effects of tax treaties on FDI. It defines a new role for tax treaties. Most of the literature (Blonigen et al. (2014)) has focused on the impact of tax treaties on FDI flows. The proposition 9 suggests that tax treaties are a first step for investment agreements to help countries reducing their FDI barriers. The proposition 8 states that the presence of tax havens makes the non-cooperative outcome Pareto-efficient and no agreement is necessary. Tax havens should be curbed or pricing transfer should become prohibitive in order to observe more agreements that help countries internalize the externality.

6 Empirical analysis

Following my results in Lemma4 [20] I test whether higher repatriation of profits increases foreign restrictions. Given the difficulty to quantify the repatriation behaviours of multinationals across countries and years, I use two proxies that cover the main determinants of the relocation of profits: corporate tax rates and future growth opportunities. I discuss the advantages and drawbacks of such proxies and show that they significantly affect the level of restrictions across countries, sectors and years. I finally discuss other possible channels that could explain this positive result.

6.1 Data

The dependent variable is given by the level of foreign restrictions. I use two indexes that quantify FDI restrictions: the FDI Regulatory Restrictiveness Index (FDI Index) from the OECD and the Services Trade Restrictiveness Index (STRI) from the World Bank. The first index measures FDI restrictions in 58 countries, covers 22 sectors and is available for 8 years: 1997, 2003, 2006-2014. The second index covers 103 countries that represent all regions and income groups of the world. For each country, five major services sectors are covered: financial services (retail banking and insurance), telecommunications, retail distribution, transportation, professional services (accounting, auditing, and legal services). I focus on services that are characterized by high FDI barriers (Figures 7 and 8 in the Data Appendix). Figure 9 shows that horizontal FDI is the main mode of trade in services. Additional details are provided in the Data Appendix.

6.1.1 Proxies for the repatriation of profits

The literature[21] suggests three determinants to explain the repatriation of profits by multinationals. The difference in corporate taxes and the existence of bilateral treaties on double taxation are the fiscal determinants of repatriation. Second growth opportunities in the host country determine whether profits are repatriated or reinvested in the host country. A last determinant is the existence of tax havens whose consequences are well described in Zucman (2014). In the previous parts I chose not to model the impact of these determinants on the ϕ parameter. I build two proxies for the behaviours of multinationals: a tax index and a growth index.

The Tax Index It quantifies the extent to which a country has a high level of taxes compared to other countries. Multinationals shift profits by comparing tax rates in their investment country and in their country of origin. More precisely the index quantifies the gap between the tax rate of a host country and the tax rates of the countries of origin of the multinationals. I use corporate tax rates data from the OECD that presents effective statutory tax rates taking into account integration or relief to reduce the effects of double taxation. A simple average across foreign countries loses a lot of information. I then use weights on tax rates such that countries with more or larger affiliates have more weight. However I only have FDI data per partner country at an aggregate level or FDI data per industry for the rest of the world. I therefore build two

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[20] I do not test the predictions of my model regarding the impact of foreign lobbying on restrictions and whether an agreement is chosen or not in different situations.

[21] Blonigen and Davies (2001) and Blonigen et al. (2014) for the bilateral treaties on double taxation and Overesch and Dreßler (2011), Hanlon et al. (2014), Zucman (2014) for the other determinants.

indexes and compare the results. I use inward FDI data at the country level when focusing on partner countries and outward FDI data at the industry level when focusing on industry data.

i) The tax index per industry: I here use aggregated data per industry. The world tax rate is the weighted average of tax rates for a representative vector of investing countries per industry and is the same for all countries. I use outward FDIs for each country to build this representative investor. The tax index for country c and sector s is:

$$Tax_{c,s} = \tau_c - \tau_s^W \quad \text{with} \quad \tau_s^W = \frac{\sum_{j \in W} \tau_j FDI_{j,s}^{out}}{\sum_{j \in W} FDI_{j,s}^{out}}$$

ii) The tax index per country: I here use aggregated data per partner country. Data of partner countries are not available per industry for confidentiality reasons. The world tax rate uses the inflows of FDI per partner country for all sector as weights. It reflects the composition of foreign investments in each country and now varies across countries but not across sectors. The Tax index for country c is:

$$Tax_c = \tau_c - \tau_c^W \quad \text{with} \quad \tau_c^W = \frac{\sum_{j \in W_{-c}} \tau_j FDI_{j,c}^{in}}{\sum_{j \in W_{-c}} FDI_{j,c}^{in}}$$

Repatriation of profits is assumed to be increasing in the tax proxy: $\text{Corr}(\phi^*, Tax) \geq 0$

The growth opportunity Index In addition I build an index that reflects the growth opportunities of a country compared to those in the rest of the world. It complements the tax index. The higher the growth rate compared to a world average, the more profits made by foreign affiliates is not repatriated and is invested in the host country. The growth index is defined as the difference between the growth rate of a country and a world growth rate index. The world index is built as a weighted average of all countries' annual growth rate with the GDP of each country. The index for country c and sector s i:

$$Growth_{c,s} = g_{c,s} - g_{c,s}^W \quad \text{with} \quad g_{c,s}^W = \frac{\sum_{j \in W} g_{j,s} GDP_{j,s}}{\sum_{j \in W} GDP_{j,s}}$$

Repatriation of profits is assumed to be decreasing in the growth index: $\text{Corr}(\phi^*, Growth) \leq 0$

6.2 Methodological issues

There are methodological issues that emerge here. I have to address the endogeneity issue coming from the omitted variable bias and reverse causality. I address the first problem by adding other control variables such as GDP, GDP per capita, added-value per sector and previous binding commitments on restrictions. In addition I use a fixed-effect model for each specification. I add sector, year and country dummies depending on each case to the specification. I also add interaction dummies to test whether the result is robust. Second I address the reverse causality issue. Indeed lower restrictions can lead the government to lower tax rates. For example, a government could decide to lower the tax rate given that more firms are present. Multinationals could also exert pressure on governments to lower taxes. In order to solve for this problem I

use lagged value for tax and growth rates. Another problem is the simultaneity bias. I assume that multinationals do not immediately react to a change in policies. An increase in restrictions might send a negative signal to multinationals that are expected to increase repatriation the next periods. I finally test the robustness of the results. I run a similar regression for different set of countries (OECD vs all countries), different FDI restrictions Index (OECD and WB Indexes) and for different years. After presenting the results of the regressions I discuss additional problems on how to interpret the results.

6.3 Results

I provide results for two cases and compare their results. First I use the OECD FDI restrictions Index for all sectors but in a limited number of countries. Second I use the WB STR Index for services only but for a larger number of countries.

FDI restrictions in all sectors I use here the FDI Index for OECD countries only. The specification is:

$$RT_{c,s,t} \quad = \quad \alpha + \delta_\tau \, Tax_{c,s,t} + \delta_g \, Growth_{c,s,t} + \lambda \, X + \delta_c + \delta_t + \delta_s + \delta_{c,s} + \delta_{t,s} + \epsilon_{c,s,t}$$

with δ_c, δ_t and δ_s the fixed effects for country c, at year t and in sector s. X is the set of control variables that gather here logGDP and logGDP per capita that are lagged by one period. The interaction fixed effects are the country-sector dummy $\delta_{c,s}$ and the year-sector dummy $\delta_{t,s}$. RT is the level of FDI restrictions. Table 1 shows the results[22].

Table 1 shows that the tax index significantly affects the level of FDI restrictions for all specifications. It is worth noting that it remains significant in the last specification with interaction dummies that capture most of the country-time-sector variations. The positive coefficient on the tax index means that higher taxes relative to the rest of the world (more repatriation) leads to higher FDI restrictions. The negative coefficient on the growth index means that higher growth opportunities (less repatriation) leads to lower FDI restrictions. This is in line with my theoretical results.

FDI restrictions in services I now focus on FDI restrictions in the services sectors and use the WB STR Index. I use the AMNE/OECD database that describe foreign affiliates characteristics (number of employees, sales etc.) in each OECD country. I use services industries from the STRI database: banking, insurance, telecom, retailing, maritime, transport and legal services. Whereas the STRI index is available for a large number of countries over the world, the foreign affiliates database (AMNE) is only available for OECD countries. I start by restricting my analysis to OECD countries in order to be able to use the AMNE database then I consider all countries from the STRI database and use outward FDI data from the World Bank. The STRI database only provides one-year data. I use 2008 data for the tax and growth rates. I build the tax index by using the number of employees in foreign affiliates as a measure of foreign presence and add country and sector-specific dummies. Following Barattieri et al. (2015), other control

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[22]I here show results for the tax index per industry. Similar results are obtained using the tax index per country.

Table 1: Impact of repatriation on FDI restrictions (OECD Index)

	OLS with FE	OLS with FE	OLS with FE	OLS with Interaction FE
TaxIndex	0.00482***		0.00460***	0.00164***
	[0.00171]		[0.00171]	[0.000399]
GrowthIndex		-0.0747	-0.0642	-0.0295***
		[0.0454]	[0.0456]	[0.0106]
laglnGdp	-0.213	-0.0934	-0.202	-0.283***
	[0.183]	[0.176]	[0.184]	[0.0389]
laglnGdpCap	0.174	0.0612	0.175	0.226***
	[0.194]	[0.187]	[0.194]	[0.0408]
Observations	911	917	911	911
Country FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country*Sector FE	No	No	No	Yes
Sector*Year FE	No	No	No	Yes
R-sq	0.399	0.394	0.400	0.981

Standard errors in brackets

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

variables are added such as Gdp, Gdp per capita, the level of GATS commitments (STRIur) and the value added in the manufacturing and in the services sectors. GATS commitments capture the possibilities for government to increase restrictions or not. The specification that is tested is:

$$STRI_{c,s} = \alpha + \delta_\tau\, Tax_{c,s} + \delta_g\, Growth_{c,s} + \lambda\, X + \delta_c + \delta_s + \epsilon_{c,s}$$

with δ_c and δ_s the fixed effects for country c and for sector s. $STRI$ is the Services Trade Restrictiveness Index per country c and per sector s. A similar regression with the tax index per industry is added in Appendix 8.2.

Results from Table 6.3 are similar to the previous results and support the model. I also observe that GATS commitments made in 1995 are a strong determinant of current restrictions. This is mainly explained by sectors for which governments committed to remove all kinds of restrictions. The index is then equal to zero and remains at zero. The tax index has therefore no impact on the level of restrictions. Countries with higher GDP per capita have lower levels of restrictions. GDP has a rather positive impact on foreign restrictions. Bigger countries have higher restrictions.

FDI restrictions in all countries   I here keep all 103 countries from the STRI database. I cannot use the previous tax index. I then use the aggregate FDI outflows data of the World Bank as well as GDP, tax and FDI data from 2006. This part provides a broader picture and takes into account countries with very high restrictions such as emerging economies (China, Russia, Indonesia, India, Brazil, etc). I get similar results on the impact of repatriation. Second I focus on the complementary between the tax Index and the growth Index. The set of countries is more

Table 2: Impact of repatriation on services restrictions (STRI) for OECD countries using Partner country data

		Sector dummy	Country dummy	The two dummies
TaxIndex	0.00420***	0.00250***	0.00638***	0.00487***
	[0.000986]	[0.000617]	[0.00109]	[0.00100]
GrowthInd		-0.0122*	-0.0280**	-0.0162*
		[0.00652]	[0.0109]	[0.00932]
lnGdpCap	-0.0944***	-0.00458	-0.148***	-0.0785***
	[0.0306]	[0.0191]	[0.0316]	[0.0256]
lnGdp	0.0196	-0.00456	0.0441***	0.0175
	[0.0119]	[0.00837]	[0.0133]	[0.0117]
Striur	0.533***	0.535***	0.442***	0.533***
	[0.0562]	[0.0506]	[0.0233]	[0.0562]
VA_serv	0.0222***	0.0225***	0.0314***	0.0213***
	[0.00408]	[0.00392]	[0.00697]	[0.00595]
VA_manuf	0.0212***	0.0239***	0.0387***	0.0217***
	[0.00349]	[0.00350]	[0.00388]	[0.00344]
Observations	244	244	244	244
Country Dummy	Yes	No	Yes	Yes
Sector Dummy	Yes	Yes	No	Yes
R-sq	0.911	0.883	0.824	0.911

Standard errors in brackets

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

heterogenous. I add an interaction term between the two proxies and compute the marginal effect of the tax Index on FDI restrictions for different Growth Index. The marginal effect in Table 5 is:

$$\frac{\partial STRI_{c,s}}{\partial Tax_c} = \delta_g + \gamma Growth_c$$

Figure 5 shows that the marginal effect of the tax index for different levels of the growth Index. It shows that high tax rates on profits increase foreign restrictions only for positive relative growth rates. This means that the two indexes are complementary. Multinationals decide whether to shift profits for tax reasons only if there are growth opportunities in the host country. Without growth opportunities, multinationals repatriate their profits for any tax rate. The decision to repatriate is based on both the corporate tax rates and the growth opportunities of a country. This implies that my mechanism particularly applies for fast-growing emerging economies for which the level of tax rates determines the levels of restrictions.

6.4   Discussion

Other channels could be candidates for explaining this positive result. For example increasing taxes creates a disadvantage for national firms that should then be protected against foreign
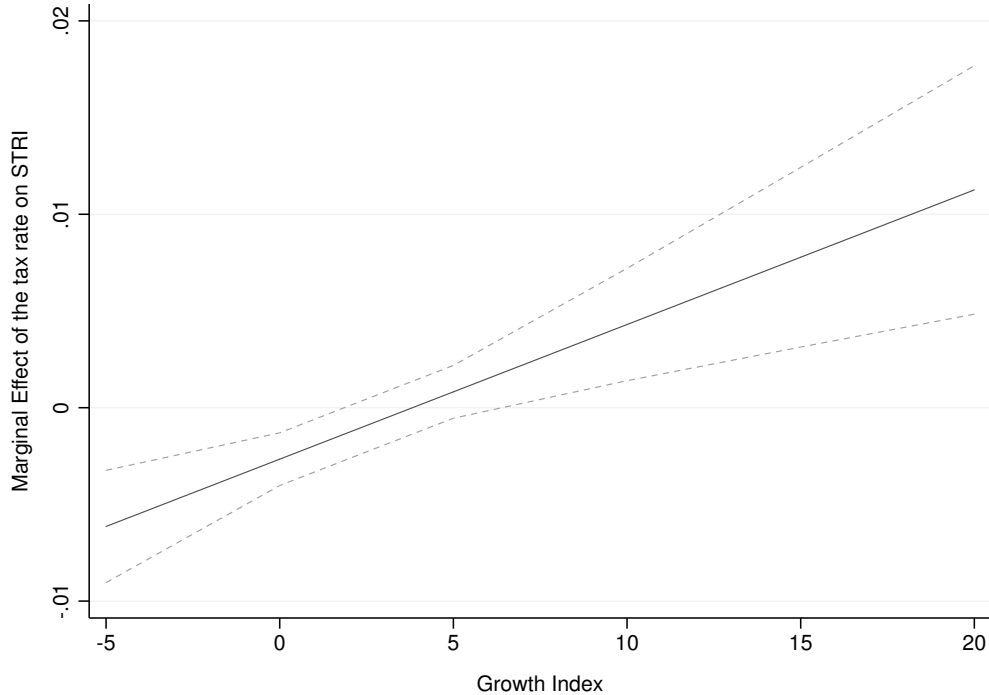
Figure 5: Complementarity between the tax and the growth indexes.

competition through higher restrictions. This channel is relevant for trade through exports across borders but is not in this model of horizontal FDI. Foreign affiliates and national firms face the same domestic conditions. An increase in tax rates affect both types of firms. However increasing corporate tax rates does not create a disadvantage for the national firms compared to their foreign competitors. Another candidate is the quality of political institutions that can act as a third factor and explain both lower tax rates and lower restrictions. In certain cases, an improvement in the political institutions or in the quality of politicians can lead to less expropriation through corporate taxes and at the same time more opening to foreign investment. The profit shifting channel is not needed. The addition of country dummies or year-country dummies is however supposed to capture these political differences across countries.

A drawback of this empirical work is due to the data used for the tax rates index. Special tax provisions as an incentive to promote a policy are difficult to take into account. It is particularly relevant for FDI given the increasing number of special economic zones in emerging or developing economies. These zones provide better economic conditions (administrative simplifications, low tax rates, etc) to attract FDIs. There exist studies that have tried to measure multinationals' effective tax rates. They use backward-looking approaches and firm-level data. However these effective rates take into account both statutory provisions to provide certain incentives and aggressive tax planning strategies. It is difficult to determine which factor explains most of the lower effective tax rates. Using tax rates that already reflect tax planning strategies is counterproductive for this work. They also cannot be used as a proxy for profit shifting for the reason that they encompass governments' incentives to attract FDI. OECD (2013) reports that the use of different methodologies to calculate these effective tax rates result in divergent

conclusions about the level of taxation imposed on multinationals. Using corporate tax rates from the OECD database seems to be a good approximation. In this paper it is the difference between all tax rates that matter, not the level of a tax rate in itself.

7   Conclusion

This paper rationalizes why few agreements to reduce FDI barriers have been signed. First I show that the possibility for multinationals to repatriate their profits is a motive for restrictions. However these profits are not taken into account by governments that non-cooperatively choose their FDI policies. Investment agreements can help countries to internalize this externality. However I show that foreign lobbying can make an agreement unnecessary if the repatriation of profits is limited and the government's valuation of foreign contributions high enough. Finally the presence of tax havens where part of the profits disappear and are not taken into account by governments always makes agreements unnecessary. Tax treaties that curb tax havens are a first step for agreements to reduce FDI barriers.

Additional work needs to be done to quantify the effects of foreign restrictions and the potential welfare gains from removing these barriers. Using the methods of Ossa (2014) I plan to build a model I could bring to the data and quantify the welfare effects of removing these barriers. The gains from services agreements that are currently negotiated could also be quantified . More empirical work should also be done to compare the influence of foreign lobbying across countries and industries. Some countries restrict foreign influence. There is no index that attempts to quantify the legal and informal barriers that restrain the capacity of foreign lobbies to exert an influence on governments. Another line of further research is the links between tax treaties and investment agreements. Taxes affect the behaviours of multinationals and their strategy in terms of profit shifting. It would be interesting to study whether current agreements that aim at reducing profit shifting towards tax havens affect the choice of FDI policies.

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8 Appendix

8.1 Data

The FDI Regulatory Restrictiveness Index (OECD) This index measures restrictions on FDI in 58 countries, covers 22 sectors and is available for 8 years: 1997, 2003, 2006-2014. The OECD lists the main types of restrictions that the index covers: foreign equity limitations, screening or approval mechanisms, restrictions on the employment of foreigners and operational restrictions. The index is between 0 and 1 with high values for high restrictions. Figure 8.1 shows a high variance across sectors and across countries. The following figure 7 focuses on barriers
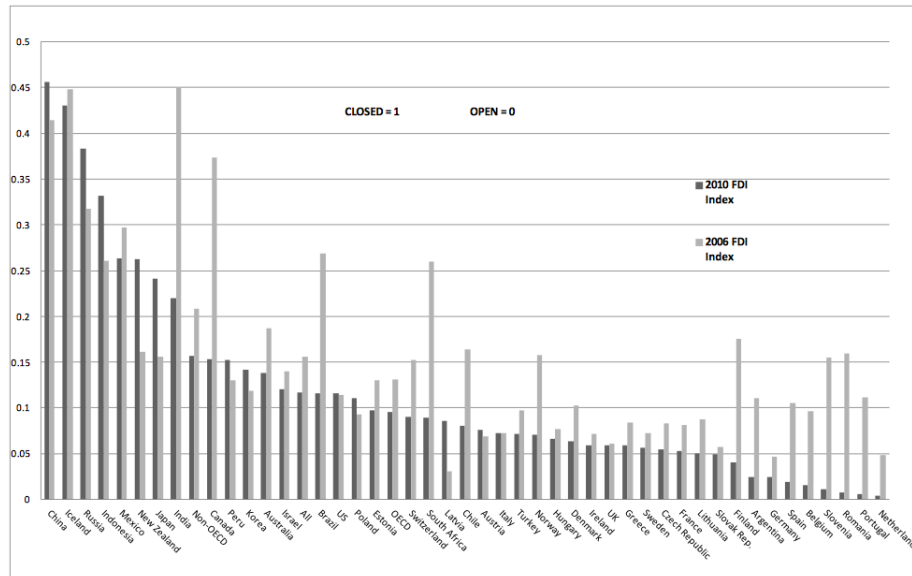

Figure 6: FDI restrictions' variations across countries and years (Source: OECD).

to FDI across services industries and across countries using the OECD FDI restriction Index. Several sectors are very restricted (real estate investment, media, maritime) whereas others are mostly not restricted (hotels and restaurants, wholesale, architectural). In addition restrictions vary across countries. Canada, the USA and Germany have on average low restrictions to foreign entry whereas China, India and Indonesia still have restrictive policies in most of the services sectors.

The Services Trade Restrictiveness Index (World Bank) It covers 103 countries that represent all regions and income groups of the world. For each country, five major services sectors are covered: financial services (retail banking and insurance), telecommunications, retail distribution, transportation, professional services (accounting, auditing, and legal services). The four modes of supplying services are covered. In the rest of the paper I only keep the data for mode 3, which is trade through commercial presence. Policies are categorized with associated scores: completely open (0), virtually open but with minor restrictions (25), major restrictions (50), virtually closed with limited opportunities to enter and operate (75), and completely closed (100). Figure 8 shows the difference in FDI barriers across countries.
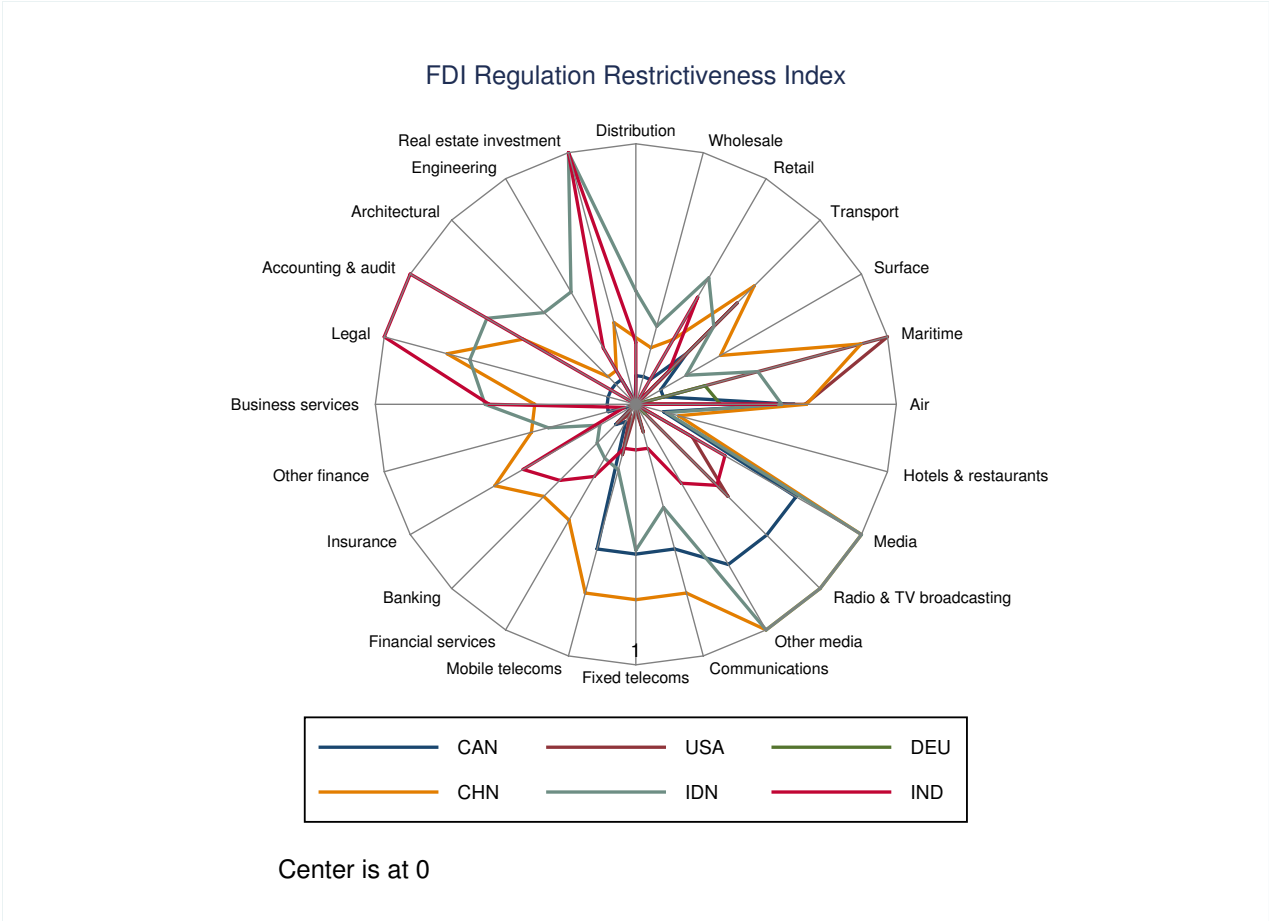
Figure 7: Barriers to FDI per services industries and per country. Source of the data: OECD
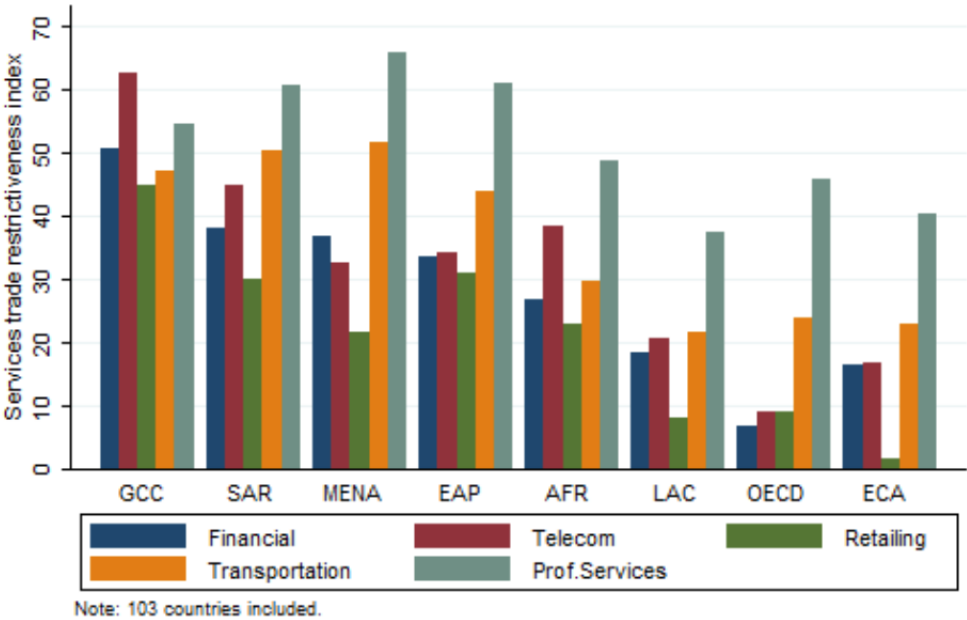

Figure 8: Services trade restrictiveness index by sector and region. Source: Borchert et al. (2012)

Services sectors Figures 9 and 10 show that horizontal FDI is the main mode of trade for services. Many services can only be provided in the host country through commercial presence and cannot be exported. The first figure shows that commercial presence is the main mode of services exports and imports. In addition commercial presence in services sector has been growing over the last years.
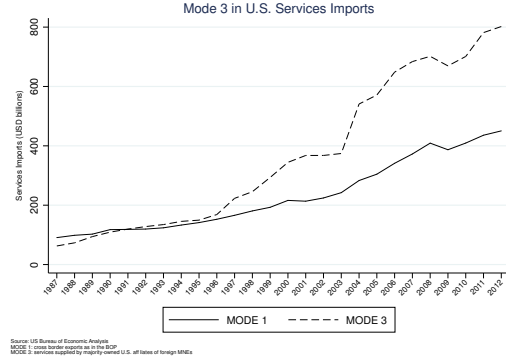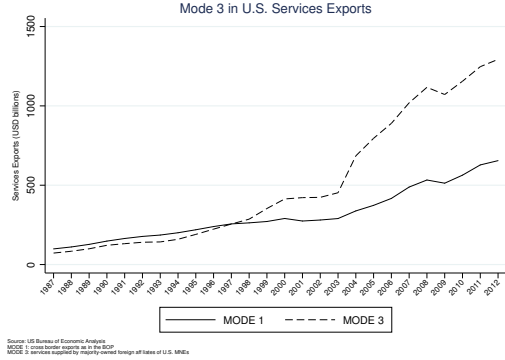

Figure 9: Commercial presence (mode 3) is the major mode of services exports and imports in the US.

Figure 10: Commercial presence (mode 3) is the major mode of services exports and imports in the US.

8.2 Additional empirical analysis

Restrictions in services sectors I provide results for the two types of tax index I describe: the tax index per industry with outflows data in the following Table 8.2 and the tax index per country with partner data in Table 6.3. Similar results are obtained.

Table 3: Impact of repatriation on services restrictions (STRI) using outflows at the industry level

	est1	est2	est3	est4	est5	est6
TaxIndex	0.0299***	0.00224**			0.00222**	0.0299***
	[0.00650]	[0.00112]			[0.00112]	[0.00650]
GrowthInd			-0.0117**	-0.00675**	-0.00753	-0.0138**
			[0.00482]	[0.00335]	[0.00500]	[0.00680]
lnGdp	-0.416***	0.00193	0.00510	0.0116*	0.00668	0.0675**
	[0.101]	[0.0118]	[0.0144]	[0.00605]	[0.0122]	[0.0292]
lnGdpCap	0.770***	0.0266	0.0207	0.0206	0.0298	-0.231***
	[0.197]	[0.0279]	[0.0400]	[0.0183]	[0.0278]	[0.0769]
Striur	0.362***	0.580***	0.390***	0.672***	0.597***	0.362***
	[0.0330]	[0.0839]	[0.0227]	[0.0512]	[0.0843]	[0.0330]
Observations	123	123	291	291	123	123
Country Dummy	Yes	No	Yes	No	No	Yes
Industry Dummy	No	Yes	No	Yes	Yes	No
R-sq	0.649	0.712	0.560	0.706	0.718	0.649

Standard errors in brackets

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

8.3 Proofs

8.3.1 Proofs Section 3

Proof of Lemma 1 The solution of the government's maximisation problem for any δ is

$$M_0(\delta) = -\frac{(A-z)(2-\delta)((1-\delta)(3/2-\delta)+1)+(z-\phi)(2-\delta)(2+\delta(M_n-1))}{(A-z)\delta[(\delta-3)/2+(2-\delta)(3-2\delta)]+(z-\phi)\delta(2+\delta(M_n-1))}$$

given the constraint $M_n \le M_0(\delta) \le 2M_n$

Proof of Proposition 1 The Pareto-efficient solution is given by

$$(M_+, M_+^*) = \underset{M}{\mathrm{argmax}} \quad W(M, M^*) + W(M^*, M)$$

and $M_+ = M_+^* = 2M_n$. I can show that $M_0 < M_+$ except if $M_0 = 2M_n$. The outcome in the non-cooperative game is inefficient.

Proof of Lemma 3

Definition 5 (Bargaining in the national sub-coalition) *Given the policy in the other country M^*, the policy and the contribution that are solutions of the bargaining game between the government and the national lobby maximize the following constrained Nash product:*

$$(M^N, c^N) \quad = \quad \mathrm{argmax} \quad [G(M, M^*, c) - M_0]^{\sigma_G}[L(M, c) - \tilde{L}_0]^{1-\sigma_G}$$

with M_0 the outside option of the government, $\tilde{L}_0$ the outside option of the national lobby.

The solution in the national sub-coalition maximizes the joint surplus of the sub-coalition. The outside option of the lobby is the profit given the policy M_0. M^N is the policy chosen in the national sub-coalition such that

$$M^N \quad \text{st.} \quad aW'(M^N, M^*) + \Pi'(M^N) = 0 \quad \wedge \quad M_n \le M^N \le 2M_n$$

Definition 6 (Bargaining in the foreign sub-coalition) *Given the policy in the other country (M^*), the policy and the contribution that are solutions of the bargaining game between the government and the foreign lobby maximize the following constrained Nash product:*

$$(M^F, c^{fF}) \quad = \quad \mathrm{argmax}[G(M, M^*, c^f) - M_0]^{\sigma_G}[L^f(M, c^f) - \tilde{L}_0^f]^{1-\sigma_G}$$

with M_0 the outside option of the government and $\tilde{L}_0^f$ the outside option of the foreign lobby in the sub-coalition game.

Similarly the solution in the foreign sub-coalition maximizes the joint surplus of the sub-coalition with the foreign lobby. The outside option of the lobby is the profit given the policy M_0. M^F is the policy chosen in the foreign sub-coalition such that

$$M^F \quad \text{st.} \quad aW'(M^F, M^*) + \gamma(\Pi^{*f'}(M^F) = 0 \quad \wedge \quad M_n \le M^F \le 2M_n$$

Proof of Proposition 2 : Efficiency I show here that the policies in the grand coalition all maximise the total surplus. I prove it given that the surplus now depends on the size of the foreign contributions and the allocations can be binding.

1. The sub-coalitions are not binding: the solution is efficient.

   I show that the policies that maximize the Nash product maximize the total surplus. At the equilibrium I have:

   $$aW(M, M^*) + c + \gamma c^f - G_0 = \sigma^G[\mathbb{J} - G_0 - L_0 - L_0^f]$$
   $$\Pi(M) - c - L_0 = \sigma^N[\mathbb{J} - G_0 - L_0 - L_0^f]$$
   $$\Pi^{*f}(M) - c^f - L_0^f = \sigma^F[\mathbb{J} - G_0 - L_0 - L_0^f]$$

   I find the expression of c^f at the equilibrium and replace it in the joint surplus:

   $$\mathbb{J}^G(M) = aW(M, M^*) + (\gamma - 1)c^f + \Pi(M) + \Pi^{*f}(M)$$
   $$\Rightarrow \mathbb{J}^G(M) = \frac{1}{1 + \sigma^F(\gamma - 1)}[aW(M, M^*) + \Pi(M) + \gamma\Pi^{*f}] + cte$$

   Therefore the maximisation of the joint surplus given the equilibrium solution of the foreign contribution gives the following FOC:

   $$aW'(M^G, M^*) + \Pi'(M^G) + \gamma\Pi'(M^G) = 0$$

   This is the same as in the FOC found by maximizing the Nash surplus.

2. The national sub-coalition is binding:the solution is efficient

   $$aW(M, M^*) + \gamma c^f + \Pi(M) = \mathbb{J}^N(M^N, M^*) \Rightarrow \gamma c^f = \mathbb{J}^N(M^N, M^*) - aW(M, M^*) - \Pi(M)$$

   $$\mathbb{J}^G(M) = aW(M, M^*) + (\gamma - 1)c^f + \Pi(M) + \Pi^{*f}(M)$$
   $$\Rightarrow \gamma\mathbb{J}^G(M) = aW(M, M^*) + \Pi(M) + \gamma\Pi^{*f}(M) + (\gamma - 1)\mathbb{J}^N(M^N, M^*)$$

   Therefore the maximisation of the joint surplus given the equilibrium solution of the foreign contribution gives the following FOC:

   $$aW'(M, M^*) + \Pi'(M) + \gamma\Pi'(M) = 0$$

   This is the same as in the FOC found by maximising the Nash surplus.

Proof of Proposition 2 : Allocations If the two sub-coalitions are binding,
$$G(M^G, M^{*C}, c^G, c^{fC}) = \mathbb{J}^{\mathbb{N}} + \mathbb{J}^{\mathbb{F}} - \mathbb{J}^{\mathbb{G}}$$

The last case of the government's allocation being higher than the outside option happens when the two sub-coalitions are binding. The allocation is determined such that the two constraints are verified. It results in the following allocations for the three players:

$$\begin{cases} G(.) + L(.) & = \mathbb{J}^{\mathbb{N}} \\ G(.) + L^f(.) & = \mathbb{J}^{\mathbb{F}} \\ G(.) + L(.) + L^f(.) & = \mathbb{J}^{\mathbb{G}} \end{cases} \Leftrightarrow \begin{cases} G(.) & = \mathbb{J}^{\mathbb{N}} + \mathbb{J}^{\mathbb{F}} - \mathbb{J}^{\mathbb{G}} \\ L(.) & = \mathbb{J}^{\mathbb{G}} - \mathbb{J}^{\mathbb{F}} \\ L^f(.) & = \mathbb{J}^{\mathbb{G}} - \mathbb{J}^{\mathbb{N}} \end{cases}$$

with $\mathbb{J}^{\mathbb{N}}$ the joint surplus of the national sub-coalition, $\mathbb{J}^{\mathbb{F}}$ the joint surplus of the national sub-coalition, and $\mathbb{J}^{\mathbb{G}}$ the joint surplus of the grand coalition .

Proof of Proposition 5   I show here that the total surplus functions differ depending in which sub-coalition is formed. This implies that the sub-coalition policy can maximize the total surplus without being equal to the grand coalition policy. In the case of $\gamma = 1$, all surplus functions are equal and the grand coalition policy is the one that maximizes the total surplus.

The total surplus in the grand coalition is given by:

$$\mathbb{J}^G(M, M^*) = \frac{1}{1 + \sigma^F(\gamma - 1)}[aW(M, M^*) + \Pi(M) + \gamma\Pi^{*f}] + \frac{(\gamma - 1)}{1 + \sigma^F(\gamma - 1)}[-\sigma^F(G_0 + L_0) + (1 - \sigma^F)L_0^f]$$

The total surplus in the foreign-subcoalition is given by:

$$\mathbb{J}^{\mathbb{F}}(M^F, M^*) + \Pi(M) = \frac{1}{\gamma(1 - \sigma_G) + \sigma_G}[aW(M^F, M^*) + \gamma\Pi^{*f}(M^F)] + \Pi(M^F) + \frac{(\gamma - 1)[(1 - \sigma_G)G_0 + \sigma_G L_0^f]}{\gamma(1 - \sigma_G) + \sigma_G}$$

The total surplus in the national sub-coalition is given by:

$$\mathbb{J}^N(M, M^*) + \Pi^{*f}(M) = aW(M, M^*) + \Pi(M) + \Pi^{*f}(M)$$

Proof of Proposition 5 : Policies   The expressions of the policies for $\gamma \neq 1$ are given by

$$M^G = M^{*G} \quad = \quad \min\left(2M_n, \max\left(\frac{(A - z)(\gamma - 2)M_n + (z - \phi)aM_n + (A - \phi)(\gamma(1 + M_n) + a)}{(A - z)\gamma + (1 + M_n)(a + \gamma)(\phi - z)}, M_n\right)\right)$$

$$M^N = M^{*N} \quad = \quad \min\left(2M_n, \max\left(\frac{a[(A - \phi) - M_n(\phi - z)] - 2M_n(A - z)}{a(1 + M_n)(\phi - z)}, M_n\right)\right)$$

$$M^F = M^{*F} \quad = \quad \min\left(2M_n, \max\left(\frac{A[\gamma(1 + 2M_n) + a] + M_n(a - \gamma)z - \phi(1 + M_n)(a + \gamma)}{\gamma(A - z) + (1 + M_n)(a + \gamma)(\phi - z)}, M_n\right)\right)$$

Proof of Proposition 5 : Efficiency   I show here that the policies in the foreign sub-coalition maximise the total surplus. I prove it given that the surplus now depends on the size of the foreign contributions and the allocations can be binding.

I define the surplus of the two players $\mathbb{J}^F(M, M^*) = aW(M, M^*) + (\gamma - 1)c^f + \Pi^{*f}(M)$.

$$aW(M, M^*) + \gamma c^f - G_0 \quad = \quad \sigma_G[\mathbb{J}^F(M) - G_0 - L_0^f]$$
$$\Pi^{*f}(M) - c^f - L_0^f \quad = \quad (1 - \sigma_G)[\mathbb{J}^F(M) - G_0 - L_0^f]$$

Finally I can show that the total surplus for the three players when the government and the foreign lobby play the political bargaining game is:

$$\mathbb{J}^F(M^F, M^*) + \Pi(M^F) \quad = \quad \frac{1}{\gamma(1 - \sigma_G) + \sigma_G}[aW(M^F, M^*) + \gamma\Pi^{*f}(M^F)]$$
$$+ \quad \Pi(M^F) + \frac{(\gamma - 1)[(1 - \sigma_G)G_0 + \sigma_G L_0^f]}{\gamma(1 - \sigma_G) + \sigma_G}$$

Proof of lemma 6   I show that $\frac{\partial M^G}{\partial \gamma}$ can be written as a second-degree polynomial of the variable M_n such that $\frac{\partial M^G}{\partial \gamma} = \alpha M_n^2 + \beta M_n + \delta$. Given that $\alpha = 2(A - z)(\phi - z)(a + 2) > 0$, I can conclude that either $\frac{\partial M^G}{\partial \gamma} \geq 0$ for all M_n or there exists two solutions $M_{n,1}$ and $M_{n,2}$ such that $\frac{\partial M^G}{\partial \gamma} = 0$ and $\frac{\partial M^G}{\partial \gamma} \geq 0$ for $M_n \leq M_{n,1}$ and $M_n \geq M_{n,2}$. For simplicity, I only consider $M_{n,2}$ in the last case. Therefor there exists a $\tilde{M}_n$ such that $\frac{\partial M^G}{\partial \gamma} = 0$ and such that

$$M_n \leq \tilde{M}_n \Rightarrow \frac{\partial M^G}{\partial \gamma} \leq 0 \quad \wedge \quad M_n \geq \tilde{M}_n \Rightarrow \frac{\partial M^G}{\partial \gamma} \geq 0$$

8.3.2 Proofs Section 4

Proof of Proposition 7   This results from the restriction in Lemma 6 such that $\frac{\partial M^G}{\partial \gamma}$ and Result 7 according to which $M^N < M^G < M^F$.