Profit shifting and Foreign entry restrictions.

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Abstract

Foreign Direct Investment (FDI) has surged but various foreign entry restrictions remain. Investment agreements aim at partly removing these restrictions. This paper studies the economic and political determinants of foreign entry restrictions and of investment agreements in the context of transfer pricing by multinationals. We develop a new model in which governments can restrict the entry of foreign affiliates and multinationals can shift their profits using transfer pricing. We find a new economic rationale for foreign entry restrictions which limit the entry of foreign affiliates that both decrease national firms’ profits and repatriate part of their profits abroad. We show that (i) restrictions increase in the foreign intra-firm price and that (i) countries are trapped in a prisoner’s dilemma when they set optimal foreign entry restrictions non-cooperatively. Using a coalitional bargaining model where both national firms and foreign affiliates can lobby, we show that (i) lobbying can reduce restrictions compared to the case of no lobbying when the intra-firm price is not too high and that (ii) domestic lobbying might then be preferred to a costly investment agreement. Finally we use two proxies for the profit shifting behaviour to provide empirical evidence that profit shifting affects the choice of FDI restrictions.

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1 Introduction

While tariffs have almost completely disappeared, various foreign entry restrictions remain for multinationals (OECD 2010). The number of bilateral investment agreements has been increasing (see the UNCTAD database for BITs). While the determinants of tariffs and of trade agreements have been studied for cross-border exports, there is little analysis of the determinants of foreign entry restrictions and of investment agreements. This is surprising given that the activities of multinationals (UNCTAD (2015)) and the share of trade in services through commercial presence (Jensen (2011)) have been increasing. In this paper we demonstrate the role of transfer pricing that allows multinationals to shift profits across countries as determinants for foreign entry restrictions and investment agreements. (UNCTAD (2015)) stresses the need to reduce tax avoidance to implement coherent investment policies. We also show that transfer pricing can undermine the positive role of foreign lobbying which lowers foreign entry restrictions. We finally provide empirical evidence that profit shifting affects foreign entry restrictions using OECD and WB data on foreign entry restrictions.

We proceed in two steps. In the first part of the paper we develop a new model to study both the economic and political determinants of foreign entry restrictions and of investment agreements in the context of transfer pricing by multinationals. Governments can restrict the entry of foreign affiliates and multinationals can shift their profits using transfer pricing. We allow both national firms and foreign affiliates to give contributions to the government to influence its policy choice. We define first the non-cooperative equilibrium between the two countries when each government can choose to play a domestic lobbying game and second the cooperative equilibrium. We show that restrictions arise when the intra-firm price is higher than its marginal cost and when it is costly to export an intermediate good to the affiliates abroad. Restrictions increase in profits shifting from the foreign multinationals, i.e. in the intra-firm price. Countries are trapped in a prisoner’s dilemma when they set optimal foreign entry restrictions non-cooperatively. Using a coalitional bargaining model where both national firms and foreign affiliates can lobby, we show that restrictions can be lower in the political game compared to the case of no lobbying due to the positive role of lobbying by foreign affiliates. This positive role is undermined when multinationals shift a large part of their profits home, i.e. the intra-firm price is high. In the cooperative game foreign free-entries are the terms of the agreement only when it is not costly to export inside the firm toward the affiliates abroad. We show that the domestic political game might be preferred to a costly investment agreement when foreign lobbying largely reduces restrictions. However a large profit shifting through transfer pricing undermines this positive role and a costly investment agreement is more likely to be preferred. In an extension of the model we assume that foreign contributions are undervalued by the government such that sub-coalitions between the government and one lobby only can be the outcome of the domestic game. Whereas a sub-coalition with the national firms only chooses less restrictive policy, a sub-coalition with the foreign firms only chooses fewer restrictions.

In the second part we provide empirical evidence of our mechanism using two datasets of foreign entry restrictions: the OECD index of FDI restrictions and the new World Bank index of foreign entry restrictions in the services sector. We build two indexes as proxies for profits shifting and show that they lead to an increase in restrictions. When studying both OECD and
non-OECD countries, we show that the corporate tax rate affects foreign entry restrictions only when there are growth opportunities in the host countries. The tax rate and growth opportunities are then complement when explaining the impact of profits shifting on foreign entry restrictions.

The paper is organized in four parts. First I describe the non-cooperative game when governments simultaneously choose their polices through a domestic bargaining game with their lobbies. Then governments can cooperate and commit to an agreement. The third part extends the model and adds an aversion toward foreign influence. The last part provides empirical evidence that a higher repatriation of profits affects foreign entry restrictions.

2 Literature

There is a long literature on the rationales why countries negotiate over tariff reductions to explain the successes of GATT/WTO negotiations. The standard theory explains that countries impose tariffs to gain over other countries by manipulating their terms-of-trade (Johnson (1953-54), Grossman and Helpman (1995), Bagwell and Staiger (1999)). These models argue that it is the only trade policy externality these negotiations are about. Another theory of trade agreements has been developed by Maggi and Rodriguez-Clare (1998) and Maggi and Rodriguez-Clare (2007). Agreements allow governments to tie their hands vis-a-vis lobbying pressures that create long-term economic inefficiencies. More recently Ossa (2011) offers an additional explanation to complement the standard terms-of-trade theory by building on the Krugman 'new trade' model. Tariffs are then chosen to host more of the world’s manufacturing firms. When governments do not cooperate countries impose inefficiently high tariffs because they want to attract firms to locate in the home country. An agreement solves for this externality. More recently, Mrazova (2009) and Mrazova (2011) use oligopolistic models and show that profit-shifting from the foreign firms towards the domestic firms is a rationale for protectionism. Our paper differs by studying the trade policy defined like the number of foreign firms allowed to enter the country. In addition the profit-shifting emerges between domestic firms between the national firms and the foreign affiliates in the same country. This strand of the literature only focuses on tariffs and GATT/WTO negotiations. Nowadays, most of the tariffs are very low and negotiations focus on other types of trade barriers. In addition it does not explain the GATS negotiations on services. One major difference between trade in goods and services comes from the fact that tariffs mostly do not apply for services which are provided through commercial presence. This paper therefore aims at answering the following question "Are services agreements different because services are provided through affiliates?" from Mavroidis (2011). We offer a new model to understand negotiations for horizontal FDI barriers.

In our model we focus on FDI barriers given that FDI has surged over the last decades whereas various restrictions on FDI flows remain. We offer a new rationale that motivates negotiations over FDI barriers. To our knowledge, no paper has offered such an explanation. In addition we study the interactions between this new externality and the existence of lobbying pressures. Maggi and Rodriguez-Clare (1998) argue that governments do not want to commit because they get positive contributions from playing the lobbying game. In addition we suggest
a new role for lobbying. Our model shows that foreign lobbying by indirectly pushing towards
less restrictive policies solves for the initial inefficiency an agreement is about. This aspect is
new in the literature.

Lobbying has been extensively studied, but few papers have focused on foreign lobbying.
Gawande et al. (2006) is one among the few that empirically shows a positive impact of foreign
lobbying on trade barriers in the US. Our contribution is first to distinguish between domestic
and national lobbies. With horizontal FDI taking place, domestic lobbies represent national
firms and foreign affiliates producing in one country. In this paper we clearly study the partic-
ular role of foreign lobbying. Similarly to Gawande et al. (2006), foreign lobbying lowers trade
barriers but it might also remove the externality problem that justifies the need for an agreement.
Several papers Conconi (2003), Antrnd Padriquel (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 Antrnd Padriquel (2011) develops a political model with a voting mechanism and
considers government to government pressures instead of a foreign lobbying channel. In addition
we study the impact of the aversion towards foreign lobbying on the public policies and the
formation of lobbying coalitions. We model this aversion or national preference as a probability
for governments that value foreign contributions to be punished. In the paper we tackle the
issue of lobby formation and the free-rider problem. Bombardini (2008) deals with the lobby
formation by having a cost of channeling political contributions and heterogenous firms. Given
this fixed costs it is efficient for the least productive firms not to participate. In this paper we do
not have a fixed cost of lobbying however some foreign firms free ride in a model with an order
of entry. The first affiliates to enter does not participate in the lobby even if they might benefit
from the foreign lobbying. Some firms might even lobby for more restrictions in order to lower
the domestic competition and behave like another national firm.

Finally International ownership and trade agreement have been studied in Blanchard (2010).
She shows that international ownership might mitigate the reasons why countries choose inef-
ficient policies. This is among the first attempts to focus on policies about FDI barriers and
multinational firms. International ownership leads governments to take into account the conse-
quences of their policy on the foreign country in which their firms have invested. However this
paper still focuses on tariffs rather than FDI barriers as our paper does. In our model the level
of repatriation of profits at home covers the different types of international ownership. No repa-
triation of profit from the affiliates illustrates the multinational case whereas a full repatriation
of profits models FDI.

A last contribution of the paper is to model a political bargaining between three players: the
government and the national and foreign lobbies. Bargaining with more than two players is more
difficult to model. Maggi and Rodriguez-Clare (1998) only models a two-player game between
the government and one lobby. We use the concept of "coalition bargaining equilibrium" from
Compte and Jehiel (2010) and study the possible outcomes depending on which coalition emerge
from the game. This coalitional approach has not been used to study competition between lob-
3 The model

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

3.1 The economic structure

The demand

In each country, we consider a representative consumer, one homogenous good and a numeraire. The demand functions are taken to be identical across countries. We assume a representative consumer that consume the domestically-produced homogenous good and a numeraire\(^1\) that represents the rest of the production. We assume that the utility \(U\) is quasi-linear. This implies that the demand for the good X only depends on the price, not on the revenue.\(^2\) The utility of the representative consumer is given by\(^3\):

\[
U(x_0, X) = x_0 + u(X) \quad \text{st.} \quad x_0 + PX \leq R
\]

with \(x_0\) the consumption of the numeraire, \(X\) the consumption of the other good and \(R\) the revenue given by the rents from the production sector.

We assume \(u(X) = AX - \frac{X^2}{2}\).

The consumer surplus is \(H(P) = u(D(P)) - PD(P) = \frac{(A-P)^2}{2}\) and \(H'(P) \leq 0\).\(^4\)

The production

We focus on the production of the homogenous good. In this paper we study horizontal FDI, firms are born in a certain country and can start investing abroad by opening an affiliate in the other country. A foreign affiliate allows the firm to produce in the host country and sell to its consumers only. At Home national firms and affiliates of foreign firms can both produce the good for Home consumers. Foreign firms do not export but are allowed to trade through affiliates. Similarly Home firms can create affiliates in the Foreign country to sell to Foreign consumers, and Foreign firms can create affiliates in the Home country to sell to Home consumers.

In the Home economy there is a total mass \(M\) of firms that produce the homogenous good. All firms are assumed to be identical regarding their production capacity. We now differentiate firms according to their nationality, given by the country in which the firms are born. Among the total mass \(M\) of firms in country Home, a mass \(M_n\) are national firms and the rest \(M_f = M - M_n\) are affiliates from Foreign firms. In the rest of the paper we focus on the short-term equilibrium and assume that the mass \(M_n\) of national firms is given at the beginning of the period and is

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\(^1\)The numeraire is produced with constant returns to scale with a per-unit cost of one which implies that its price is equal to one.

\(^2\)We consider a partial equilibrium model with \(x_0\) the rest of the economy. Therefore we do not consider the case for \(x_0 = 0\) and \(X = R/P\).

\(^3\)The linearity of demand is not essential for our results but simplifies their derivation and presentation.

\(^4\)The surplus is defined by \(H(P) = \int_p D(p)dp\) and the Roy’s law gives \(D(p) = -v'(p)\) with \(v\) the indirect utility function defined by \(v(p) = u(D(p)) - pD(p)\)

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6
We assume oligopolistic competition à la Cournot, there is no free-entry and the price \( P(M) \) depends on the number of firms. The mass of firms is here only determined by the entry of foreign affiliates in the production process.

Each firm, either a national firm or a foreign affiliate, produces an individual quantity \( q(M) \) and the total production is given by \( Q(M) = M \times q(M) \). Given that there is no free-entry, individual profits are not driven to zeros and are therefore positive \( \pi \geq 0 \).

We use the model from Davies et al. (2014) for the strategies of the multinationals that use transfer pricing. We assume that the firm produces an intermediate good in its home country at a constant marginal cost \( c \) and sells it to its affiliates at a price \( p_{MNE} \). We assume that exports can be costly and we denote by \( g(p_{MNE}) \) the price that has to be paid by the affiliates to receive the intermediate goods. We assume constant returns to scale for the production of the intermediate goods and for the production of the final good. We denote by \( c \) the marginal cost of the intermediate production. The production of the final good is costless and transforms one unit of intermediate good into one unit of final good. The incentives of the firms to open an affiliate are not modelled. For simplicity it is also assumed that the cost of opening an affiliate is null and that the profit of the affiliate will be positive. The mass of affiliates that are open is then only determined by the government’s policy in the next subsection.

The individual domestic profit of a Home firm is

\[
\pi(M) = \left[ (P(M) - c)q(M) \right]
\]  

(3.1)

with \( q \) the individual production per firm and \( P \) the price of the final homogenous good in the Home country.

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

\[
\pi^f(M) = \left[ (P(M) - g^*(p_{MNE}^*))q(M) \right]
\]  

(3.2)

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

\[
\pi^f(M) = \left[ (P^*(M^*) - g(p_{MNE}))q^*(M^*) \right]
\]  

(3.3)

with \( q^* \) the individual production per firm and \( P \) the price of the final homogenous good in the Foreign country.

Firms set a price \( p_{MNE} \) that might differ from the arm’s length price \( \tilde{p} \) which is the price of a firm selling the intermediate good to a third party. This defines the transfer pricing strategy that allows multinationals to shift profits towards low-tax countries. For the moment we do not model the transfer pricing strategy and take the price \( p_{MNE} \) as exogenous. The multinational repatriates profit at Home by choosing a high price for the intermediate good to be sent abroad.
\( p_{MNE} > \tilde{p} \) whereas it shifts profit abroad by choosing a low price for the intermediate good \( p_{MNE} < \tilde{p} \). In this paper we keep \( \tilde{p} \) as exogenous for simplicity.

**The policy**

We assume that the only policy instrument of the government is a market access restriction in the production sector. The government chooses the final mass \( M \) of firms to restrict the entry of foreign producers that directly compete with national producers. More precisely, the government takes as given the mass of national firms \( M_n \) and sets a value for \( M \) which directly determines the mass of non-national suppliers allowed to produce in the country.

On this paper we introduce the possibility for lobbies to be formed and influence the choice of the government.

**The lobbies**

We assume that firms are able to coalesce in a lobby in order to affect the trade policy chosen by the government. For simplicity we 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"). Both lobbies can give contributions to the government at the time when the government chooses the trade policy, i.e. the restrictions on the mass of foreign affiliates that can start producing in the country and compete with the national firms. The national and foreign lobbies have different objective functions.

National firms value protection against foreign entry at Home. Indeed a higher mass 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 will give contributions in order to increase the restrictions on foreign entry and lower the choice of the final mass \( M \).

The national lobby’s objective is given by:

\[
L(M, c) = M_n\pi(M) - c
\]

On the contrary, foreign affiliates might value both less or more protection. Similarly to national firms’ domestic profits, individual Foreign affiliates’ profits decrease in the mass of total firms \( M \). However the foreign lobby represents the sum of all foreign affiliates’ profit and the aggregate profit might decrease in the mass of firms. The purpose of the foreign lobby is not straightforward and might push towards more or less protection. The foreign lobby’s objective is given by:

\[
L^f(M, c^f) = (M - M_n)\pi^f(M) - c^f
\]

**The government**
The government chooses the trade policy, i.e. the mass 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

\[ W^g(M, M^*) = H(M) + \Pi(M, M^*) + \Pi^{*f}(M) \]

with

\[ \Pi(M, M^*) = \Pi(M) + \Pi^{*f}(M^*) = M_n\pi(M) + (M^* - M^*_n)\pi^f(M^*) \]
\[ \Pi^{*f}(M) = (M - M_n)\pi(M) \]

When the government plays the political game, both lobbies can give contributions to influence the policy. Following Grossman and Helpman (1994), we 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. We assume a national preference, or aversion towards foreign influence, which is an adverse reaction of the voters towards foreign affiliates’ expenditures to affect government’s policies. We model this aversion by a punishment cost for the government that receives foreign contributions. Foreign contributions are publicized and punished with a probability \(1 - \gamma\). For simplicity we assume a punishment cost equal to the foreign contributions. Given this structure of punishment the government always accepts to receive foreign contributions which only benefits him with a probability \(\gamma\). This is similar to the model of Gawande et al. (2006) in which foreign contributions are assumed to be less valued by the government. This undervaluation is empirically showed by Gawande et al. (2006).

When the government accepts contributions from the lobbies, his objective is a weighted average of his previous social utility and of the contributions:

\[ G(M, M^*, c, c^f) = aW^g(M, M^*) + c + \gamma c^f \]

\(\gamma\) is the probability for foreign contributions not to be punished by Home consumers and implies that the government values less foreign contributions\(^5\).

In this model, there are two countries, Home (no \(^*)\) and Foreign (\(^*)\), that are symmetric. The previous description of the economic and political structures symmetrically applies for the Foreign country. We consider first the non-cooperative game between the two countries in which each country simultaneously decides his policy in a non-cooperative way. Second we consider the cooperative game in which the two countries can initially agree to commit to a policy through an agreement. The last part focuses on the aversion towards foreign contributions and adds a

\(^5\)The full government’s objective is the following: \( G = aW^g(M, M^*) + c + c^f + (1 - \gamma)(-c^f) \).
4 The non-cooperative world game

In this section, countries simultaneously decides their policy \((M)\) in a non-cooperative way. This policy may be decided through a domestic lobbying game. We describe here the domestic game in country Home. Given that the two countries are symmetric, the same game takes place in country Foreign.

The timing There are two periods in this game. At the beginning, the mass of national firms born in each country \((M_n)\) and the tax rates are fixed. At \(t = 1\) the government chooses the trade policy, i.e the number of foreign affiliates that can enter the country, when playing the domestic political game with the two lobbies. 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 \(t = 2\). The part that needs to be more detailed is the domestic game between the government and the lobbies at the period \(t = 1\).

4.1 The production/consumption equilibrium \((t=2)\)

At \(t = 2\), the number of producers has been chosen. Each producer maximizes his profit in an oligopolistic framework.

The production/consumption equilibrium Given the governments’ policy \(M\), the price \(P(M)\) and the quantities are determined and verify the optimality conditions of the producers and consumers as well as the good market clearing condition.

There are no exports of final goods between the two countries so the price only depends on the domestic policy.

The solutions are those of an oligopolistic setting with \(M\) firms.

\[
P(M) = \frac{1}{M+1} A + \frac{M}{M+1} c \rightarrow_{M \rightarrow \infty} c
\]

\[
g(M) = \frac{1}{M+1} (A - c) \rightarrow_{M \rightarrow \infty} 0
\]

\[
\pi(M) = \frac{1}{(M+1)^2} (A - c)^2 \rightarrow_{M \rightarrow \infty} 0
\]

\[
\pi^f(M) = \left( P - g^* (p^*_{MNE}) \right) \frac{A - c}{M + 1}
\]

\[
= \frac{(A - c)(M(c - g^*(p^*_{MNE})) + A - g^*(p^*_{MNE}))}{(M + 1)^2}
\]

We can notice that the profit of the foreign affiliate in the Home country \((\pi^f(M))\) differs from the profit of a national firm \((\pi(M))\).
4.2 The domestic lobbying game \((t = 1)\): the grand coalition

At \(t = 1\) the government and the two lobbies have the choice whether to play a bargaining game to determine the policy \(M\) or not. The lobbies can influence the choice of the government through contributions. In order to determine the best strategy of the government, we first consider the utilities in the two cases for any foreign policy \(M^*\).

4.2.1 No political game

When there is no lobbying, the government does not receive any contributions and maximizes his social welfare \(W\).

Given the policy in the other country \(M^*\), the solution \(M_0\) with no lobbying and repatriation of profits (0) is given by

\[
M_0 = \max_{M} W(M, M^*)
\]

and

\[
M_0 = \frac{2A - c - g^*(p_{MNE}^*)}{g^*(p_{MNE}^*) - c}
\]

We can notice that \(M_0\) does not depend on \(M^*\) because of the linearity of the domestic profits or of the foreign affiliates’ profits. It however depends on the intra-firm firm chosen by the multinationals in the Foreign country. In this part we assume that the profit shifting behavior is exogenous and does not depend on the policy chosen in the Foreign country. Finally given the policy in the other country \(M^*\), the utility of the government when not playing the political game is:

\[
G_0 = G(M_0, M^*) = aW(M_0, M^*) + 0
\]

4.2.2 The bargaining game

In this part the government and the two lobbies can bargain to determine the policy. We assume that there is no cost of punishment for a government to accept foreign contributions such that \(\gamma = 1\). Foreign and national contributions are valued in the same way. We relax this assumption in the last section.

Following Maggi and Rodriguez-Clare (1998)\(^6\) we model the political game as a bargaining game between the government and the lobbies. Whereas it is easy to model a bargaining game between two players, a bargaining game between three players is more demanding. We then use the concept of "coalitional bargaining" developed in Compte and Jehiel (2010). This bargaining game can be applied to any number of players and is conceptually close to the bargaining game definition used for two players in the literature. The difference comes from the possibility for any subset of players to quit the grand coalition and form a sub-coalition. This possible outcome is similar to the outside option in a two-player game. The new equilibrium is the solution of the weighted Nash product given the constraints that a subset of players can form a sub-coalition.

\(^6\)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.
The additional constraints allow the grand coalition to be stable. We can already notice that the government which chooses the policy has to be in any sub-coalition, so we assume that only the government and one lobby can coordinate to form a sub-coalition. This means that the two lobbies cannot coordinate not to participate in the bargaining game. A coordinated deviation for the two lobbies to quit the game is not possible. Therefore the outside option of each lobby is the solution of the sub-coalition game without their participation.

There are two sub-coalitions that can be formed here: the national sub-coalition between the government and the national lobby, and the foreign sub-coalition between the government and the foreign lobby.

**The coalitional bargaining solution** Given the policy in the other country $M^*$, the solutions of the bargaining game between the government and the two lobbies are given by:

$$(M^C, c^C, c^f) =_{(M,c,c^f) \in \mathbb{R}^3} \left[ G(M, M^*, c, c^f) - G_0 \right]^{\sigma_G} \left[ L(M, c) - \Pi(M^F) \right]^{\sigma_N} \left[ L^f(M, c^f) - \Pi^*f(M^N) \right]^{\sigma_F}$$

subject to:

$G(.) + L(.) \geq \mathcal{J}^N(M^N, M^*)$ (binding national sub-coalition)

$G(.) + L^f(.) \geq \mathcal{J}^F(M^F, M^*)$ (binding foreign sub-coalition)

with $G_0$ the outside option of the government, $\mathcal{J}^N$, resp. $\mathcal{J}^F$, the joint surplus of the national sub-coalition, resp. of the foreign sub-coalition, and $M^N$ ($M^F$) the policy chosen in the national sub-coalition (foreign sub-coalition). $\sigma_G$ is the bargaining power of the government.

In annex we show that the grand coalition is always the equilibrium formation in this game because the policy $M^C$ maximises the joint surplus. It could then be profitable for two agents to deviate but never for all the agents.

**The policy** In the grand coalition with the government and the two lobbies, the solution of the Nash product is efficient and maximises the joint surplus.

$$M^C =_{M} \mathcal{J}^C(M, M^*)$$

with $\mathcal{J}^C(M, M^*)$ the joint surplus of the grand coalition given by

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

The bargaining game is defined both by a policy $M^C$ and some allocations $(G(.), L(.), L^f(.))$ for the three players defined through contributions. These allocations are defined either through the maximisation of the Nash product according to each player’s bargaining power or through the constraints. The constraints are defined by the possible deviations of the government and one lobby to form a sub-coalition.

**The sub-coalitions** The outside options are the games when not all three agents play the political bargaining game. The government and one of the two lobbies can choose not to play in the grand coalition, or one of the lobbies can choose unilaterally not to participate in the political game.
The following graphic illustrates the cases for which one of the constraints might be binding. When the joint surplus in the national sub-coalition $\mathcal{J}^N$ is higher than the sum of the allocations of the government $G()$ and of the national lobby $L()$, there is a profitable deviation. The same happens for the foreign sub-coalition with the surplus $\mathcal{J}^F$.

![Diagram showing four cases: The sub-coalition government + foreign lobby is binding, The sub-coalition government + national lobby is binding, The two sub-coalitions are binding, No binding sub-coalitions.]

Figure 1: The four different cases depending on which sub-coalitions might be binding.

The outcomes of the two sub-coalitions are given by the following two propositions.

**The national sub-coalition** When the government and the national lobby play a two-player bargaining game, the policy and the contribution solve the Nash product given the policy in the other country $M^*$.

\[
(M^N, c^N) =_{(M,c) \in \mathbb{R}^2} \left[ G(M, M^*, c) - G_0 \right]^{{\sigma_G}} \left[ L(M, c) - L_0 \right]^{1-\sigma_G}
\]

with $G_0$ the outside option of the government, and $L_0$ the outside option of the national lobby.

The solution in the national sub-coalition maximises the joint surplus and is given by:

\[
M^N = M \quad aW(M, M^*) + M_n \pi(M)
\]

The surplus is

\[
\mathcal{J}^N(M^N, M^*) = aW(M^N, M^*) + M_n \pi(M^N)
\]

**The foreign sub-coalition** When the government and the foreign lobby play a two-player bargaining game, the policy and the contribution solve the Nash product given the policy in the
other country $M^*$.

$$(M^F, c^{f,F}) =_{(M,c^f)} (M,M^*,c^f) \in \mathbb{R}^2$$

$$\left[ G(M,M^*,c^f) - G_0 \right]^{\sigma_G} \left[ L^f(M,c^f) - L^f_0 \right]^{1-\sigma_G}$$

with $G_0$ the outside option of the government, and $L^f_0$ the outside option of the foreign lobby.

The solution in the foreign sub-coalition maximises the joint surplus and is given by:

$$M^F = M \quad aW(M,M^*) + (M - M_n)\pi(M)$$

The surplus is

$$\mathcal{J}^F(M^F, M^*) = aW(M^F, M^*) + (M^F - M_n)\pi(M^F).$$

We can now compare the two policies chosen in the two sub-coalitions and the policy chosen in the grand coalition.

**Remark 1 (Comparative statics)** We can show that (i) the policy chosen in the foreign sub-coalition ($M^F$) is always less restrictive than the policy chosen in the grand coalition ($M^C < M^F$), and that (ii) the policy chosen in the national sub-coalition ($M^N$) is more restrictive ($M^N < M^C$) when the extensive margin of the foreign lobby is higher and less restrictive ($M^C < M^N$) when its intensive margin is higher.

The foreign lobby might either support more entry if he benefits more from an additional entry - the extensive margin is higher- or support less entry if he benefits more from a higher marginal individual profit - the intensive margin is higher-. The foreign lobby benefits from an additional entry if $-(M^C - M_n)\pi'(M^C) \leq \pi(M^C)$ and benefits from a higher marginal individual profit if $-(M^C - M_n)\pi'(M^C) \geq \pi(M^C)$.

Given the surplus for the two possible sub-coalitions we can define the allocations for each player and determine whether the government wants to play the domestic bargaining game.

**4.2.3 The equilibrium of the non-cooperative world game**

The previous part describe the strategic choices of the bargaining game in the Home country. The same strategy is chosen by the other country which is symmetric. In the two countries, the strategies of the non-cooperative world game are to play the domestic grand-coalition bargaining game. The government is indeed always compensated by the lobbies for not choosing his outside option. We can now compute the final allocations in the non-cooperative world game given that each government always prefers to play the bargaining game with his lobbies. For the rest of the paper we focus on the particular case of a null government’s bargaining power ($\sigma_G = 0$).

**Proposition 1 (The non-cooperative world equilibrium)** The equilibrium policies in the non-cooperative world equilibrium are the solutions of the domestic grand-coalition bargainings.
\((M^C, M^{C*})\) defined by

\[
M^C = \frac{(a + 1)[(A - g^*(p^*_{\text{MNE}})) + M_n(c - g^*(p^*_{\text{MNE}}))]}{A - c + (1 + M_n)(a + 1)(g^*(p^*_{\text{MNE}}) - c)}
\]

\[
M^{C*} = \frac{(a + 1)[(A - g(p_{\text{MNE}})) + M_n(c - g(p_{\text{MNE}}))]}{A - c + (1 + M_n)(a + 1)(g(p_{\text{MNE}}) - c)}
\]

The Home government’s allocation is given by:

\[
G(M^C, M^{C*}, c^C, c^{C^*}) = \begin{cases} 
  aW^\phi(M^\phi_0, M^{\phi*}_0) & \text{if at most one sub-coalition is binding and } M^C < M_0 \\
  aW^\phi(M^C, M^{C*}) & \text{if at most one sub-coalition is binding and } M^C \geq M_0 \\
  J_N + J_F - J_C & \text{if the two sub-coalitions are binding.}
\end{cases}
\]

The Foreign government’s allocation is symmetric.

This result differs from the literature on commitment that finds that a government always gets his outside option when he has no bargaining power. This is only happening in the first case when at most one sub-coalition is binding and the policy chosen in the grand coalition bargaining is more restrictive than the policy when there is no political game \((M^C < M^\phi_0)\).

The interesting case is when the policy chosen in the grand coalition bargaining is less restrictive than the policy when there is no political game \((M^C \geq M^\phi_0)\). This means that the foreign lobby leads towards more entry compared to the no-lobby situation. Given that the government has no bargaining power, he is only compensated for playing the lobbying game. However in the case of \(M^C \geq M_0\), the final utility of the government without any contributions is higher than the final outside option \(aW(M^C, M^{C*}) > aW(M^\phi_0, M^{\phi*}_0) = G_0\). This is due to the fact that \(M_0\) is chosen without considering the policy of the other country which itself affects the final utility of the government. A less restrictive policy (i.e. a higher number of firms) in the two countries increases the utility of the government which also benefits from the increasing entry for his firms’ affiliates in the other country. At the equilibrium the government does not receive any contributions but has a higher utility than his outside option.

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:

\[
\begin{align*}
G(.) + L(.) &= J_N \\
G(.) + L^I(.) &= J_F \\
G(.) + L(.) + L^I(.) &= J_C
\end{align*}
\]

\[
\begin{align*}
G(.) &= J_N + J_F - J_C \\
L(.) &= J_C - J_F \\
L^I(.) &= J_C - J_N
\end{align*}
\]

with \(J_N\) the joint surplus of the national sub-coalition, \(J_F\) the joint surplus of the national sub-coalition, and \(J_C\) the joint surplus of the grand coalition.
4.3 Comparative statics

We now focus on the case when at most one sub-coalition is binding. The government’s allocation depends whether the policy chosen in the grand-coalition bargaining ($M^C$) is more or less restrictive than the policy chosen when there is no domestic bargaining game ($M_0$).

In the previous part we showed that the solutions of the non-cooperative world equilibrium with no lobbying ($M_0, M^*_0$) are given by:

$$M_0 = \frac{2A - c - g^*(p^*_\text{MNE})}{g^*(p^*_\text{MNE}) - c} \quad \text{and} \quad M^*_0 = \frac{2A - c - g(p\text{MNE})}{g(p\text{MNE}) - c}$$

The following proposition details the equilibrium when there is no lobbying.

**Proposition 2 (No lobbying: free-entry vs restrictions)** When there is no lobbying, we can show that

i. Foreign free-entry is the solution when the intra-firm price of the intermediate good is equal to its marginal cost ($p\text{MNE} = c$) and when it is not costly to send it overseas ($g(p\text{MNE}) = p\text{MNE}$).

ii. Foreign entry restrictions arise otherwise ($p\text{MNE} > c$ or $g(p\text{MNE}) \neq p\text{MNE}$) and increase in the intra-firm price chosen by the foreign multinationals ($\frac{\partial M_0}{\partial p\text{MNE}}$).

**Proposition 3 (Pareto inefficiency)** Nash entry policies in the non-cooperative world equilibrium with no lobbying ($M_0, M^*_0$) are inefficient when the price paid by the foreign affiliates for the intermediate good is larger than its cost ($g(p\text{MNE}) \neq c$ and $g^*(p^*_\text{MNE}) \neq c$).

**Proposition 4 (Comparative statics)** There exist two thresholds $\tilde{g}$ and $\tilde{a}$ such that the policy chosen when playing the bargaining game is less restrictive than when not playing the game ($M^C > M_0$) if the intra-firm price for the intermediate good is low enough ($g < \tilde{g}$) and the social weight high enough ($a > \tilde{a}$).

5 The cooperative world game: the agreement

In this section, we introduce the possibility for countries to initially ($t = 0$) cooperate to choose together their policies and commit through an agreement. An agreement allows the government to choose a policy that he would not choose by playing the non-cooperative game and tie his hands for the rest of the period. Taking into consideration that an agreement might be costly, it is only useful when it creates positive externalities. We assume that this agreement is perfectly enforceable such that there is no domestic political game any more at $t = 1$. In addition we assume that there is no ex-ante lobbying.\footnote{cf Maggi and Rodriguez-Clare (2007) for an example of ex-ante lobbying.}

**The timing** There are three periods in this game. At the beginning, the mass of national firms born in each country ($M_n$) is fixed. At $t = 0$ governments can cooperatively choose the trade policies and commit by signing an agreement. At $t = 1$, if an agreement that determine
policies is signed, commitment is perfect so there is no domestic political game between the government and the lobbies any more. At $t = 1$, if no agreement is signed, there is the domestic political game between the government and the lobbies as previously described. 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 $t = 2$. The part that needs to be more detailed is the world game between the two governments at $t = 0$.

First the production/consumption equilibrium at $t = 2$ is the same as in the previous part. At $t = 1$ there is no domestic bargaining game if governments have committed in the first stage.

5.1 The world cooperative game ($t = 0$)

We assume that the two symmetric countries play a bargaining game to choose the agreement policies. The solutions are efficient and maximize the joint surplus.

**Proposition 5 (The optimal agreement)** The optimal terms of the agreement are given by

\[ M^{ag} = \frac{A - c}{(g^*(p_{MNE}^*) - p_{MNE}^*)(1 + M)} - 1 \quad \text{and} \quad M^{*ag} = \frac{A - c}{(g(p_{MNE}) - p_{MNE})(1 + M)} - 1 \]

We can show that

i) The terms of the agreement are foreign free-entry only when there is no cost for a multinational to export the intermediate good to its affiliate ($g(p_{MNE}) = p_{MNE}$ and $g^*(p_{MNE}^*) - p_{MNE}^*$).

ii) The terms of the agreement are more restrictive when it is more costly to export intermediate goods.

An agreement allows the two governments to commit to a policy that differs from the policy chosen in the non-cooperative world game. Governments now take into consideration that the choice of one policy affects the utility of the other government through the repatriated profits of his affiliates. In the non-cooperative game, the two governments play simultaneously and cannot directly affect the choice of the policy abroad. They therefore choose their policy without taking these profits made in the other country into account. This changes in a cooperative game.

In addition the policy of the cooperative game is the same as in the non-cooperative game when there is no repatriation. In that case the government’s utility only depends on the profits of the foreign firms’ affiliates. His firms do not repatriate any profits back so the previous externality problem disappears.

---

8We 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. In this paper we have assumed that the two countries are symmetric.
5.2 Costly agreement versus foreign lobbying

In this part we determine whether the government prefers to commit to an agreement or play
the domestic political game. We keep considering the case of no bargaining power for the gov-
ernment and no punishment for foreign contributions. Non-zero bargaining powers will lead to
the previous results (Maggi and Rodriguez-Clare (1998) and Maggi and Rodriguez-Clare (2007))
that the government might prefer to play the domestic game when he gets enough contributions.
Here we focus on no bargaining power for the rest of the part to be more clear. In another
paper I look into more details on a similar problem applied to trade in services with non-zero
bargaining powers.

We consider now that negotiating an agreement is costly. When there is no cost, the govern-
ment always chooses to commit for our particular case of interest (one sub-coalition is binding
at most and \( M^C > M_0^\phi \)). The policies \((M_0, M_0^*)\) are never chosen in the non-cooperative world
game because individual profits are then driven to zero (free-entry condition) and lobbies never
want this outcome.

**Assumption:** There is a cost \( K \) to negotiate an agreement which is low enough so that
the government always wants to sign an agreement if there is no lobbying: \( G(M_0^\phi, M_0^\phi) < G(M_0, M_0) - K \).

The interesting case if when the non-cooperative solution in the grand coalition \((M^C)\) is
higher (less restrictive) than the solution with no lobbying \((M_0^\phi)\). Foreign lobbying decreases the
level of restrictions -increases foreign entry- compared to the non-cooperative solution with no
lobbying.

**Proposition 6** For two symmetric countries, the governments do not sign an agreement when
foreign lobbying leads to higher foreign entry in both countries and makes agreement negotiations
too costly.

\[
M^C > M_0, \quad M^* > M_0^* \quad \text{and} \quad G(M^C, M^*, 0, 0) \geq G(M_0, M_0^*, 0, 0) - K
\]

\[
M^* > M_0^*, \quad M^C > M_0 \quad \text{and} \quad G^*(M^C, M^*, 0, 0) \geq G^*(M_0^*, M_0, 0, 0) - K
\]

It is interesting that the reason why the government does not sign an agreement is not because
he gets more contributions by playing the lobbying game as it is in the literature. Compared
to previous commitment models, the reason why the government does not commit is not due to
the positive contributions he would get from the lobbies. Here the government does not receive
any contributions due to the assumption of no bargaining power. Foreign lobbying pushes the
government to choose a lower level of restrictions (higher level of entry \( M \)) and finally to increase
his objective in the world two-player game assuming countries are symmetric. It is therefore the
action of the foreign lobbying that explains why the government does not commit.
This proposition shows cases when a costly agreement is not the best solution. An agreement maximises the social welfare $W$ but can waste a certain amount of resources $K$ through lengthy negotiations. In case of foreign lobbying, playing the domestic bargaining game only might lead to a lower level of restrictions when the foreign lobby supports more entry than the agreement but avoids to waste the resources of the agreement cost.

This shows that foreign lobbying can be welfare-improving and decreases the externality in the world game. However foreign lobbying might not be discriminated compared to national lobbying, and this positive effect might disappear. In that case an agreement might remain the best solution. Thus in the next part we allow for extensions to study how the discrimination towards foreign lobbying and the introduction of taxes that affect the repatriation behaviour of firms might change the results.
6 Extensions

In this part we study two extensions: a cost for accepting foreign contributions and the choice of taxes that affect the repatriation behaviour of the firms. We consider these extensions to discuss our previous results that foreign lobbying might replace a costly agreement. First we study whether differences between national and foreign influence might affect this result. Second we study whether adding for a government the possibility to affect the repatriation behaviour with taxes might also affect this result.

6.1 A positive cost of punishment for foreign lobbying ($\gamma < 1$).

In this section we consider a non-zero probability that foreign contributions are punished. This implies that the objective of the government when playing the domestic political game is:

$$G(M, M^*, c, c_f) = aW^\phi(M, M^*) + c + \gamma c_f$$

with $\gamma < 1$

Similar assumptions have been used to model foreign lobbying (Gawande et al. (2006)). The parameter $\gamma$ is the probability for foreign contributions not to be punished and affects the government’s valuation of foreign contributions. When $\gamma < 1$ the government differently values national and foreign contributions. The same bargaining process takes place between the government and the two lobbies. We only focus on the domestic bargaining in the non-cooperative world game. The domestic bargaining at $t = 1$ when contributions are differently valued ($\gamma < 1$) is defined in the following part.

6.1.1 The grand-coalition bargaining

The coalitional bargaining solution Given the policy in the other country $M^*$,

$$(M^C, c^C, c_f^C) = \max_{(M, c, c_f) \in \mathbb{R}^3} \left[ G(M, M^*, c, c_f) - G_0 \right]^{\sigma_g} \left[ L(M, c) - \Pi(M_f) \right]^{\sigma_N} \left[ L_f(M, c_f) - \Pi^*_f(M_N) \right]^{\sigma_F}$$

subject to

$$G_\gamma(.) + L_\gamma(.) \geq J_N^\gamma(M^N, M^*) \quad \text{(binding national sub-coalition)}$$

$$G_\gamma(.) + L_f^\gamma(.) \geq J_f^\gamma(M_f^C, M^*) \quad \text{(binding foreign sub-coalition)}$$

with $G_0$ the outside option of the government and $J_N^\gamma$, resp. $J_f^\gamma$, the joint surplus of the national sub-coalition, resp. of the foreign sub-coalition.

The policy In the grand coalition with the government and the two lobbies, the policy $M^C_\gamma$ maximises $J_\gamma^C(M)$ the joint surplus of the grand coalition given by

$$J_\gamma^C(M, M^*) = aW(M, M^*) + (\gamma - 1)c_f + \Pi(M) + \Pi^*_f(M)$$

Given the expression of the foreign contribution at the equilibrium, we can show that

$$M_\gamma^C = M^\phi(M, M^*) + \Pi(M) + \gamma \Pi^*_f(M)$$

Given the expression of the foreign contribution at the equilibrium, we can show that

$$M_{\gamma=0}^C = M^N$$

$M_{\gamma=1}^C = M^C$. 

20
Compared to the bargaining with $\gamma = 1$, the surplus that is shared between the three players is decreasing in foreign contributions. Only a percentage $\gamma$ of what is given by the foreign lobby reaches the government’s utility. Therefore there is a loss of surplus due to this difference in valuation. However the policy chosen in the bargaining process remain efficient and maximises the surplus given that this surplus decreases in the equilibrium level of foreign contributions. The main difference with a bargaining in which there is no such loss of surplus is explained in the next part.

**Comparative statics** When the foreign lobby benefits more from increasing the individual profits of the affiliates than from increasing the number of affiliates, we can show that the solution in the grand coalition bargaining is decreasing in the valuation of foreign contributions. When the government increasingly considers foreign interests, it chooses a more restrictive policy to increase individual profits.

$$-(M^C_\gamma - M_N)\pi^*(M^C_\gamma) \geq \pi(M^C_\gamma) \Rightarrow \frac{\partial M^C_\gamma}{\partial \gamma} \leq 0$$

On the contrary when the foreign lobby benefits more from increasing the number of affiliate than from increasing individual profits, the solution in the grand coalition bargaining is decreasing in the valuation of foreign contributions. A government that increasingly values foreign contributions chooses a less restrictive policy to increase foreign entry.

$$-(M^C_\gamma - M_N)\pi^*(M^C_\gamma) \leq \pi(M^C_\gamma) \Rightarrow \frac{\partial M^C_\gamma}{\partial \gamma} \geq 0$$

### 6.1.2 Formation of sub-coalitions as an equilibrium

While sub-coalitions were never the equilibrium formations in the previous sections for $\gamma = 1$, we can show that sub-coalitions might now form.

**Proposition 7** Sub-coalitions between the government and one lobby only can be the equilibrium bargaining formation instead of the grand coalition with the three players when $\gamma < 1$.

We can show that (i) the national sub-coalition might form when the total surplus for the three players larger when only the government and the national lobby bargain:

$$\mathbb{J}^N(M^N_\gamma, M^*) + \Pi^N(M^N_\gamma) \geq \mathbb{J}^C_\gamma(M^C_\gamma, M^*)$$

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

$$\mathbb{J}^F(M^F_\gamma, M^*) + \Pi(M^F_\gamma) \geq \mathbb{J}^C_\gamma(M^C_\gamma, M^*)$$

In order to show that the formation of sub-coalitions can be the equilibrium formations we have to show that the surplus for all three players can be larger in a sub-coalition formation than in the grand coalition. This was not the case in the previous section for $\gamma = 1$. The formation of sub-coalitions is possible given that the total surplus decreases in the foreign contribution with $\gamma < 1$.

The proof of this proposition comes from the constraints in the grand coalition bargaining. Let’s take the case of a surplus higher with the national sub-coalition. A solution in the grand bargaining should respect the following: $G() + L() \geq \mathbb{J}^N(M^N_\gamma, M^*)$ and $L^*(()) \geq \Pi^N(M^N_\gamma)$. This leads to a contradiction in the case stated in the proposition as we need $G() + L() + L^*(()) = \mathbb{J}^N(M^N_\gamma, M^*) \geq \mathbb{J}^N(M^N_\gamma, M^*) + \Pi^N(M^N_\gamma)$.
The national bargaining solution Given the policy in the other country $M^*$,
\[
(M^N_γ, γ^N_γ) = (M, c)_{c∈R^{+2}} \frac{G(M, M^*, c) - G_0^{σ_G}[L^F(M, c) - L_0^{1-σ_G}}
\]
with $G_0$ the outside option of the government, and $L_0$ the outside option of the foreign lobby.
In the national sub-coalition with the government and the national lobby, the solution of the Nash product maximisation is efficient and maximises the joint surplus of the government and the national lobby given by $J^N_γ(M) = aW_0(M, M^*) + M_0π(M)$. We can notice that $M^N_γ = M^N$ the foreign entry level in the sub-coalition when $γ = 1$.

Finally we can show that the total surplus for the three players when only the government and the foreign lobby play a political bargaining game is:
\[
J^N(M^N, M^*) + Π^F(M^N) = aW(M^N, M^*) + Π(M^N) + Π^F(M^N)
\]
The parameter $γ$ does not enter the joint surplus of the three players because there is no foreign contributions when only the government and the national lobby bargain.

\[
γ < 1 \Rightarrow J^N(M, M^*) + Π^F(M) ≠ J^C_γ(M, M^*)
\]

The foreign sub-coalition Given the policy in the other country $M^*$,
\[
(M^F_γ, c^F_γ) = (M, c^F)_{c^F∈R^{+2}} \frac{G(M, M^*, c^F) - G_0^{σ_G}[L^F(M, c^F) - L_0^{1-σ_G}}
\]
with $G_0$ the outside option of the government, and $L_0^F$ the outside option of the foreign lobby.
In the foreign sub-coalition with the government and the foreign lobby, the solution of the Nash product maximisation is efficient and maximises the joint surplus of the government and the foreign lobby given by $J^F_γ(M) = aW_0(M, M^*) + (γ - 1)c^F + (M - M_n)π(M)$. At the equilibrium, given the expression of the foreign contribution, we have
\[
M^F_γ \text{ st. } aW_0(M^F, M^*) + γ(M^F_γ - M_n)π′(M^F_γ) = 0
\]

Finally we can show in annex that the total surplus for the three players when only the government and the foreign lobby play the political bargaining game is:
\[
J^F_γ(M^F, M^*) + Π(M^F) = \frac{1}{γ(1 - σ_G) + σ_G}[aW(M^F, M^*) + γΠ^F(M^F_γ)] + Π(M^F_γ) + cte
\]

The formation of the foreign sub-coalition is possible because the surplus that is negotiated in the two games is not the same when $γ < 1$. The size of the surplus to be shared depends on the contribution that is defined to maximize the Nash product.

\[
γ < 1 \Rightarrow J^F_γ(M) + Π(M) ≠ J^C_γ(M, M^*)
\]

We can summarize the previous results by the following:
\[
M = \begin{cases} 
M^C & \text{if the grand coalition is formed}, \\
M^N & \text{if the national sub-coalition is formed, and } M^N < M^C \\
M^F_γ & \text{if the foreign sub-coalition is formed, and } M^F_γ > M^C
\end{cases}
\]

The comparison of the three possible outcomes is the same as in the case of $γ = 1$.

Proposition 8 (Agreements versus foreign lobbying with $γ < 1$) When foreign contributions are punished ($γ < 1$), we can show that (i) the government is more likely to sign an agreement as foreign interests are less valued in the grand coalition and that (ii) it is however more likely that the government does not sign an agreement when the foreign sub-coalition is formed as only foreign interests are valued by the government.
7 Empirical part

In this part we test whether the repatriation of profits from foreign affiliates affects the choice of foreign entry restrictions. We first look at FDI restrictions for all types of industries and then focus on services where horizontal FDI are particularly relevant. We provide empirical evidence for both OECD and nonOECD countries. The main problem is the lack of data on profit shifting across time and across countries. We start by describing the two types of foreign entry restrictions we look at. We then detail the proxies we use to think about the repatriation of profits. Finally we report several regressions for the two entry restrictions indexes as well as for OECD and non OECD countries.

The foreign entry restrictions indexes: the OECD index and the WB STRI. The dependent variable in the following regressions is the level of restrictions in a country for a particular sector in a particular year. We first use the FDI Regulatory Restrictiveness Index (FDI Index) from the 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. In the graphic 7 we observe a high variance across sectors and across countries.

![Figure 2: FDI restrictions’ variations across countries and years (Source: OECD).](image)

The following figure 3 shows the large diversity in barriers to FDI across industries in the services sector and across countries. We can observe that some 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.
Figure 3: Barriers to FDI per sector and per country for services. Source of the data: OECD

The second index that we use is the Services Trade Restrictiveness Index (STRI). 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 we 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).
The main problem of this exercise is to find aggregated data on profits’ repatriation. We use two proxies that are correlated to the repatriation of profits without being a direct causal factor of FDI restrictions. Given that our variable is unobserved, we rely on the literature to find proxies for profit shifting. The literature⁹ suggests three determinants to explain the repatriation of profits by multinationals. First the difference in corporate taxes and the existence of bilateral treaties on double taxation are the fiscal determinants of repatriation of profits. The second determinant is the growth opportunities in the host country to explain why profits is not repatriated but rather reinvested in the host country. A last determinant is the existence of tax heavens whose consequences are well described in Zucman (2014).

In this empirical exercise we only consider the first two determinants for the repatriation of profits.

7.1 The proxies for the repatriation of profits

I use here two proxies that I theoretically assume to be correlated with the repatriation of profits but that do not directly cause or are caused by the dependent variable. There is no large database about decisions of multinational firms to repatriate their profits across countries and years. In addition it is also not possible to get the exact composition of foreign affiliates for each country in each sector. FDI data from the OECD are incomplete and often confidential when we look at the country/sector/partner level.

1. The tax proxy: Corporate taxes across countries affect the repatriation of profits. We build an index that reflects the extent to which a country has a high level of taxes compared to the other countries. We do not only use the tax rate as the repatriation of profits takes into account the level of taxes in the host and in the home countries. In addition we use weights on tax rates to see which countries’ tax rates have more impact on the aggregate level of profits’ repatriation. However we only have FDI data per partner country at an aggregate level or FDI data per industry for the rest of the world. We compare results

⁹Overesch and Dreßler (2011), Hanlon et al. (2014), Zucman (2014)
with two indexes, one that uses partner country data and one that uses industry data. I use inward FDI data at the country level when focusing on partner countries and outward FDI data at the industry level.

- The tax proxy per industry.

It is defined as the difference between the corporate tax rate in a country and a world corporate tax index. We use outward FDIs to get data at the industry level. The world index is built as a weighted average of all countries’ corporate tax rates with the outward FDI position of each country. The index for country \( c \) and sector \( s \) is:

\[
Tax_{c,s} = \tau_c - \tau^W_{c,s} \quad \text{with} \quad \tau^W_{c,s} = \frac{\sum_{j \in W} \tau_j FDI^\text{out}_{j,s}}{\sum_{j \in W} FDI^\text{out}_{j,s}}
\]

Repatriation of profits is assumed to be increasing in the tax proxy. The higher the corporate tax compared to a world average, the more profits made by foreign affiliates are repatriated home.

\[
\text{Corr}(\phi^*, Tax) \geq 0
\]

In addition we assume that the corporate tax rate does not directly affect the choice of entry restrictions. The idea here is to weight corporate tax rates by outward foreign investments of every country. We assume that each country has received a representative investment given by the sum of outward investments for all countries except the one at stake. If China has invested a lot abroad, the proxy assumes that a large part of the investment inside the country at stake comes from China. Therefore the comparison between the tax rate in China and the tax rate in the host country matters a lot for the average repatriation of profits from the host country towards foreign countries. This explains the choice of outward investments as weights. If the tax rate from a large investor is higher than the tax rate of the host country, the index will decrease and therefore repatriation is expected to decrease too. In addition we argue that corporate taxes are not directly linked to FDI restrictions so the index works as a proxy for repatriation.

- The tax proxy per country

We use here the composition of inward FDI per country for the whole economy. These data are not available per industry. We build an index that allows to compare the tax rate with a weighted tax rate whose weights are the FDI positions of foreign firms in the country.

\[
Tax_c = \tau_c - \tau^W_c \quad \text{with} \quad \tau^W_c = \frac{\sum_{j \in W_c} \tau_j FDI^\text{in}_{j,c}}{\sum_{j \in W_c} FDI^\text{in}_{j,c}}
\]

The world tax rate \( \tau^W_c \) is not a representative foreign investor like for the previous index. It is a representative tax rate given the presence of each country in the host country \( c \). This world tax rate changes for each country. It is more precise on the composition of foreign investors but does not provide information at the industry level.

2. The growth opportunity proxy: 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.

\[
Growth_{c,s} = g_{c,s} - g^W_{c,s} \quad \text{with} \quad g^W_{c,s} = \frac{\sum_{j \in W} g_{j,s} GDP_{j,s}}{\sum_{j \in W} GDP_{j,s}}
\]
Repatriation of profits is assumed to be decreasing in the opportunity growth index. The higher the growth rate compared to a world average, the more profits made by foreign affiliates remain in the country to be reinvested.

\[ \text{Corr}(\phi^*, \text{Growth}) \leq 0 \]

Profits of affiliates are not repatriated if the host country has high growth opportunities. Therefore we use growth rates as a possible mechanism to explain repatriation of profits. We choose to weight these growth rates by the economic size of the country. Therefore a high growth rate in a large country matters more than a high growth rate in a small country. Using this weighting system we build a growth opportunity index that compares a weighted grow rate for the rest of the world with the growth rate in the host country. If the host country has a high growth rate, less repatriation of profits is expected from the affiliates in the country. In addition we argue that growth rates are not directly link to FDI restrictions.

7.2 The regression for general FDI restrictions

In a first part we use our two proxies. We regress FDI restrictions in each of the proxies. We also do a regression with the two proxies in the same equation. Then we discuss our findings and the possible problems due to the error measurement.

Given the large number of omitted variables that can explain FDI restrictions, we use a fixed-effect model with fixed effects for countries, for years and for sectors. This aims at controlling all the possible unobserved factors that could explain FDI restrictions.

The equations that are first tested are:

for the tax index:

\[ RT_{c,s,t} = \alpha + \beta_T Tax_{c,s,t} + \lambda X + \delta_c + \delta_t + \delta_s + \epsilon_{c,s,t} \]

for the growth index:

\[ RT_{c,s,t} = \alpha + \beta_g Growth_{c,s,t} + \lambda X + \delta_c + \delta_t + \delta_s + \epsilon_{c,s,t} \]

for the two indexes:

\[ RT_{c,s,t} = \alpha + \beta_g Growth_{c,s,t} + \beta_T Tax_{c,s,t} + \lambda X + \delta_c + \delta_t + \delta_s + \epsilon_{c,s,t} \]

for the two indexes:

\[ RT_{c,s,t} = \alpha + \beta_g Growth_{c,s,t} + \beta_T Tax_{c,s,t} + \lambda X + \delta_c + \delta_t + \delta_s + \delta_{c,s} + \delta_{t,s} + \epsilon_{c,s,t} \]

with \( \delta_c, \delta_t \) and \( \delta_s \) the fixed effects for country \( c \), at year \( t \) and in sector \( s \). \( X \) is the set of control variables: the lag of the log of gdp and of gdp per capita. The interaction fixed effects are given by \( \delta_{c,s} \) for a country-sector fixed effect and by \( \delta_{t,s} \) for a sector-year fixed effect. \( RT \) is the level of FDI restrictions from the OECD FDI index.

We regress the FDI index using the two proxy and get the following results from table 1.

The data seem to support the mechanism that is at stake in this paper. Indeed the coefficient for the tax index is significant and positive. Given that the tax index is assumed to be positively correlated to the repatriation of profits, a higher repatriation of profits increases the level of restrictions. The second proxy is the growth index. The coefficient is significant and negative. Given that the tax index is assumed to be negatively correlated to the repatriation of profits, a higher repatriation of profits also increases the level of restrictions.
Table 1: Impact of repatriation on FDI restrictions (OECD Index)

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

Standard errors in brackets

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

7.3 Regression with services restrictions only

The descriptive part of the paper showed the importance of horizontal foreign investments for services. Therefore we now focus on services and use another database for foreign entry restrictions. The STRI covers more countries but is only provided for one year. The advantage of the STRI is that we can keep the index for the mode 3 (commercial presence) only. We remove restrictions for cross-country exports or for movements of persons. This reflects better our theoretical mechanism that applies for affiliates that produce abroad.

7.3.1 OECD countries

In this part we focus on services for which foreign presence is a main mode to reach foreign consumers. We use the Services Trade Restrictiveness Index (STRI) from the World Bank as well as GDP/GDP per capita data from the World Bank. Instead of outward FDI data, we use foreign affiliates characteristics from the AMNE/OECD database. This database is also incomplete but gives the number of firms and the number of employees for foreign affiliates from each country in the rest of the world. We build the same proxies to do the same regressions as in the previous part. We only use services data with sub-sectors that are restricted to those used in the STRI database. 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. On a first part we restrict our analysis to OECD countries using the AMNE database then we consider all countries from the STRI database and use FDI data from the World Bank.

The STRI database only provides one-year data. For the other variables, we use data for the years 2008 and 2010. In addition we use the number of employees in foreign affiliates as a measure of foreign presence. We use a specification with country and sector-specific dummies.
We use several other control variables that are Gdp, Gdp per capita, the level of commitments at the GATS (STRIur) and the value added in the manufacturing and in the services sectors. These variables among others are used by Barattieri et al. (2015).

The equations that are tested are:

for the tax index:  
$$STRI_{c,s} = \alpha + \beta_{\tau} Tax_{c,s} + \lambda X + \delta_{c} + \delta_{s} + \epsilon_{c,s}$$

for the growth index:  
$$STRI_{c,s} = \alpha + \beta_{g} Growth_{c,s} + \lambda X + \delta_{c} + \delta_{s} + \epsilon_{c,s}$$

for the two indexes:  
$$STRI_{c,s} = \alpha + \beta_{g} Growth_{c,s} + \beta_{\tau} Tax_{c,s} + \lambda X + \delta_{c} + \delta_{s} + \epsilon_{c,s}$$

with $\delta_{c}$ and $\delta_{s}$ the fixed effects for country $c$ and for sector $s$. $y$ is the level per country per sector of the Services Trade Restrictiveness Index.

We use the following tax index that uses OECD/AMNE data at the industry level ($s$) for each country ($c$):

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

Table 2: Impact of repatriation on services entry restrictions (STRI) using outflows at the industry level:

<table>
<thead>
<tr>
<th></th>
<th>est1</th>
<th>est2</th>
<th>est3</th>
<th>est4</th>
<th>est5</th>
<th>est6</th>
</tr>
</thead>
<tbody>
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<td>TaxIndex</td>
<td>0.0299***</td>
<td>0.00224**</td>
<td>0.00222**</td>
<td>0.0299***</td>
<td>[0.00650]</td>
<td>[0.00112]</td>
</tr>
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<td>[0.00112]</td>
<td>[0.00650]</td>
<td>[0.00112]</td>
<td>[0.00112]</td>
<td>[0.00650]</td>
<td>[0.00112]</td>
</tr>
<tr>
<td>GrowthInd</td>
<td>-0.0117**</td>
<td>-0.00675**</td>
<td>-0.00753</td>
<td>-0.0138**</td>
<td>[0.00482]</td>
<td>[0.00335]</td>
</tr>
<tr>
<td></td>
<td>[0.00050]</td>
<td>[0.00680]</td>
<td>[0.00500]</td>
<td>[0.00680]</td>
<td>[0.00500]</td>
<td>[0.00680]</td>
</tr>
<tr>
<td>lnGdp</td>
<td>-0.416***</td>
<td>0.00193</td>
<td>0.00510</td>
<td>0.0116*</td>
<td>0.00668</td>
<td>0.0675**</td>
</tr>
<tr>
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<td>[0.0118]</td>
<td>[0.0144]</td>
<td>[0.00605]</td>
<td>[0.0122]</td>
<td>[0.0292]</td>
</tr>
<tr>
<td>lnGdpCap</td>
<td>0.770***</td>
<td>0.0266</td>
<td>0.0207</td>
<td>0.0206</td>
<td>0.0298</td>
<td>-0.231***</td>
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<tr>
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<td>[0.0278]</td>
<td>[0.0769]</td>
</tr>
<tr>
<td>Striur</td>
<td>0.362***</td>
<td>0.580***</td>
<td>0.390***</td>
<td>0.672***</td>
<td>0.597***</td>
<td>0.362***</td>
</tr>
<tr>
<td></td>
<td>[0.0330]</td>
<td>[0.0839]</td>
<td>[0.0227]</td>
<td>[0.0512]</td>
<td>[0.0843]</td>
<td>[0.0330]</td>
</tr>
<tr>
<td>Observations</td>
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<td>123</td>
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<tr>
<td>Country Dummy</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.649</td>
<td>0.712</td>
<td>0.560</td>
<td>0.706</td>
<td>0.718</td>
<td>0.649</td>
</tr>
</tbody>
</table>

Standard errors in brackets
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The table gives similar results to the previous table.

We do a third series of regressions using inward FDI for multinationals from the AMNE database. More specifically we use the number of employees per foreign affiliates according to the nationality of the firm.
We use the following tax index that is country specific ($c$):

$$Tax_c = \tau_c - \tau^W_c$$

with

$$\tau^W_c = \frac{\sum_{j \in W - c} \tau_j Af_{j,c}^{in}}{\sum_{j \in W - c} Af_{j,c}^{out}}$$

This index uses foreign affiliates that are in the country $c$ per partner country but is not decomposed per sector.

Table 3: Impact of repatriation on services restrictions (STRI) for OECD countries using Partner country data

<table>
<thead>
<tr>
<th></th>
<th>Sector dummy</th>
<th>Country dummy</th>
<th>The two dummies</th>
</tr>
</thead>
<tbody>
<tr>
<td>TaxIndex</td>
<td>0.00420***</td>
<td>0.00250***</td>
<td>0.00638***</td>
</tr>
<tr>
<td></td>
<td>[0.000986]</td>
<td>[0.000617]</td>
<td>[0.00109]</td>
</tr>
<tr>
<td>GrowthInd</td>
<td>-0.0122*</td>
<td>-0.0280**</td>
<td>-0.0162*</td>
</tr>
<tr>
<td></td>
<td>[0.00652]</td>
<td>[0.0109]</td>
<td>[0.00932]</td>
</tr>
<tr>
<td>lnGdpCap</td>
<td>-0.0944***</td>
<td>-0.00458</td>
<td>-0.148***</td>
</tr>
<tr>
<td></td>
<td>[0.0306]</td>
<td>[0.0191]</td>
<td>[0.0316]</td>
</tr>
<tr>
<td>lnGdp</td>
<td>0.0196</td>
<td>-0.00456</td>
<td>0.0441***</td>
</tr>
<tr>
<td></td>
<td>[0.0119]</td>
<td>[0.00837]</td>
<td>[0.0133]</td>
</tr>
<tr>
<td>Striur</td>
<td>0.533***</td>
<td>0.535***</td>
<td>0.442***</td>
</tr>
<tr>
<td></td>
<td>[0.0562]</td>
<td>[0.0506]</td>
<td>[0.0233]</td>
</tr>
<tr>
<td>VA_serv</td>
<td>0.0222***</td>
<td>0.0225***</td>
<td>0.0314***</td>
</tr>
<tr>
<td></td>
<td>[0.00408]</td>
<td>[0.00392]</td>
<td>[0.00697]</td>
</tr>
<tr>
<td>VA_manuf</td>
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<td>0.0387***</td>
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<tr>
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<tr>
<td>Country Dummy</td>
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<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Sector Dummy</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.911</td>
<td>0.883</td>
<td>0.824</td>
</tr>
</tbody>
</table>

Standard errors in brackets

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

Results are similar and show that our proxies for profits repatriation affect the level of foreign entry restrictions in the case of services.

**7.3.2 OECD and non OECD countries**

In this last part we include non-OECD countries. The STRI index covers 103 countries that represent all regions and income groups of the world. However we can't use the previous tax index which is build on FDI or foreign affiliates data per industry or per partner country. Here we use the aggregate FDI outflows data given by the World Bank to build the tax index.

$$Tax_c = \tau_c - \tau^W$$

with

$$\tau^W = \frac{\sum_{j \in W - c} \tau_j FDI_{j}^{out}}{\sum_{j \in W} FDI_{j}^{out}}$$

We use GDP, tax and FDI data from 2006. This especially solves for the problem of reverse causality in the case when lower restrictions boost growth and affects the tax rate.
This part provides a broader picture and goes back to the initial observation in the first part. Indeed we observe that higher entry restrictions apply for developing fast-growing countries. Therefore we study whether our mechanism applies and helps to explain why these countries maintain high entry restrictions.

We run the following regression with STRI data per sector and per country and with our two indexes per country for one year. We add an interaction effect between our two indexes given that the group of countries we study is more heterogenous.

\[ STRI_{c,s} = \alpha + \beta_g \text{Growth}_c + \beta_T \text{Tax}_c + \gamma \text{Growth}_c \times \text{Tax}_c + \lambda X + \delta_c + \delta_s + \epsilon_{c,s} \]

with \( X \) some controls variables (GDP, GDP per capita, STRIur). We are interested in the marginal effect of the tax index on the STRI:

\[ \frac{\partial STRI_{c,s}}{\partial \text{Tax}_c} = \beta_g + \gamma \text{Growth}_c \]

![Figure 5: Complementarity between the tax and the growth indexes.](image)

The figure 5 shows the marginal effect of the tax index for different level of our growth Index which represents the country growth rate compared to a weighted world average. We see that a high tax rate on profits only increases foreign entry restrictions for positive relative growth rate. This means that the two indexes are complementary to explain our mechanism. A high tax rate increases profit shifting only when the growth rate is high enough. When the growth rate is low, firms repatriate their profits anyway. When the growth rate is high, the level of the tax rate will affect incentives not to repatriate the profits. This means that our mechanism particularly applies for fast-growing emerging economies. A growing economy is a necessary condition for FDI to be attracted and for the tax rate to push for more or less repatriation when we look at a large set of OECD and non-OECD economies.
8 Conclusion
References


33


9 Proofs

9.1 Grand coalition

9.1.1 Proposition 4.2.2 : The coalitional bargaining solution:

Proof. The combination of the FOCs of the Nash product to find \( M, c \) and \( c' \) gives:

\[
M^C \text{ st. } aW^\phi(M^C, M^*) + \Pi'(M^C) + \Pi^s(M^C) = 0
\]

Proof. Existence and stability of such an equilibrium in the grand coalition.
A sub coalition is never the equilibrium formation because the solution of the Nash product \( M^C \) is efficient and maximises the joint surplus. The joint surplus in the grand coalition is always higher than with any other possible sub-coalitions. There exists some allocations not to deviate to the national sub-coalition or to the foreign sub-coalition. By definition of the joint surplus and its efficient redistribution:

\[
\forall M^*, \quad J^C(M^C, M^*) = G(.) + L(.) + L^f(.)
\]

By definition of \( M^C \):

\[
\begin{align*}
aW(M^N, M^*) + \Pi(M^N) + \Pi^s(M^N) &\leq aW(M^C, M^*) + \Pi(M^C) + \Pi^s(M^C) \\
\Rightarrow \quad J^N(M^N, M^*) + \Pi^s(M^N) &\leq J^C(M^C, M^*) \\
\end{align*}
\]

\[
\begin{align*}
aW(M^F, M^*) + \Pi(M^F) + \Pi^s(M^F) &\leq aW(M^C, M^*) + \Pi(M^C) + \Pi^s(M^C) \\
\Rightarrow \quad J^F(M^F, M^*) + \Pi(M^F) &\leq J^C(M^C, M^*) \\
\end{align*}
\]

9.1.2 Proof of remark 1

Proof. \( M^N \not\sim M^C \)

\[
aW^\phi(M^N, M^*) + M_n\pi'(M^N) = 0
\]

and \[
aW^\phi(M^C, M^*) + M_n\pi'(M^C) = -(M^C - M_n)\pi'(M^C) - \pi(M^C)
\]

case 1 If the intensive margin of the foreign lobby is higher : \[-(M^C - M_n)\pi'(M^C) \geq \pi(M^C)\]

\[
\Rightarrow \quad aW^\phi(M^F, M^*) + M_n\pi'(M^C) \geq aW^\phi(M^C, M^*) + M_n\pi'(M^N)
\]

\[
\Rightarrow \quad M^N \geq M^C \quad M^C \text{ is more restrictive}
\]

case 2 If the extensive margin of the foreign lobby is higher : \[-(M^C - M_n)\pi'(M^C) \leq \pi(M^C)\]

then \[
aW^\phi(M^F, M^*) + M_n\pi'(M^C) \leq aW^\phi(M^C, M^*) + M_n\pi'(M^N)
\]

\[
\Rightarrow \quad M^N \leq M^C \quad M^C \text{ is less restrictive}
\]

Proof. \( M^F > M^C \)

\[
aW^\phi(M^C, M^*) + (M^C - M_n)\pi'(M^C) + \pi(M^C) = -M_n\pi'(M^C) \geq 0
\]

and \[
aW^\phi(M^F, M^*) + (M^F - M_n)\pi'(M^F) + \pi(M^F) = 0
\]

\[
\Rightarrow \quad aW^\phi(M^C, M^*) + (M^C - M_n)\pi'(M^C) + \pi(M^C) \geq aW^\phi(M^F, M^*) + (M^F - M_n)\pi'(M^F) + \pi(M^F)
\]

\[
\Rightarrow \quad M^C \leq M^F
\]
9.1.3 The benchmark equilibrium with repatriation of profits

[No lobbying: free-entry or restrictions]

1. When there is no repatriation of affiliates' profits ($\phi = 0$), the solutions of the non-cooperative equilibrium with no lobbying are given by free-entry in the two countries. The number of firms ($M_0, M_0^*$) is defined at the equilibrium such that the individual profits are null.

$$
\begin{align*}
M_0 & \quad \text{st.} \quad \pi(M_0) = 0 \quad \text{and} \quad M_0 = W^0(M) \\
M_0^* & \quad \text{st.} \quad \pi^*(M_0^*) = 0 \quad \text{and} \quad M_0^* = W^{*0}(M^*)
\end{align*}
$$

2. When there is a positive repatriation of affiliates' profits ($\phi > 0$), there are positive restrictions to foreign entry (free-entry is not allowed) even when there is no lobbying: $M_0^\phi \leq M_0$ and $M_0^\phi^* \leq M_0^*$. In addition entry ($M$) decreases in the percentage of repatriation ($\phi$).

Examples of restrictions $M_0^\phi < M_0$: assuming that the aggregate foreign domestic profits increase in $M$ in the neighbourhood of $M_0^\phi$.

By definition of $M_0^\phi$, for all $M^*$, $W^\phi(M_0^\phi, M^*) = 0$. We now assume that the aggregate foreign domestic profits increase in $M$: $\Pi^f(M_0^\phi) > 0$. Then we have

$$
W^\phi(M_0^\phi, M^*) = H^\phi(M_0^\phi, M^*) + \Pi^f(M_0^\phi, M^*) + (1 - \phi)\Pi_0^f(M_0^\phi) = 0
$$

$$
\Rightarrow W^\phi(M_0^\phi, M^*) + \phi \Pi^f(M_0^\phi) > 0
$$

$$
\Rightarrow W^\phi(M_0^\phi, M^*) > 0
$$

$$
\Rightarrow W^\phi(M_0^\phi) > W^\phi(M_0)
$$

$$
\Rightarrow M_0^\phi < M_0
$$

given that $W^\phi$ is concave and reaches its maximum in $M_0$.

[Pareto inefficiency]

Nash entry policies in the world equilibrium with no lobbying ($M_0^\phi, M_0^{\phi^*}$) are inefficient.

9.1.4 When is the grand coalition solution ($M_C^C$) higher (less restrictive) than the solution without lobbying ($M_0^\phi$)?

We can show that:

1. If $-\Pi^f(M_C^C) \geq \Pi_0^f(M_C^C) \iff M_C^C \pi^f(M_C^C) + \pi(M_C^C) \leq 0$ then $M_C^C < M_0^\phi < M_0$

The loss of national profit is bigger than that gain of foreign profit. Or the marginal loss for all firms from more entry is bigger than the gain from one additional firm. Lobbying pushes the government to choose a more restrictive policy.

2. If $-\Pi^f(M_C^C) \leq \Pi_0^f(M_C^C) \iff M_C^C \pi^f(M_C^C) + \pi(M_C^C) \geq 0$ then $M_0 > M_C^C > M_0^\phi$

The loss of national profit is smaller than that gain of foreign profit. Or the marginal loss for all firms from more entry is smaller than the gain from one additional firm. Lobbying pushes the government to choose a less restrictive policy.
Proof.

\[ aW^\phi(M^C, M^*) + \Pi^\prime(M^C) + \Pi^\phi'(M^C) = 0 \]
\[ \Rightarrow aW^\phi(M^C, M^*) = -\Pi^\prime(M^C) - \Pi^\phi'(M^C) \]

If national lobbying dominates foreign lobbying

\[ -\Pi^\prime(M^C) \geq \Pi^\phi'(M^C) \]
\[ \Rightarrow -\Pi^\prime(M^C) - \Pi^\phi'(M^C) \geq 0 \]
\[ \Rightarrow aW^\phi(M^C, M^*) \geq aW^\phi(M_0^\phi, M^*) \]
\[ \Rightarrow M^C \leq M_0^\phi \]

9.2 Extension

9.2.1 Efficiency of the Nash solution when \( \gamma < 1 \)

Proof.

1. The subcoalitions are not binding: the solution is efficient.

The combination of the FOCs of the Nash product to find \( M, c \) and \( c^f \) gives:

\[ aW^\prime(M, M^*) + \Pi^\prime(M) + \gamma \Pi^\phi'(M) = 0 \]

We can show that this is equivalent to maximising the joint surplus given the equilibrium expression of the foreign contribution \( c^f \).

At the equilibrium we have:

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

This implies

\[ \Pi(M) - c - L_0 = \frac{\sigma^N}{\sigma^F}[\Pi^\phi(M) - c^f - L_0^f] \]
\[ aW(M, M^*) + c + \gamma c^f - G_0 = \frac{\sigma^G}{\sigma^N}[\Pi(M) - c - L_0] \]
\[ \Rightarrow \Pi(M) - c - L_0 - \frac{\sigma^N}{\sigma^F}[\Pi^\phi(M) - c^f - L_0^f] = 0 \]
\[ aW(M, M^*) - G_0 + [1 + \frac{\sigma^G}{\sigma^N}]c + \gamma c^f - \frac{\sigma^G}{\sigma^N}[\Pi(M) - L_0] = 0 \]
\[ \Rightarrow [1 + \frac{\sigma^G}{\sigma^N}] \left[ \Pi(M) - L_0 - \frac{\sigma^N}{\sigma^F}[\Pi^\phi(M) - c^f - L_0^f] \right] + aW(M, M^*) - G_0 + \gamma c^f - \frac{\sigma^G}{\sigma^N}[\Pi(M) - L_0] = 0 \]
\[ \Rightarrow \left( 1 + \frac{\sigma^G}{\sigma^N} \right) \frac{\sigma^N}{\sigma^F} \left[ \Pi^\phi(M) - L_0 \right] + aW(M, M^*) - G_0 + \Pi(M) - L_0 - (1 + \frac{\sigma^G}{\sigma^N}) \frac{\sigma^N}{\sigma^F}[\Pi^\phi - L_0^f] = 0 \]
We denote $\Omega = \left[ (1 + \frac{\sigma^G}{\sigma^N}) \frac{\sigma^N}{\sigma^F} + \gamma \right]$. 

We replace the expression of $c^f$ at the equilibrium in the joint surplus:

$$
\begin{align*}
\bar{J}^C(M) &= aW(M, M^*) + (\gamma - 1)c^f + \Pi(M) + \Pi^*(M) \\
\Rightarrow &= \left[ 1 - \frac{\gamma - 1}{\Omega} \right] (aW(M, M^*) + \Pi(M)) + \left[ 1 + \frac{\gamma - 1}{\Omega} \right] (1 + \frac{\sigma^G}{\sigma^N}) \frac{\sigma^N}{\sigma^F} \Pi^* + cte \\
\Rightarrow &= \frac{1}{1 + \sigma^F(\gamma - 1)} (aW(M, M^*) + \Pi(M)) + \frac{\gamma}{1 + \sigma^F(\gamma - 1)} \Pi^* + cte \\
\Rightarrow &= \frac{1}{1 + \sigma^F(\gamma - 1)} [aW(M, M^*) + \Pi(M) + \gamma \Pi^*] + cte
\end{align*}
$$

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.

The joint surplus in the grand coalition game is given by:

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

2. The national subcoalition is binding: what is the solution that maximises the joint surplus when the national subcoalition is binding?

We have

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

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.

3. The foreign subcoalition is binding.
9.2.2 Foreign sub-coalition when $\gamma < 1$

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

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

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

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

$$\Pi^*f(M) - c^f - L_0^f = (1 - \sigma_G)[\mathbb{J}^F_\gamma(M) - G_0 - L_0^f]$$

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

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

$$\Rightarrow \mathbb{J}_\gamma(M) = aW^\phi(M, M^*) + (\gamma - 1)\frac{-aW^\phi(M, M^*) + \frac{\sigma_G}{1 - \sigma_G}\Pi^*f(M)}{\gamma + \frac{\sigma_G}{1 - \sigma_G}} + \Pi^*f(M) + \Pi(M)$$

$$+ \frac{(\gamma - 1)[(1 - \sigma_G)G_0 + \sigma_G L_0^f]}{\gamma(1 - \sigma_G) + \sigma_G}$$

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

9.2.3 Comparative statics: $M^N$, $M^F_\gamma$ and $M^C_\gamma$ when $\gamma < 1$

(same as before)

**Proof.** $M^F_\gamma > M^C_\gamma$

$$aW^\phi(M^C_\gamma, M^*) + \gamma(M^C_\gamma - M_n)\pi^*(M^C_\gamma) + \gamma \pi(M^C_\gamma) = -M_n \pi^*(M^C_\gamma) \geq 0$$

and $$aW^\phi(M^F_\gamma, M^*) + \gamma(M^F_\gamma - M_n)\pi^*(M^F_\gamma) + \gamma \pi(M^F_\gamma) = 0$$

$$\Rightarrow aW^\phi(M^C_\gamma, M^*) + \gamma(M^C_\gamma - M_n)\pi^*(M^C_\gamma) + \gamma \pi(M^C_\gamma) \geq aW^\phi(M^F_\gamma, M^*) + \gamma(M^F_\gamma - M_n)\pi^*(M^F_\gamma) + \gamma \pi(M^F_\gamma)$$

$$\Rightarrow M^C_\gamma \leq M^F_\gamma$$

because $\mathbb{J}^F_\gamma$ is an inversed U-shaped function that has a maximum in $M^F_\gamma$. ■

39
Proof. \( M^N \Leftrightarrow M^C \)

\[
aW\phi'(M^N, M^*) + M_n\pi'(M^N) = 0
\]

and

\[
aW\phi'(M^C, M^*) + M_n\pi'(M^C) = -\gamma(M^C - M_n)\pi'(M^C) - \gamma\pi(M^C)
\]

**case 1** If the intensive margin of the foreign lobby is higher: \( -(M^C - M_n)\pi'(M^C) \geq \pi(M^C) \)

\[
\Rightarrow aW\phi'(M^C, M^*) + M_n\pi'(M^C) \geq 0 = aW\phi'(M^N, M^*) + M_n\pi'(M^N)
\]

\[
\Rightarrow M^N \geq M^C : M^C \text{ is more restrictive}
\]

**case 2** If the extensive margin of the foreign lobby is higher: \( -(M^C - M_n)\pi'(M^C) \leq \pi(M^C) \)

then

\[
aW\phi'(M^C, M^*) + M_n\pi'(M^C) \leq aW\phi'(M^N, M^*) + M_n\pi'(M^N)
\]

\[
\Rightarrow M^N \leq M^C : M^C \text{ is less restrictive}
\]

\[\blacksquare\]

## 9.2.4 Taxation

**Taxation on national revenues** In the first stage the government chooses the tax rate \( \tau \) on profits such that

\[
\left[H'(M) + \Pi'(M) + (1 - \phi^*(\tau^*, \tau))\Pi^f(M)\right] \frac{\partial M}{\partial \tau} + \phi(\tau, \tau^*)\Pi^f(M) \frac{\partial M^*}{\partial \tau} - \phi^*(\tau^*, \tau)\Pi^f(M) = 0
\]

In the second stage we have \( \left[H'(M) + \Pi'(M) + (1 - \phi^*(\tau^*, \tau))\Pi^f(M)\right] = 0. \)

**Taxation on domestic profits** The objective of the government is

\[
G(M, M^*, \tau, \tau^*) = W(M, M^*, \tau, \tau^*) + \tau[\Pi(M) + \Pi^F(M)]
\]

\[
= H(M) + (1 - \tau)[\Pi(M) + (1 - \phi^*(\tau^*, \tau))\Pi^f(M)] + \phi(\tau, \tau^*)(1 - \tau^*)\Pi^f(M^*)
\]

\[
+ \tau[\Pi(M) + \Pi^f(M)]
\]

\[
= H(M) + \Pi(M) + [\tau + (1 - \tau)(1 - \phi^*(\tau^*, \tau))]\Pi^f(M) + \phi(\tau, \tau^*)(1 - \tau^*)\Pi^f(M^*)
\]

In the first stage the government chooses the tax rate \( \tau \) on profits such that

\[
\left[H'(M) + \Pi'(M) + [\tau + (1 - \tau)(1 - \phi^*(\tau^*, \tau))]\Pi^f(M)\right] \frac{\partial M}{\partial \tau} + \phi^*(\tau^*, \tau)\Pi^f(M) \frac{\partial M^*}{\partial \tau} - (1 - \tau)\phi^*_n(\tau^*, \tau)\Pi^f(M) + \phi(\tau, \tau^*)(1 - \tau^*)\Pi^f(M^*) = 0
\]

In the second stage we have \( \left[H'(M) + \Pi'(M) + [\tau + (1 - \tau)(1 - \phi^*(\tau^*, \tau))]\Pi^f(M)\right] = 0. \)