Private Interest Based Multilateral Loans[*]

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Abstract

Firms now operate worldwide and have interests in many countries. If one of these countries is facing a crisis, many foreign firms interests may be threatened. This paper investigates the effect lobbying by firms over their own government may have on International Financial Institutions (IFIs) loans decisions or multilateral loans. This paper also investigates the interconnections between political and diplomatic interests. Using two types of consensuses to model the decision process, a multilateral decision is showed to have two dimensions. The first one is the optimal value each member wishes. The second one is the range over which a member sees its welfare increasing in the multilateral decision. Some elements are found to only influence the range and not the optimum whereas no element uniquely influences the optimum. The main result is that lobbying may raise the probability of a consensus for two reasons. First, its position may be closer of the mean position of the international community. Second, it can increase the range over which its government gains if the loan is granted. Lastly, a high diplomatic proximity with the country facing the crisis may reduce the effect of lobbying.

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1 Introduction

International Financial Institutions (IFIs), and especially the IMF, currently know a revival period as they are now the corner stone of the re-foundation of the world financial system according to the last meetings of the G20. The underlying ideology is that IFIs perform well as lenders and in their surveillance activities, or monitoring, more broadly. The IFIs seem far from the deep crisis they were facing just before the great recession.

A now quite proliferating literature on endogenous policy formation highlights the important role of lobbies. They are not, of course, the unique force that determines policies but they should not be ignored. The theoretical (Grossman and Helpman, 1994; Mitra, 1999; Ornelas, 2005; Bombardini, 2008) as well as the empirical (Goldberg and Maggi, 1999; Gawande and Bandyopadhyay, 2000) works have robustly contributed to the recognition of the role of lobbies. In parallel, many firms are multinational that operate in many countries, either through exports or through Foreign Direct Investments (FDI). Consequently, firms' interests are disseminated worldwide.

When a country is facing a crisis and then comes to an IFI or an informal group of countries (e.g the Paris Club) in order to obtain a loan, the financial health of many firms may be at stake. So why lobbies could not influence their respective governments to obtain that a country facing a crisis gets a loan to preserve their interests located there? This paper is an attempt to encompass this idea. Moreover, lobbies may have an interest closer to those of the international community than to the one of their country of origin. Hence, lobbying could help reaching a consensus.

The first task is to determine the way consensus over lending decisions may be reached in a multilateral context. This paper focuses on a static approach, despite we acknowledge the importance of dynamics in this topic. Voting exchange is probably a widely used practice, as well as outside-IFI/financial concessions to convince a country to vote for a given loan. In this paper, to keep things simple, we will consider a very simple approach of multilateral consensus. Indeed, it appears that negotiations on a day to day basis are much more settled with consensus

than with a formal voting procedure. One should not forget, however, that each country is granted with a particular voting power that should enter into consideration in the consensus rule. We consider mostly the conditions under which a consensus is reachable. To this end we will consider that a consensus is either reached under the rule named an *apparent consensus* or under the more standard *explicit consensus*.

Then, a simple political economy framework is introduced to assess the extent to which lobbies may influence the decision of the IFIs. Another aspect this paper explores is the role of diplomatic proximity in the possibility to reach a consensus. A quite recent literature is interested in highlighting how governments may influence each others as in Antràs and Padró i Miquel (2008). Hence, despite this paper does not propose a sophisticated way to introduce diplomacy, it allows it to be present in order to underline the possible interplays with the political economy.

This paper follows an international political economy approach and we show the effect of political economy on the optimal loans and on the probability of reaching a consensus. Then we show the effect of diplomacy, distinguishing between the diplomatic proximity with the country facing the crisis and the diplomatic proximity with the other countries, thus reflecting the systemic effect of the crisis. Finally, the interactions between both aspects are studied.

First, we show that the political economy, understood here as the presence of lobbying, does not necessarily conduct to a decrease of the probability a consensus will be reached. Two effects are at work. The first effect is an expected one. If lobbies' interests are closer to those of the international community, their political action moves the optimal loan of their country towards the optimal loan of the international community. The second effect is more surprising, at an optimal loan unchanged for the country they influence, lobbies still have an effect on the probability a consensus will be reached. The reason is that their presence may increase the gain of the government independently of the size of the loan thus increasing its propensity to accept a consensus. Logically, the bargaining power of lobbyists is found to reduce the probability of consensus whereas their profit not affected by the crisis has an opposed effect. The larger are their interests not affected by the crisis, the more likely is the consensus to occur. In other words, the financial health of the industry that influences the government has a positive effect

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on the probability a consensus will be reached by enlarging the range over which a decision yields a positive outcome. The reason of that is that a Grossman and Helpman (1994)'s like framework amount to introduce the welfare of organized sectors two times in the considerations of the government. First, since they are representing the producers interest, their surplus is present, known as the *producer surplus.* And second, as lobbyists, they reintroduce their welfare because as is well-known, a truthful equilibrium implies a maximization of the joint welfare of the government and the lobby.

We next show that the diplomacy reduces or increases the effect of the political relationship on the probability to reach a consensus. The main result with this respect is that diplomatic proximity with the country facing the crisis generally reduces the effect of the lobbying activity. The inverted causality is also present. A small bargaining power of lobbies is proven to reduce the effect of a high diplomatic proximity with a country wishing a large loan. A large bargaining power of lobbies reduce the effect of a high diplomatic proximity with a country wishing a low loan.

Finally, we explore as in Grossman and Helpman (1994) the effect of the population share represented by lobbies on these effects. We show that the fact the lobby represents a non negligible share of the population reinforces the positive political effect on the probability of reaching a consensus.

The remaining of the paper is organized as follows. The next section exposes the international political economy approach. The third section introduces the idea of consensus over a loan. The political economy framework is introduced and its results derived in section 4 whereas section 5 discusses the question of the diplomacy and the population share represented by lobbies. The antepenultimate section explicits the expected consequences on the probability of reaching each type of consensus whereas the penultimate section sketches how environmental and trade negotiations could be interpreted in the light of the present framework. The last section proposes some extensions and briefly concludes.

2 An international welfare approach

2.1 Diplomatic proximity

In a recent paper, Antràs and Padró i Miquel (2008) study the influence a foreign country can have on the domestic policies of another one. We kind of follow this idea but from a more diplomatic point of view. A country is assumed here to have the following objective function:

$$H_i = W_i + \sum_{j \neq i} \alpha_{ij} W_j \tag{1}$$

where H_i is the objective function of the government of country i, W_i is the social welfare of country i and α_{ij} is the weight government i grants to the welfare of country j. The closer both countries are, the higher α_{ij}. This coefficient has nothing to do with the effect of world trade that operates through the social welfare. This function is also quite comparable to the utility function of Lahiri and Raimondos-Møller (2000) in which the parameters weighting the utility of the citizens in others countries are a measure of altruism.

Broadly, this functional form is aimed at encompassing the idea that diplomatic proximity should affect the decision of a country. Intuitively, and that is what will prevail in this paper, a closer proximity between any two countries should increase the incentive of one of them to grant a loan to the other if it is facing a crisis.

2.2 The country facing a crisis

We consider that when a country j is facing a crisis, its welfare suffers a sudden loss. We are not interested in this paper in representing a crisis using some complex mechanisms that may create it.

As it is obvious, the country may be helped because of a systemic risk as every welfare depends on local firms whose profits may depend on the crisis. So there are some direct incentives to rescue the country and some others that are indirect.

2.3 Firms

In each country, there is a continuum of firms. We assume that each firm's profit can be disaggregated into a sum of the profits according to the location of their source.[1] For instance, a country is assumed to be able to split its profit into Europe and USA as two independent profit centers. This assumption seems simplifying as it comes to mind that the profit from country i may be affected by the situation in country j. For simplicity, we assume that if 50% of the profit in country i depends on what is going on in country j, then this share is attributed to country j for instance.

We denote these shares μ_{kij}. They indicates that firm k, originating from country i, generates a share of μ_{kij} of its profit in country j, directly and/or indirectly. We assume that the sum of these parameters is equal to one for each firm.

2.4 Gain for country i when helping country j

First, the question of the cost of helping country j needs to be addressed. Here, we will take our inspiration from the Fund; it has the most developed structure and we have already proven that diplomacy has a determinant role in its lending decision in Reynaud and Vauday (2009). In particular, the contribution to the Funds does not depend on the situation of this or that country asking for a loan. So we simply will consider that the cost for the country is equal to $\beta_i S_j$ if a loan of an amount S_j is granted, where β_i is the voting share (or quota in the case of the IMF) of country i.

The simplicity of this assumption may surprise. However, for instance, the IMF almost never spends the integrality of its available money in a year, despite such a case has been under consideration during the 2007-2009 global crisis when large IMF members came to the Fund with large financing needs. Consequently, it is hard to consider that a country could be reluctant in voting for a given loan because it fears that no money will be available when a much closer country will come to the IMF to ask for a loan. Moreover, this dynamic vision, despite its obvious interest,

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[1]It is interesting to note that a misperception of these stakes by geographical origin could introduce a tricky story in political economy frameworks.

would largely complicate the story. So this is different from Lahiri and Raimondos-Møller (2000) that have an endogenous amount that has to be split into two recipient countries.

So now, what is the gain to help country j for country i? The gain may be divided in several distinct channels. First, there is a direct gain for helping country j through domestic firms.

$$\sum_{k}^{m} \mu_{kij}[\Pi_{ki}(S_{ij} > 0) - \Pi_{ki}(S_{ij} = 0)] \tag{2}$$

where S_{ij} is the amount country i would lend to country j. Second, there is a diplomatic gain which is equal to

$$\alpha_{ij}[W_j(\sum_{k} \mu_{kjj}\Pi_{kj}(S_{ij})) - W_j(\sum_{k} \mu_{kjj}\Pi_{kj}(S_{ij} = 0))] + \alpha_{ij}S_{ij} \tag{3}$$

The last term is the direct effect of the crisis, the two other ones being the effect through the domestic firms' of country j. Finally, there is a systemic gain that passes through the firms of other countries.

$$\sum_{h \neq i,j} \alpha_{ih}W_h(\sum_{k} \mu_{khj}\Pi_{kh}(S_{ij})) - \sum_{h \neq i,j} \alpha_{ih}W_h(\sum_{k} \mu_{khj}\Pi_{kh}(S_{ij} = 0)) \tag{4}$$

This being true under the assumption that the welfare is linear in Π. For simplicity, we assume that the crisis uniquely hits profits. The generality of the results is clearly left unchanged as adding the consumer surplus or the government revenues would just make equations coarser.

It is easy to show that a country has always interest to vote for the loan as soon as it thinks it is profitable. If one assumes that the probability country j obtains the loan is $\rho_j = \overline{\rho_j} + \epsilon_i j$, where $\overline{\rho_j}$ is the probability country j gets the loan if country i has not voted for it, and ϵ_{ij} is the effect that country i votes for the loan on the overall probability that country j obtains the loan. It is easy to see that this is positive independently on the effect of ϵ_{ij}.

3 The multilateral decision making process

The previous section has exposed what would be the position of a country that would vote for an amount S_{ij}. However, this is not how things are going on in a multilateral decision process. First, the decision is based on consensus, i.e. their is no formal voting at the executive board but a policy discussion during which executive directors express their opinions. Second, and this is related, it is probable that the decisions simultaneously concern the agreement to grant a loan as well as its amount. Therefore, we will study what happens if the country wants to maximize the difference of welfare with respect to the size of the loan compared to the null loan situation.

So the government seeks to maximize the difference between the welfare it obtains and what it would obtain if no loan is granted. Consequently, the constant term (with respect to S_{ij}) in $H_i(.)$ disappears. The maximization program of the government is:

$$\max_S \left[H(S) - H(S = 0) \right]$$

$$\Leftrightarrow \max_S G(S) \tag{5}$$

which yields

$$-\sum_k \mu_{kij} \frac{\partial \Pi_{kij}(S_j - S_a)}{\partial (S_j - S_a)} - \sum_{h \neq i,j} \alpha_{ih} \sum_k \mu_{khj} \frac{\partial \Pi_{khj}(S_j - S_a)}{\partial (S_j - S_a)} - \alpha_{ij} \sum_k \mu_{kjj} \frac{\partial \Pi_{kjj}(S_j - S_a)}{\partial (S_j - S_a)} = \alpha_{ij} - \beta_i \tag{6}$$

Again, for simplicity we have assumed that only the profits are affected by the crisis. The optimal loan country i wants to grant to country j is labeled S_{ij}^*.

3.1 Consensus

We need to define two additional values that will prove very useful. Let $\underline{S_{ij}}$ and $\overline{S_{ij}}$ be respectively the lowest bound and the highest bound over which the expected objective function of country i is positive, under the assumption that the objective function is quadratic in the argument S_{ij}. As one will see, the real assumption is that the objective function $H(.)$ is third order. We further

denote $\underline{S_{ij}} = S_{ij}^* - \theta_i^l$ and $\overline{S_{ij}} = S_{ij}^* + \theta_i^r$.

We are first interested in a notion that we label an *explicit consensus*, one of the two notions of consensus we use in the paper.

Definition 1 *A full consensus implies that all parties agree to grant a loan.*[2]

We consider for now under what conditions a consensus is reachable, we are not directly interested in how it is reached. There are n active countries. We assume that a consensus over a loan to country j is reachable between any two countries i and h, characterized by S_{ij}^* and S_{hj}^* respectively, with $S_{ij}^* < S_{hj}^*$, if and only if $S_{hj}^* - S_{ij}^* < \theta_{hj}^l + \theta_{ij}^r$. That is, two countries will reach a consensus if and only if they may agree on a loan amount such that they both gain (or even not loose) in lending that amount to country j. Moreover, we assume that the probability of reaching a consensus between any two countries depends on the size of the range defined just above under explicit consensus. This is in line with research in psychology (see the works of Dan Gilbert) that suggests a person is more likely to make a choice if she has the choice. The fact that relativeness helps making consensus could be the way to interpret this. For instance, if there is only one choice S_u, a country could be reluctant to accept it. If there are several choices among which some choices such that $S_u << S_s$ where S_s is another value of the range, then S_u could be chosen.

As we shall see, with polynomial of degree 2, $\theta_{ij}^r = \theta_{ij}^l = \theta_{ij}$. Under this assumption, with n countries, there are $\sum_1^{n-1} k$ conditions that ensure a consensus is reachable. However, by definition, it is possible to rank the countries from the lowest $\underline{S_{ij}}$ to the highest and from the lowest $\overline{S_{ij}}$ to the highest. Therefore, a necessary condition for a explicit consensus to be reached is guaranteed by the fact that the lowest $\overline{S_{ij}}$ is larger than the highest $\underline{S_{ij}}$. So if we can establish the range of all countries under which they would gain with a loan to country j, then we can rank the bounds and we can concentrate on the "less probable" bilateral consensus. This does not exclude the reasoning that should be done for all the other pairs if one wants to establish

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[2]This definition seems rather obvious but one could also think to a consensus that is reached if a given percentage of the participants agree to grant loan. This situation is possible because many IFIs, among which the IMF, have a voting rule behind its consensus practice.

the probability of a consensus.

Everything else being equal, if I increase the probability that two countries would a reach consensus if they were just two to make the decision could under some conditions be enough to conclude that this increases the probability the n countries will reach a consensus. We postpone this discussion to the end of the paper.

It is also of course probable that there are some strategic behaviors behind this since a country should hide its bounds (or even lie) in order to increase the probability that the consensus will be closer to its optimal loan.

The fact all countries agree for a loan comprised between $\underline{S_{ij}}$ and $\overline{S_{ij}}$ is not obvious. Therefore, we will also work with another definition of consensus, borrowed to sociology (Urfino, 2006), called *apparent consensus*

Definition 2 *An apparent consensus is a decision validated after talks have been hold if no country expresses a disagreement*

If one accepts the idea, as in the case of the IMF for instance, that all available money is not spent each year, such a form of consensus is acceptable and corresponds to our simple framework concerning the bounds. So we state that if the consensus value is in the range of values that ensures a given country that it will gain from the decision, then this country will not oppose to the decision despite this value is far from its optimal loan value. Consequently, under apparent consensus, the existence of one unique value common to both ranges of two countries is enough for them to reach a consensus. Moreover, an increase in the range does not change anything to the probability that two countries will reach an apparent consensus.

3.1.1 The bounds and the optimum

A noticeable aspect is that two elements are active in each bound. First, there is the optimal loan of both countries, and there are the bounds of the range over which both countries have an interest in granting the loan to country j. The highest $\underline{S_{ij}}$ depends on S_{ij}^* and on θ_{ij}^l. The lowest $\overline{S_{ij}}$ depends on S_{ij}^* and on θ_{ij}^r.

These values come from the two following equations:

$$\max_{S} G \tag{7}$$

$$G(S_j) = 0 \tag{8}$$

Finally we need to add that there is requirement for the optimum solution of country i without political economy. The optimal loan of country i must be such that the mean of the differences to the optimal values of all diplomatic partners is lower than $S_{ij}^* + \alpha_{ij} W_j$.[3]

So it is important to keep in mind that under both types of consensus, an increase of the range of one country such that the lower bound is the same or smaller and the upper bound is equal or larger than the previous ones, has either a positive effect or a nil effect according to the type of consensus. If this is not the case, then the move has to be in the "right way", i.e towards countries with which there are no common values before the move. We have this effect always implicit in the remaining of the paper. The penultimate section clarify the expected effect on the probability of reaching both type of consensus and obtaining a favorable vote under a majority rule.

3.2 Voting power

An aspect has, for now, been put aside. In the case of IFIs, the voting power should enter in the negotiation process because there is always, implicitly, the possibility to turn to a formal voting procedure. More broadly, one could think to a bargaining power.

In order to have an idea of the effect of voting power, it is logically more helpful to figure out an explicit voting procedure. The proposed amount that will be accepted or refused with the vote should be equal to the weighted sum of all optima of each country member. The weight of each country being equal to the voting power, $\tilde{S}_j^* = \frac{\sum_i^n b_i S_{ij}^*}{n}$. An alternative approach could be that under explicit consensus which procedure is closer to a voting procedure, we have that the value chosen inside the range of possible values is calculated according to the relative voting

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[3]See in appendix

powers of each country member. So if the weighted sum is in the range, this is $\bar{s}*$ that is chosen, otherwise this is the closest possible value.

For the moment, the effect of the voting power in the simple formalization proposed above enters the coefficient b negatively where b is the parameter that weights the part that depends on the S_{ij} =s of power one. So a higher voting power means a lower optimal policy and lower bounds. This seems coherent as a country having a large voting power first, ceteris paribus, finds any given loan more expansive since the cost of the loan depends on the voting power and second, ceteris paribus, uses its voting power to reduce the room of maneuver around its optimal loan amount.

4 Political economy

We now turn to the political economy part, the core of the paper. We are going to describe what happens to one given country i that has to decide whether lending to country j or not. In a second step, we will infer the effect on the two consensuses exposed above and we will also refer to a modified version of the median voter theory.

We first start with a very general discussion. Following Grossman and Helpman (1994), two elements are central in the political game. In their framework, the optimal policy is determined by the following equality

$$- a\frac{\partial W_i}{\partial S_j} = \sum_k \frac{\partial W_{ki}}{\partial S_j} \tag{9}$$

where W_{ki} is the welfare of firm k originating from country i and a is the weight the government grants to social gains compared to private revenues. In other words, the equilibrium policy is locally truthful as it comes from the fact that $\frac{\partial C_{ki}}{\partial S_j} = \frac{\partial W_{ki}}{\partial S_j}$. Hence, in addition to what influences the government in its decision, every aspect that influences the welfare of active firms or lobby is influencing the optimal loan the country i will wish.

The political relationship also necessitates to share a constant between the government and

the lobbies. Grossman and Helpman (1994) show it is possible to determine their values (i.e one per lobby) using the assumption of truthful everywhere contribution. That is, $\frac{\partial C_{ki}}{\partial S_j} = \frac{\partial W_{ki}}{\partial S_j}$ is true, whatever the value of S_j. A simplifying way to understand how this constant is shared is that it depends on the relative bargaining power of the government with respect to each lobby. For a formal explanation of the sharing of the constant, refer to Grossman and Helpman (1992).

Consequently, the relative bargaining power of the government may, by itself, modifies the range over which a full consensus is reachable. Indeed, the higher is the bargaining power of the government, the lower is the constant in the contribution and this has an effect on the bound over which the objective function of the government is positive for $S_j > 0$. Everything else equal, a higher bargaining power of the government increases the value of $G(S_j > 0)$.

More precisely, switching from a nil loan to a positive one increases by $C_{ij}(S_j)$ the objective function of the government. Two effects are at work. First the constant part of the contribution, that depends on the relative bargaining power, increases the two bounds by the same magnitude. Second, the variable part has an undetermined influence over the bounds. If it is strictly increasing in S_j, then it should have a larger effect on $\overline{S_{ij}}$.

On the other hand, the variables that affect the equilibrium value of the policy have an effect on $G(.)$ and on $\partial G(.)$, despite they are not the same.

Lemma 1 *Under the assumption that the objective functions of the government exhibit one or two values such that $G(S_j = 0) - G(S_j > 0) = 0$, this means that they are of the type $G = aS_{ij}^2 + bS_{ij} + c = 0$. If one maximizes this function, one obtains $S_{ij}^* = -\frac{b}{2a}$. The two values that cancel out this function are given by $x_i = x^* \pm \frac{\sqrt{b^2 - 4ac}}{2a}$. The constant only has an effect on the bounds, whereas a and b have an effect on both.*

The effect of b over x^* depends on the sign of a. The effect over x_i has the same sign if this is the upper bound and b is positive. If ac is positive, then it has an opposed sign if this is the lower bound and if b is positive.

We are interested in the lobbying by private interests. Under a truthful everywhere equilibrium, the contribution is $Prim\frac{\partial W_{ki}}{\partial S_j}$, where the constant of the primitive is determined by the

relative bargaining power of the government with respect to the lobbies. The contribution may either be linear or quadratic[4]. We consider that there is only lobbying for the loan to be granted since, again, the total amount country i contributes to the IFI has already been spent and this amount is not totally spent by the IFI on a yearly basis, by assumption. Talking about a private multilateral lending initiative (as the Paris Club), the assumption means that a government has always some available funds to lend, whatever the amount it has already lent.

One should note that an increase in b has a positive effect on the upper bound and on the optimal loan whereas it has a negative effect on the lower bound if c is negative and an increase of the lower bound if c is positive. So if c is positive (which is suppose to say that the welfare is positive even with a nil loan which is more likely) an increase in b indeed yields an increase of the range but not such that it ensures that both bounds evolve in order to yield a positive effect. Thus it depends on the position of the country with respect all the other countries.

4.1 Linear contribution

In the case of linearity, the contribution is strictly increasing in its argument, so a_c is nil, b_c is positive as is c_c where $C = a_c S_{ij}^2 + b_c S_{ij} + c_c$. The subscript c denotes that these parameters are those of the contribution. This b_c comes from the lobby's welfare. So everything that could explain a positive effect of the loan over the lobby's welfare will have the following effects. Since we want the government's objective function to be concave, we can conclude that a is negative and that b is positive. So the effect of b_c is positive on the optimum. It is also positive on the upper bound. The effect of an increase in b_c on the lower bound may be negative if ac is positive, so if c is negative. c represents the part of the objective function of country i that depends linearly on S_{ij}.[5] This corresponds to the constant (with respect to S_{ij}) in the derivative of $H(.)$ with respect to S_{ij}. Concretely, this is a share of the government that is affected by the crisis but that is independent on the seriousness of the crisis. This is a first order effect of the crisis. For instance, a crisis reduces demand; the more serious the crisis, the larger the decrease in the

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[4]Under our simplifying assumptions.

[5]Because we have assumed the objective function of the government is of degree 3.

demand, but in the same proportion. If the crisis hits the financial system because it is very large, then this aggravating effect passes through the remaining of the derivative. We can expect it is negative, except for countries that could suffer of highly systemic risk due to the crisis in country j. If b is positive, the effect of b_c is lower on the lower bound than it is on the upper bound so we can conclude the following

Proposition 1 *If $C = b_c S_{ij} + c_c$ and $G = a S_{ij}^2 + b S_{ij} + c$.[6] If G is concave, then $a < 0$ and $b > 0$.*

Then an increase in b_c which is positive induces an increase of b.

This increase in b increases S_{ij}^*, increases $\underline{S_{ij}}$, $\overline{S_{ij}}$ and increases $\overline{S_{ij}} - \underline{S_{ij}}$.

So the lobbying activity increases the range over which reaching a consensus is possible through the effect the crisis has on the firms that have an interest in country j.

The effect of the constant c_c is to decrease the lower bound and to increase the upper bound, by the same magnitude.

Proposition 2 *The higher the bargaining power of the government is, the larger the range over which country i will accept a consensus.*

So the effect of the bargaining power is the same, independently of the position of country i with respect to the other countries in the ranking of their S_{ij}^*'s. As for the increase in b_c, its effect on the probability a consensus will be reached is positive if country i is in the bottom of the S_{ij}^*-ranking and it is negative if the country is in the top of this ranking.

Moreover, the global effect of the contribution on the optimum is an increase. Hence, independently on the probability the loan is granted, lobbying should increase the size of the loan. However, this result is due to the fact we have assumed the crisis only affects profits and that, for the moment, the share of population represented by lobbies is negligible. It could well be that a lobby has an optimal loan equal to zero because it has almost no interests in country j and because, as a consumer, it thinks it costs too much to the economy.

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[6]In fact, the function is of degree 3. The constant disappears if the difference between both welfare is maximized. So one can simplify by S_{ij} such that it remains a degree-2 polynomial.

A last aspect that could change this effect is the fact all firms whose interests are threatened in country j are represented by lobbies or not. If only those weakly affected by the crisis are represented whereas others are not, the lobby should wish a lower loan than the government. As a consequence, once the political relationship has occurred, the optimal loan should decrease.

As for the probability of reaching a consensus, it depends on the position of the country compared to the other concerned countries. If, before any political pressures, the country of interest is already wishing a higher loan then, ceteris paribus, the effect of lobbying is to reduces the probability of consensus, under the assumption the lobby wishes a higher loan.
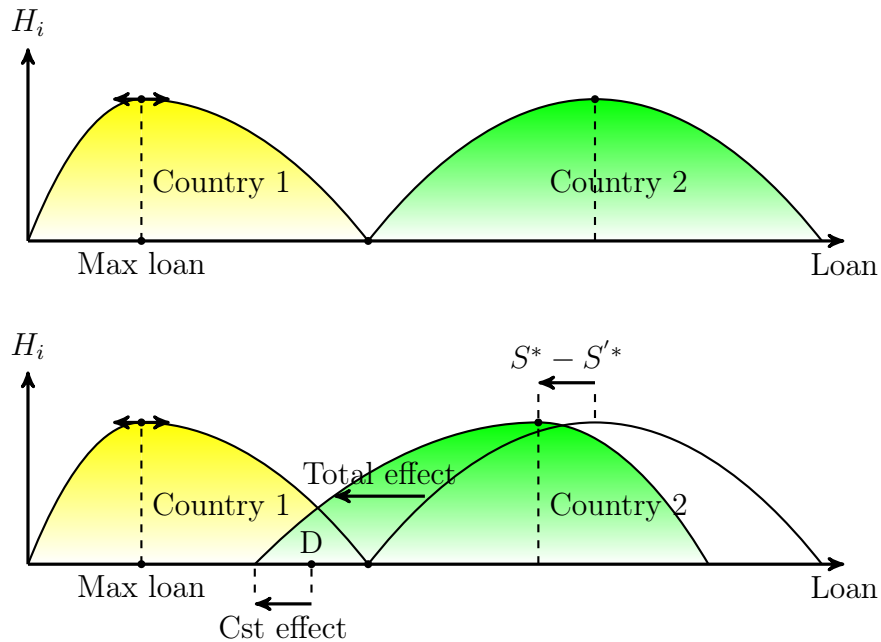
As illustrated on the graphs above, before the political relationship occurs both areas are not overlapped. Then, there is a move on the left of the country 2's curve and some points, as point D, are in both areas. The move of the maximum loan of country 2 has not the same magnitude than the move of the intersection between the curve of country 2 and the horizontal axis. As indicated, there is an effect labeled "constant effect" (Cst on the graph) that plays on the bounds and not on the maximum value.

4.2 Quadratic contributions

The quadratic functions work also very well. It is just harder to determine some effects of the lobbying as now lobbies contribution may increase the numerator or the denominator of the equilibrium loan S_{ij}^* as well as in the bounds over which the country gains.

Lemma 2 *With a contribution such that $C = a_c S_{ij} + b_c S_{ij} + c_c$ and $G = a S_{ij}^2 + b S_{ij} + c$. We know that a is negative as we consider the maximum is between the two bounds. It is well known that the sign of the polynomial is from the sign of $-a$. Since G is assumed to be positive in its maximum S_{ij}^*, then the sign of a must be negative.*
This is not true for a_c since this not obliged that a firm exhibits a maximum optimal loan. She may well wish a loan equal to infinity.

So this lemma influences the effect of diplomacy on the optimum policy as the next section will underline it. In this condition, it is possible to state that

Proposition 3 *With a quadratic contribution, a political economy framework has a positive effect on the two bounds if at least one of the following statements is true:*

- *The profits of the lobby if the loan is null are negative.*

- *a_c is positive, the lobby hence wants the largest possible loan. Implicitly, this is to say that the lobbying activity has not an marginally increasing cost.*

One can also add that the constant in the contribution being negative, it has a negative effect on the range allowing a consensus. Except in the case of a positive a_c, so high that it outweighs the negative a. To see this, we write the objective program after the contribution has been paid.

$$G(S_{ij}) + \sum C_c(S_{ij}) = 0 \tag{10}$$

which is equivalent to

$$a S_{ij}^2 + b S_{ij} + c + a_c S_{ij}^2 + b_c S_{ij} + c_c$$

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that finally yields

$$(a + a_c)S_{ij}^2 + (b + b_c)S_{ij} + c + c_c$$

The optimal loan is therefore

$$S_{ij}^* = -\frac{(b + b_c)}{(a + a_c)} \tag{11}$$

and the bounds are

$$S_{ij} = S_{ij}^* \pm \frac{\sqrt{(b + b_c)^2 - 4(a + a_c)(c + c_c)}}{2(a + a_c)} \tag{12}$$

For the government, a must be negative. For the lobby, the constant has two components. A truthful contribution is such that $C = \Pi_{ik} + \gamma_{ik}W_i - B_{ik}$ (the term γ_{ik} is the share of the population, see the next section). The last term is a negative constant and the first two terms also contains some constants that may either be negative or positive. Consequently, the overall effect is not obvious. First, there are no reasons to think a_c is negative. Indeed, if the lobbying activity has a marginally decreasing cost, then a lobby could find it always profitable to ask more. We however admit this is a particular situation and we do not intend to analyze this in the present paper.

Therefore, we will focus on the case (most likely to occur) of a marginally increasing lobbying cost. The conclusions that we draw have just to be inverted if we are interested in the case of a $a_c > 0$ but again with caution as observing such a particular feature should probably necessitate some additional hypotheses.

Under this assumption, the effect of lobbying depends on b_c and c_c. As already evoked, the fact b_c or a_c have an effect on the equilibrium loan a government wishes is not of a primary interest since its effect on the probability to obtain a consensus depends on the relative position of the country with respect to the multilateral political loan (see the definition in a following section). Hence, we are interested in the effects on the bounds.

Considering b_c, the largest and positive it is, the largest are the two bounds if b is positive. If b is negative, then the largest and negative b_c is, the largest is the range between the two bounds. To the contrary, an increasing c_c, as we have already highlight it, depends solely on the lobbies' welfare.

Indeed, the objective of the government only depends on S_{ij}. Since it is equal to $W_i(S_{ij}) - W_i(S_{ij} = 0)$, all terms of the welfare that do not depend on S_{ij} vanish as they cancel each others. If c_c is positive, then it will increase the size of the interval between the two bounds. Logically, the constant due to the political relationship in itself is negative. Under the hypothesis of contributions truthful everywhere, the contribution is equal to the welfare of the lobby minus a constant B_j as showed by Grossman and Helpman (1994), applying the result of Bernheim and Whinston (1986). This constant is a measure of the relative bargaining power of the lobbies and when it is high this reduces the size of the interval. This is not surprising as it reduces the size of the gain of the government.

However, the welfare of lobbies does not entirely depend on the crisis for most of the lobbies. If, under a null loan, the welfare of the lobby is negative, then this indicates the constant in the welfare is negative. In that situation, the effect on the bounds is also negative. But most lobbies do not depend on the crisis so much that with a null loan their welfare is negative. Under this consideration,

Proposition 4 *The fact a political relationship is engaged will increase the size of the interval and therefore, under the definition of a consensus we have adopted in this paper, will increase the probability a consensus will be reached, everything else being equal.*

5   Diplomacy and population

The effect of the diplomacy only passes through the part that depends on the size of the loan. The effect on the equilibrium policy needs here to be separated between the effect of the diplomatic proximity with the country that faces the crisis and the other countries.

5.1 Diplomacy with the country facing the crisis

This country would obviously be favorable for the largest possible loan, so $a_j > 0$. Then, since a is negative, including a_j with a coefficient which is positive α_{ij} decreases the absolute value of the numerator of both the equilibrium and the bounds. Additionally, it decreases the effect of the constant in the numerator of the bounds.[7]

The decrease of the $|a|$ implies an increase of the equilibrium which is logical as this implies that the tighter the diplomatic links of a country i with the country j hit by the crisis, the larger the loan the country i wishes.

We next turn to the effect on the bounds. It reduces the effect of the political constant. If one admits that the magnitude of a_j is correlated to the magnitude of the crisis[8], the harder the crisis, the lower the effect of lobbying activity through the constant, everything else equal. This is also true for the magnitude of α_{ij}. So interestingly, the diplomatic relationship with the country facing the crisis has a negative effect on the lobbying activity.

Proposition 5 *An increase of the diplomatic proximity with the country facing the crisis reduces the effect of the political relationship*

As underlined in section 2.4, the diplomatic proximity is related to the sum of the profits firms from country j that depend on the crisis (under our simplifying assumptions that the effects only pass through profits). A small crisis would then only have a marginal effect on the decision.

5.2 Diplomacy with the other countries

Other countries have gross-of-politics objective functions that have shapes corresponding to the shape of the objective function of the country of interest, namely country i. As a consequence, they are such that $a_h < 0$ since they also exhibit an optimal loan. So diplomatic relationships with other countries have a leverage effect on the political effects.

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[7]If one has to analyze the effect of the political economy in the country facing the crisis, the fact a_j is negative reverses the conclusion of the section above.

[8]When a_j increases, this indicates a larger propensity of the country facing the crisis to ask quickly for a large loan.

One might wonder whether the effect is larger when the other country has a similar position with respect to the loan (i.e the optimal loans of country i and h are similar), or if the distance between both countries in terms of optimal loan is large. In order to check this, we need to think of moving a parameter, holding the other ones constant. If the bs are held constant. A country that is on the left of the axis that measures the optimal loan of each country if and only if $0 > a_h > a_i$. So the numerator is lower compared to the opposed situation $(a_h < a_i)$. So when the country h wishes a lower loan, the effect is unambiguously negative on the optimal equilibrium of country i if the constant is negative overall. Hence, when the dominating political effect is driven by the bargaining power of lobbies, then being closer from a country that wishes a low loan reduces its own loan. The effect is ambiguous when considering the case of $c_c > 0$. Since the a in the numerator is in a square root, we can logically conclude that the effect the is the most important is the one passing through the denominator.

As a consequence, the political economy aspect may reduce the effect of being close to a country that wishes a low loan. Turning to the other situation, obviously the overall effect is in the other direction (and that's reassuring). However, that is the other situation of the political economy framework that reduces the effect of diplomacy. When the bargaining power of lobbies is small, then the effect of being close to a country that wishes a high loan is reduced.

5.3   Lobbies represent a non-negligible share of the population

A last aspect we want to discuss in this paper is the role of the fact population is at leat partly represented by lobbies. In such case, the welfare of a given lobby is equal to

$$W_{ik} = \Pi_{ik} + \gamma_{ik} W_i \tag{13}$$

where γ_{ik} is the share of the population of country i that is represented by the lobby k. An interesting effect is that this reintroduces the constant part of the welfare of country i in the overall effect on the bounds. Indeed, the weight of W_i in the equation of interest is now $1 + \gamma_{ik}$. So when we consider the difference with $W_i(S_{ij} = 0)$, the part of W_i that is independent of S_{ij}

does not totally disappear. This is due to the population is interested in the welfare W_i and not by the difference $W_i - W_i(S_{ij} = 0)$.

Consequently, when the welfare of country i is positive despite the loan is null, which is probable yet not systematic since domestic firms may be so exposed in country j, this reinforces the positive effect of the political relationship between the government and lobbies on the probability a consensus will be reached.

Proposition 6 *When a lobby represents a non-negligible share of the domestic population, this reinforces the positive effect on the probability a consensus will be reached*

6   Probability of reaching a consensus

Now that we know the effect on one country, one can infer the effect on the probabilities of reaching an apparent consensus, then of reaching an explicit consensus and finally of reaching a simple majority vote for a loan.

We will use two ways to represent the countries that make a loan decision. A first one (refer to as representation 1) is an axis on which all countries are ranked according to their S^*s and their ranges are drawn on the same axis. The second one (refer to as representation 2) is a two axes representation where the x-axis measures the S^*s and the y-axis measures the θs. It is important to note for instance that according to the representation 2, the more U-shaped it looks like, the more likely is the consensus as we need the two extreme countries to share at least one value. However, a very increasing line or a very decreasing line should also be ok. That is, starting for the lowest S^* to the highest (or conversely), the next country just has to have a θ such that it is equal to the difference between the two S^*s. The country after has to have a θ such that it is equal to the difference between its S^* and the lowest one, etc ... So moving from country n to country $n+1$, the θ increase by the difference between S_n^* and S_{n+1}^*. Hence this is a 45° line.

6.1 Apparent consensus

As already said, in the case of an apparent consensus, the existence of one common value in the ranges of two countries is enough to reach a consensus. If all countries share pair by pair a common value, then the consensus is reached, otherwise it is not.

Two possibilities arise. (i) Either the range increases from $[\underline{S}, \overline{S}]$ to $[\underline{S}', \overline{S}']$ such that $\underline{S}' < \underline{S}$ and $\overline{S}' > \overline{S}$. In such a case, whatever the position of the country, this effect or effort is either positive or has no effect. It is positive if it allows this country to reach some common values with at least one additional country (given that one could turn to a vote if no consensus is reached). It has no effect if this simply increases ranges that are already non-empty before the effect or effort takes place.

(ii) If this not the case, this leaves unchanged the probability if it does nothing or if it suppresses the last common value between two countries. An effort in the right direction may help reaching a consensus. A country such that $S_{ij}^* < \bar{S}^* = \sum_i^n S_{ij}^*/n$ will have a nil or positive effect if $\overline{S}' > \overline{S}$. Conversely, a country such that $S_{ij}^* > \bar{S}^*$ will have a positive or nil effect if $\underline{S}' < \underline{S}$.

6.2 Explicit consensus

In the case of the explicit consensus, the existence of one common value is just enough to have a non nil probability of reaching a consensus. However, the rule of a consensus is that all countries have agreed. So the most important is the range between the two most extreme countries, i.e the lowest $S^* - \theta$ and the highest $S^* + \theta$. Because of course, despite two countries share a very large range, they have to choose a value in the range of the two extreme countries if they want all countries to agree to the proposition.

Contrary to the case of apparent consensus, increasing all ranges is assumed to have a positive effect on the probability as soon as all pairs of countries share some common values. This being more true concerning the two extreme countries.

For an explicit consensus, as soon as the range of a country is not diminishing in size, there is

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an increase in the probability a consensus will reached if all pairs of countries exist. That is, even if no new pair of countries sharing a common value is created, this still increases the probability.

It is however probable (even if the aim of this paper is not to develop this) that a move such that an increase of the common ranges of several pairs has for consequence a reduction of the minimum common range to all countries, this would reduce the probability a consensus will be reached.

6.3   Modified median voter

The median voter offers some interesting insight. This is a modified version because here we have two dimensions. Considering representation 1, suppose we have 5 countries from 1 to 5. Assume we have that $S_1^* < S_2^* < S_3^* < S_4^* < S_5^*$. A standard median voter situation would say that a solution around (or equal to, according to the refinement) S_3^* would be chosen.

Here, the θs are very important. They may make possible that a solution between S_1^* and S_2^* to be chosen. If one considers a country votes for a proposition if it is not reducing its welfare, the presence of this rule transforms the issue of the vote. Even, if one gives the choice between this value and S_3^*, this could be the case. It suffice in this example that the θs of country 1, country 2 and country 4 to be very small whereas the one of country 5 is very large for instance. This is true even if the country 5 has a voting power by far larger than those of the other four countries. Country 5 could prefer a value in the small range of country 4 but if the range of country 3 is small enough, country 3 would not vote for it. So if countries 1 and 2 have a common range and that the other country to share a range with the others is country 5, the solution that emerges is between S_1^* and S_2^*.

The effect are obviously comparable to those highlighted before. Except that only three countries sharing some common ranges are necessary under a simple majority rule.

7 Other negotiations

In many international negotiations, lobbies interests are opposed to those of the government, contrary to what has been described above. Indeed, for the loan, except the fact the loan has a cost, the country and the lobbies wish the same outcome, i.e a positive loan. One may, however, wish to have an idea on the reason why, for instance, the WTO is facing these difficulties to close the Doha round or why the Copenhagen conference has yield such a poor outcome.

For the WTO, the variables over which governments are negotiating are known, so are their effects over the welfare. As for Copenhagen, it is more tricky since the variables has not yet been defined. According to what variable is chosen, the effects are not the same. So the constant is changing according to the nature of the variable.

7.1 Environmental negotiations

Obviously, the choice of the variable has allowed the reaching of an agreement in Copenhagen. Inasmuch the final declaration did not included some precise numbers of emission reductions, the consensus was much more easier to reach. In particular, comparing to the model presented in this paper, two variables were of interest. First, a and then c. What is the main difference between the two types of proposals during the summit. The first proposition is a reduction of the actual emission by an amount x_t to be attained at date t, or a schedule $\{x_{t_1}, x_{t_2}...\}$. The second type of proposition (emanating from China) is a decrease of the growth rate of emission.

The argument made in this paper underlines that c is such that the effect of the decision is proportional to its value. Reducing the total emissions is obviously at least quadratic in the argument of the amount to reduce. It is of course more than probable that the cost of reducing emissions is increasing in the reduction one wishes to obtain. To the contrary, reducing the growth rate amounts to reducing the increase of this cost that is more probably linear in the emission reduction. Acting on this dimension has then probably allowed to reach a consensus in particular that has included the USA and China.

7.2 Trade negotiations

Consider for instance the case of the tariff reduction. No consensus has been reached in summer 08 and apparently the Doha round is far from being closed. Presumably, the main opposition that prevents the round from being closed is between India and the USA around the question of agriculture.

India wants a strong liberalization whereas the US do not. Independently of their optimal degree of liberalization, compared to the statu quo, the influence over c is important. If one wants to use the framework of this paper, the adoption of variable such that the welfare of each country is an inverted U-shape. One can simply assume this variable is one over the mean tariff or one over the mean agricultural tariff. India is much more on the right of the axis than are the USA. First, as argued in the paper, one could think the bargaining power of each government is not strong. However, one knows that agricultural sectors are not specially concentrated and also represent a quite large share of the population, so we may expect the government has a strong bargaining power.

Since a is negative, a positive c should increase the probability of reaching a consensus. For lobbies, this means a positive and large share of their welfare that is not affected by the liberalization, which, in the case of the agricultural sector is not highly probable. This has to be nuanced. The share not affected by the liberalization may be large despite the share influenced by the liberalization may also be large. Hence, for agriculture, one may think that the size of the sector, in particular in the USA that have a strong domestic demand, is large and the constant is large too. For India, the benefits the domestic market generates are probably quite small relatively to the share that depends on liberalization. The other effect then comes from both countries' objective functions. And the difficulty to reach a consensus probably comes from that point. There are no linear effect of liberalization on the agricultural welfare, either a country earns more and much more (India), or a country loses more and much more (USA). This should explain why the rooms of maneuver of both countries are so small around their respective optima.

The diplomacy has here an important effect. The USA are close to Europe that acts mostly

like the US, so a strong proximity with the Europe reduces the room of maneuver of the US around their optimal liberalization level. Similarly, the recent proximity of India towards Brazil or China that have similar interests in particular in obtaining a strong liberalization have the same effect on India. The constitution of groups of similar interests reduces the probability a consensus is reached, hence this should not be encouraged.

8   Extension and conclusion

The first extension that may come to mind is to apply the following framework to the possibility for the G20 to find an agreement over the financial crisis of the last years. An other interesting extension would be to consider heterogenous firms in each sector in order to assess the effect of lobbying whether most of organized firms are more or less exposed to the crisis. Applying this type of framework to other multilateral decisions as the WTO negotiations or the environmental negotiations would also represent a particularly interesting approach. A last extension that would be of interest is the inclusion of foreign private influence.

This paper is the first, to our best knowledge, to propose such a framework to assess the effects of domestic political relationship and the diplomatic proximity on the probability of reaching a consensus over a lending decision in the context of a crisis. We believe the results are indicative that we need to pursue in this research avenue as it is simple and suggests many possible applications as well in the theoretical direction than in the empirical one.

One of the most striking result is that lobbying may help negotiations to be concluded under some particular conditions. It is however not surprising since it is enough that the country under private interest influence is on the opposed side of the spectrum of all optimal loans, compared to the lobbies, in order to have a consensus more easily reached.

A Proof of the requirement for S

Every welfare may be written as

$$W_i = (\underline{S}_i - S_{ij})(\bar{S}_i + S_{ij}) \tag{14}$$

except for country j (that faces the crisis). Recall that θ_{ij} is the difference to the bounds for country i when judging of the size of the loan to grant to country j.

So the objective function of the government is the following

$$G_i = \sum_{h \neq j} \alpha_{ih}(\underline{S_{hj}} - S_{ij})(\bar{S_{hj}} + S_{ij}) + \alpha_{ij}W_j \tag{15}$$

under the convention that $\alpha_{ii} = 1$. So we have that, around the optimum

$$G_i^* = \sum_{h \neq j} \alpha_{ih}(S_{ij}^* - \theta_{hj} - S_{ij}^*)(S_{ij}^* + \theta_{hj} + S_{ij}^*) + \alpha_{ij}W_j \tag{16}$$

or

$$G_i^* = \sum_{h \neq j} \alpha_{ih}(-\theta_{ih})(2S_{ij}^* + \theta_{hj}) + \alpha_{ij}W_j(S_{ij}^*) \tag{17}$$

We know that $\theta_{ij} < 0 \forall i \neq j$. If the mean of $|\theta_{hj}|$ for all $h \neq j$ is superior to $2S_{ij}^* + \alpha_{ij}W_j(S_{ij}^*)$, then the equilibrium welfare is negative.

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