LACEA 2007
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Stéphane Straub

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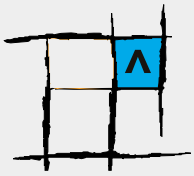

FDI vs. Debt, with Imperfect Commitment and Corruption

Stéphane Straub
Université de Toulouse

May 2001

Abstract

We model the boundaries of the multinational firm by looking at a simple trade-off between FDI (internal expansion) and debt (arm's length expansion). We then analyze the effects of contractual incompleteness due to institutional constraints in host countries, i.e. credit constraints and problems of commitment, and introduce the possibility of corruption due to informational asymmetry. The model predicts that multinational firms will prefer FDI the weaker the ability to commit of the host country, while more corruption will shift the trade-off marginally toward debt. Cross-country empirical evidence support these conclusions.

1 Introduction: Foreign Direct Investment, Debt, and the Boundaries of the Multinational Firm

Attracting foreign direct investment (FDI) is very often considered as an important policy objective in developing countries. Justifications for this are various. As for the macroeconomic part, the argument starts from the necessity to attract external savings to complete insufficient national savings and allow a higher level of investment in order to boost growth. Moreover, since capital flows are supposed to have different degrees of stability depending on their nature, FDI is often perceived as safer than other types of capital, like long term debt that may be difficult to renew when the economic context changes (see the debt crisis of the 80's), or short-term inflows that may reverse very quickly in case of shocks (as happened in Latin America after the 1995 Mexican crisis or in 1997 in some Asian countries)[1]. As for the microeconomic part, it is often stressed that FDI improves the efficiency of capital, through transfers of technologies and formation of human capital, as well as through important spillovers and externalities in the whole industrial sector of the receptor country.

These last effects, the argument goes, are generally even stronger in a dynamic perspective, as FDI also stimulates competition[2].

The weak point, however, is the lack of a satisfactory theory of FDI. The nature of the multinational firm itself has received a quite limited treatment in the theory of international trade, in particular in the so-called "new trade theory" and the "geography and trade" literature.

The first issue we want to stress in this paper is that most of the effects attributed to FDI are in fact produced by multinational enterprises (MNE) expanding their activities to new markets and by the subsequent asset accumulation, or in other words by the international diffusion of technological progress and corporate best practices, but that this expansion does not necessarily take the form of FDI. As a consequence, evaluating the challenge of the attraction of technology for developing countries requires first a theory of the boundaries of the multinational firm.

[1] To quote just some recent references on the stability and behavior of different types of capital inflows, see Frankel and Rose (1996) and Sarno and Taylor (1999).

[2] A clear exposition of this double macro- and micro- "philosophy", which often guides multilateral institutions' development policies can for example be found in a 1998 presentation report of the Multilateral Investment Guarantee Agency (MIGA, a World Bank agency devoted to the insurance of foreign investment political risk). See http://www.miga.org/tenyrs/guarant.htm, page 3.

Let us consider briefly how the multinational firm has been modeled in the theoretical literature (see Markusen, 1995, for a review). In the last 20 years, the literature has basically developed around Dunning's "OLI" framework, which groups the motives for a firm to engage in direct investment in three categories: ownership, location, and internalization. *Ownership* advantages correspond to some product, know-how, reputation or production process which give the firm a relative cost or market superiority. These are conveniently summarized in "knowledge-based, firm-specific assets". They supposedly have two important features: they are transferable across space easily and at low cost, and they have to some extent a joint-input characteristic which makes their use reproducible at low cost. *Location* advantages exist if it is profitable to produce in a foreign country rather than producing at home and exporting, because of tariffs, quotas, transport costs, local factors costs, type of product (e.g. goods with complementary services requiring to be near the consumers) and access to a potential market. These first two characteristics together are thus direct advantages that outweigh the extra-cost of doing business abroad and may explain the decision to invest in a foreign country. The third feature, *internalization*, is somewhat conceptually different from the first two. It generically refers to the problem of whether the most advantageous way of foreign investment is setting a foreign subsidiary, i.e. exploiting the potential advantages internally, or at arm's length, for example through a licensing agreement with a domestic firm. Consistently with the case of ownership and location, internalization advantages have been considered to be linked to characteristics like product complexity and R&D intensity. However, the models which developed this concept have relied on different tools, like asymmetric information (adverse selection and moral hazard), the incomplete nature of contracts and the risk of asset-dissipation.

This OLI framework introduces however confusion into what is the point of the discussion. The problem is that it explains the multinational quality of a firm by mixing technological and organizational characteristics (ownership), efficiency of trade arguments (location), and considerations about the form of the involvement in a foreign country (internalization). To simplify, we may say that the first two points refer to why firms may want to expand abroad, while the third one has to do with the financial structure they give to their expansion. The decision of whether to engage in FDI or not obviously belongs to this third category and is only relevant if the two first points justify the multinational nature of the firm. To say it in yet another way, two different trade-offs are involved: the first one responds to ownership and location motives and is about going multinational vs. staying national; whenever this first problem is resolved in favor of multinational expansion,

a second trade-off arises for the firm, which is about exploiting its potential advantages internally by investing directly in foreign countries vs. simply selling or licensing its technology.

To focus on this second trade-off, consider the definition of FDI from the IMF's 1993 Balance of Payments Manual, which is the internationally accepted one:

"Foreign Direct Investment is net inflows of investment to acquire a lasting management interest (10 percents or more of voting stock[3]) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, and short- and long-term intercompany loans between parent firms and foreign affiliates."

From a standard corporate finance perspective, FDI is thus not the investment itself (the plant, the assets) but a particular way to finance this investment, namely through equity and internal loans. An alternative way for the MNE to take advantage of its specific assets would be to sell it directly to the host country or to engage, as mentioned before, in some licensing agreement, in which case it would in fact choose to hold a claim on the project which can be broadly defined as debt[4]. Whether the firm will prefer holding equity (FDI) or debt (selling or licensing) will then depend on the nature of the project and on the particular kind of risks it faces (see Hausmann and Fernández-Arias, 2000, for an interesting discussion along these lines). In our opinion, these must be understood broadly as including specific industrial or climatic risks, as well as factors resulting from the nature of the information available to the parties and the institutional structure of the host country. Default on debt by sovereign borrowers, direct or indirect expropriation of investments, and cases of corruption are some well known problems plaguing relationships between foreign investors and host countries, in particular in less developed countries (LDCs). We should thus expect these features to have a significant impact on the financial decision of the firm seeking to invest abroad.

To sum up, the aim of our paper is to offer a very simplified theory of the boundaries of the multinational firm in the presence of institutional constraints, such as problems of commitment and corruption. The basic mechanism draws on Williamson (1975), Hart and Moore (1990) and Hart (1995), where one of the parties (the firm) takes ex ante a specific action (here the sunk investment), which has an influence on its bargaining position

[3]In practice, some countries set a higher threshold.

[4]A classification of claims from the more junior to the more senior ones would be: 100% ownership FDI, joint venture with more than 10% participation (thus still considered as FDI), joint venture with less than 10% participation, licensing (where the firm retains some technological "secret"), and debt (pure cession of the technology).

in subsequent periods. The incompleteness of contracts implies that the returns from the relationship depend precisely on this ex post bargaining position, and so the decision on the ownership structure (here debt or equity) is taken by comparing the payoffs that arise in each case. Specifically here, we assume that the choice of the ownership structure belongs solely to the firm. Furthermore, the specific investment involved is of a very simple nature, since it does not affect the productivity of the project per se[5], but is simply a sunk cost which allows the firm to retain part of the benefits of the project in case of ex post renegotiation.

To capture in a simple way the "institutional effects" of information, we extend the model to deal with what seems to us a crucial feature of the situation: the fact that the real value of the flow of externalities to the country may be uncertain (for the host country) and/or not verifiable, but known to the investing firm. We consider this asymmetry of information to be at the heart of the pervasive problem of corruption. By introducing a potentially corrupt "expert" in charge of assessing the value of the projects, we examine how corruption affects the trade-off between debt and FDI. We model the expert choice of the supervision intensity as an effort variable and make simple comparative statics when the transaction costs of corruption (taken as a proxy for the level of corruption in a given environment) vary.

The second goal of the paper is to test empirically the main predictions of the model, in particular how the trade-off debt vs. FDI is affected by institutional phenomena such as the risk of repudiation of contracts and corruption. We also consider the effects of mechanisms aimed at providing to international investors insurance against political risk, in order to see if they are consistent with our theoretical framework.

In what follows, we present a stylized story which captures the basic elements of the previous discussion. Section 3 introduces a simple model of the trade-off between FDI and debt, that we progressively enrich to consider the effect of the lack of commitment, asymmetric information and corruption. Section 4 then presents empirical evidence supporting the basic results of the model, and Section 5 concludes.

2 A Stylized Story

Consider the following stylized story. A firm has developed some specific knowledge (as a result of large investment in R&D, long term experience in

[5]Such an extension would of course be possible. However, as we argue later on, it is not clear which form of involvement should a priori be considered as more productive (see footnote 10).

managerial best practice, etc.) that allows it to produce some good at a substantial lower cost than its potential competitors in a given developing country. This specific advantage pushes it to expand its activities in foreign markets. The developing country has an interest in attracting this technology for several reasons. First, there is a direct welfare effect on consumers from making a good available at both better quality and lower price, thus from increased competition. Moreover, the introduction of the technology has a bunch of indirect or "spillover" effects. These are broadly referred to as productivity spillovers and imply that as a result of being exposed to the more efficient production process the domestic producers in this and other branches also become more efficient over time[6]. In a dynamic context, these externalities are likely to be important.

In a world of complete contracting, the firm and the developing country's government (or some local firm) would presumably agree on a contract stipulating the transfer of the blueprint of the technology for a given price, according to the potential surplus created by the adaptation of the technology to the host country and the bargaining power of the parties. Thus, the developing country would simply "buy" the technology and the necessary inputs to make it work (machines, management, etc.). The payment could be realized upfront by contracting debt backed by the potential gains of the acquisition, either from the domestic or international financial system or alternatively directly from the seller.

However, various problems may make this complete contract solution impossible. If the value of the technology plus the net spillovers are very high, the receiving country is likely to be credit constrained or credit would be available at too high an interest rate premium, so it cannot simply contract debt to pay for the technology. The alternative solution would be for the parties to agree on a scheduled payment over time, adapted to the realization of the potential benefits to the country. If the risk of contract repudiation exists, however, as it does in most of the world, this is plagued by a commitment problem, since once the firm has transferred the blueprint of the technology it exposes itself to a situation where the debtor reneges on its commitment and forces a renegotiation in which it has increased bargaining power (if the technology has been totally transferred, the debtor could simply refuse to keep on paying). Thus, in this simple setting, the combination of credit constraint and weak ability to commit on the side of the receiving country puts us in a context of incomplete contracting where the direct acquisition of the

[6]Beside these productivity spillovers, another strand of benefits can be labeled "market access spillovers". See Blomström and Kokko (1996) for an extensive discussion of spillovers arising from the operations of multinational corporations abroad.

technology becomes more difficult.

Anticipating this, the alternative for the firm is to undertake direct investment. The country would still benefit from the spillovers mentioned above, while the firm would keep its strategic information secret. However, the firm will now have to incur a costly sunk investment. This cost is linked to the need to prospect and negotiate with local partners and counterparts, to deal with local bureaucrats, and to the investment in local physical and managerial assets (construction of a new plant, adaptation to different business conditions, etc.). This cost is greater than it would be for the host country (or some local investor) who has better knowledge of local conditions and, by definition, better access to the local administration. So, the net value of the project over which bargaining takes place is lower than under the debt option. In a world with perfect commitment, the debt option is thus always more efficient from a global perspective. However, once we consider the possibility of contract renegotiation at the end of the first period, the outcome is not obvious anymore. The firm has now a better status quo residual payoff in case the host country defaults, represented in our model by the fact that it can recover a fraction of its second period profits (we discuss later on why this is a reasonable approximation to the complex threat facing FDI, namely outright expropriation on the one hand, and "creeping" expropriation, for example through increased taxation, on the other hand). The ingredients of the basic debt vs. equity trade-off in the international diffusion of technology are present in this simple framework: credit constraint and lack of commitment, relative efficiency of local and foreign producers, extent of the potential spillover effects in the host economy, relative inefficiency (sunk cost) of the direct investment option, relative bargaining power of the parties[7].

Consider, moreover, the existence of an asymmetry of information on the potential benefits of the project between the parties involved in the negotiation. The fact that the host country has only prior subjective beliefs about the real value has obviously important consequences for the final outcome of bargaining. It may then hire an expert in charge of assessing this value. However, the need to delegate this task inside the government structure gives rise to the possibility of corruption, whereby a better informed agent takes advantage of her position to make a side contract with the investors, sharing

[7]Let us mention that this is of course a very simplified vision of multinational expansion. In a multicountry world, the commitment problem becomes even worst, as we would have to take into account the possibility that the host country, once it has acquired the technology, may resell it to a third party, thus capturing some of the firm's future rents. This problem would obviously shift the trade-off against debt and in favor of direct investment. Its analysis would however require a more complex model, so we abstract from it in the present version.

the potential information rent, in exchange for a favorable report. The facts that ensuring honest behavior from the expert requires costly incentive payments and that the monitoring effort of this expert depends on its potential reward, explain that the bargaining position of the firm, and thus the final trade-off between FDI and debt will be affected by the level of corruption that prevails.

3 The Model

3.1 Basic Setting: Debt vs. FDI

We consider the following three period model. Consider a country L, in which a single firm produces a good with a constant return to scale technology of marginal cost c_L. This good is consumed by local consumers who have a downward sloping demand function.

This technology happens to be a relatively inefficient one: a foreign firm F has developed an alternative technology which allows it to produce the same good at a lower marginal cost c_F. Technology here must be understood in the broad sense of technical as well as managerial and commercial capacity.

Assume for simplicity that exporting to L is not an option for transport costs reasons for example[8]. Both country L and the firm F, however, have an interest in introducing the improved technology to L's interior market:

> - F has increasing returns to scale, due for example to an important fixed investment in the development of the technology, and wants to expand its activity.
>
> - As for country L, first it will obviously benefit from increased competition (thus higher consumers' welfare). Second, the introduction of a better technology will have positive spillovers for the domestic industry through some learning effect: while in the first period the indigenous producers compete with their low cost technology (c_L), the contact with F will allow them to upgrade their own technology and to produce in period 2 at a lower marginal cost c_{LS}.

The subscript $t = 0, 1, 2$ refers to time, with:

> - $t = 0$, the benchmark situation in country L, with only indigenous producers of cost c_L.

[8]The model could be extended to consider an initial situation in which the firm exports to country L, without modifying the principal insights.

- t = 1, the situation in L when the improved technology (c_F) is first introduced and competes with high cost producers (c_L).

- t = 2, the situation in L when the improved technology (c_F) competes with local producers who have benefited from technological spillovers (cost $c_{LS} < c_L$).

In each period t = 0 to 2, the situation is characterized by the following outcomes, where the upperscripts L and F refer to the "local" and "foreign" technologies respectively:

Profits	Π_t^L, Π_t^F
Consumer surplus	S_t^C
Aggregate welfare	$W_t = S_t^C + \Pi_t^L + \Pi_t^F$

Assuming there is no discounting, the net benefit of the introduction of the technology is thus given by[9]:

$$\begin{aligned} G &= (W_1 - W_0) + (W_2 - W_0) \qquad (1) \\ &= \left(\left(S_1^C + \Pi_1^L + \Pi_1^F\right) - \left(S_0^C + \Pi_0^L\right)\right) + \left(\left(S_2^C + \Pi_2^L + \Pi_2^F\right) - \left(S_0^C + \Pi_0^L\right)\right). \end{aligned}$$

We assume that the parties are risk neutral and that the surplus is divided among them according to a Nash bargaining process. Although at this stage we can just compute the outcome in terms of cooperative game theory, we find it useful to introduce the extensive game form corresponding to the Nash bargaining solution that we will use later to solve the asymmetric information case. The following three stage game, which exactly implements the Nash

[9] We can also disentangle the competition and the technological effects, by writing:

$$\begin{aligned} G &= (W_1 - W_0) + (W_2 - W_1) + (W_1 - W_0) \\ &= 2\,(W_1 - W_0) + (W_2 - W_1) \end{aligned}$$

where the increase in welfare due to the change in the competitive structure of the market is:

$$W_1 - W_0 = \left(S_1^C + \Pi_1^L + \Pi_1^F\right) - \left(S_0^C + \Pi_0^L\right)$$

and the increase in welfare due to the technological spillover between period 1 and 2 is:

$$W_2 - W_1 = \left(S_2^C + \Pi_2^L + \Pi_2^F\right) - \left(S_1^C + \Pi_1^L + \Pi_1^F\right)$$

For simple downward sloping demand functions, it is easily shown that G, the sum of both effects, is always positive, although the technological effect may be negative for certain extreme values of the parameters. We do not need to consider any specific functional form for the development of the model, and assume that higher spillovers imply a higher global value of the project (see below).

solution, is a simplified version of Howard (1992) proposed by Osborne and Rubinstein (1994).

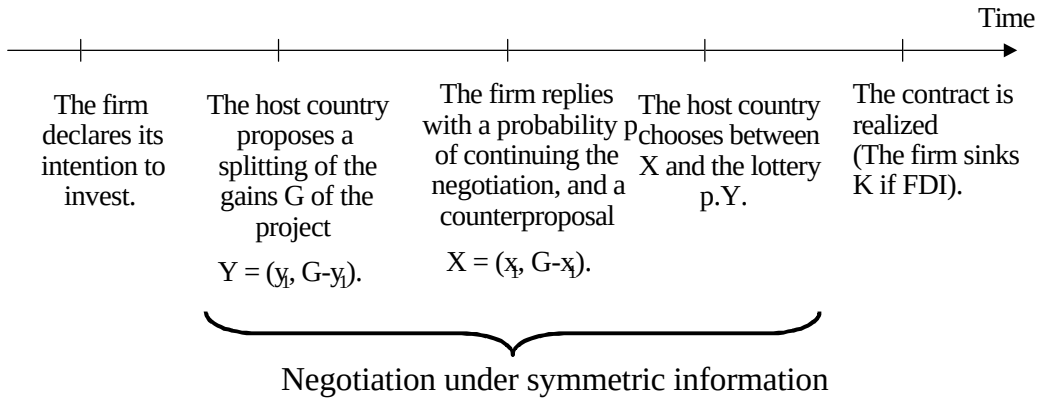

Figure 1: Timing under perfect information

This game form has the advantage of being simple and thus easily extendable to an asymmetric information setting. In the present context we propose an intuitive application, which runs as follows.

The game is a simple alternated offers bargaining in three stages. The first player to move (the country) offers a possible agreement $Y = (y_1, G - y_1)$. The second player (the firm) responds to this offer by a counteroffer $X = (x_1, G - x_1)$ and a threat to terminate the negotiation. Ex ante, the multinational firm's position runs as follows: "Given your offer, I will quit with probability $1 - p$ (thus an *ex ante* threat). Furthermore, if negotiation go on and you don't accept my counteroffer X and insist in implementing Y, there is a probability $1 - p$ that I will decline any agreement."

The mechanism which leads the players to choose the Nash solution is quite intuitive: any initial offer which fails to propose this solution can be met with a "punishment" that leaves the initial offerer worse off than when he proposes an equal splitting of the pie. This is because if $y_1 > \frac{G}{2}$, the firm has the possibility to choose a probability $p < 1$, so that the negotiation ends with a strictly positive probability. Faced with this threat, it is the country's best strategy to offer the Nash solution and the firm agrees to this choice by choosing $X = Y$ and $p = 1$. Of course, the country would never choose $y_1 < \frac{G}{2}$, since the firm would again choose $X = Y$ and $p = 1$. (see Appendix 1 for a complete resolution of the game under complete and incomplete information).

With perfect information, the timing is as in Figure 1. In a world of complete contracting, the firm would simply sell the blueprint of the technology

to country L, based on its total value. From now on, we call this the "Debt" option, in the sense that the country (or some local firm) simply contracts debt to buy the technology, eventually collateralized by its expected gain from this acquisition, and sets up a locally owned firm endowed with the new production process.

The status quo payoffs of the parties, if the negotiation is abandoned and the investment is not realized, are simply 0, so that the surplus G will be split in the following way:

$$U^L_{DEBT} = U^F_{DEBT} = \frac{1}{2}G \tag{2}$$

Alternatively, the firm may choose to engage in FDI. In this case, it will have to pay in period 1 a sunk cost K, which generically corresponds to the cost of finding local counterparts, building a new plant in the host country and adapting to an imperfectly known business context. On the other hand, the firm keeps the property-right over the technology. For simplicity, we assume that both the efficiency of the new firm in the host country and the resulting spillovers for the local industry are the same regardless of the way the technology is introduced (debt or FDI)[10]. As before, the firm bargains with the host country over a share of the benefits generated by its entry, now equal to $G - K$. With the same status quo payoffs than before, the outcome of the Nash bargaining is:

$$U^L_{FDI} = U^F_{FDI} = \frac{1}{2}(G - K) \tag{3}$$

Hence, in a world with perfect information and no commitment problems, debt is always more efficient.

3.2 Credit Constraints and Lack of Commitment

This framework relies however on a number of disputable assumptions, such as perfect access to financial markets for the receiving country, and absence of strategic default. In fact, the total actual value of the introduction of new technology being of high magnitude, country L is likely to be credit constrained in international markets. In this case, a possible alternative is

[10] As for the efficiency of the organization resulting from the debt option vs. that of the FDI option, the comparison is a priori ambiguous. On the one hand, a subsidiary may benefit from specific spillovers from the parent company, that would not accrue to a locally owned firm. On the other hand, local entrepreneurs may benefit from better knowledge and information about the business conditions in their country (see Schnitzer, 1997). The comparison of spillovers in both cases is thus also ambiguous.

for the firm to sell its technology against the promise of partial payments in each period. With a similar bargaining process, the outcome in each case is the same as before, divided in two successive parts. Calling:

$$G_1 = W_1 - W_0, \quad and \quad G_2 = W_2 - W_0$$

the surplus from a debt contract is shared in each successive period, so that global payoffs are as follows:

$$U^L_{DEBT} = U^F_{DEBT} = \frac{1}{2}G_1 + \frac{1}{2}G_2 \tag{4}$$

while in case of FDI, it is

$$U^L_{FDI} = U^F_{FDI} = \frac{1}{2}(G_1 - K) + \frac{1}{2}G_2 \tag{5}$$

This option may however collapse because of imperfect commitment on the part of country L. Consider the possibility that it may renege on its commitment in second period, represented here by an exogenous probability γ of strategic default, and force a renegotiation. To say it in another way, γ corresponds to the risk of repudiation of contract by country L.

Before going on, it is useful to discuss briefly the form that this repudiation may take with a debt and with a FDI contract respectively. In case of debt, it is straightforward to consider that the country simply defaults (with probability γ) and forces a renegotiation in which the firm has a status quo utility level of zero, thus appropriating the whole surplus. In case of FDI, the situation is slightly more complex. First, in some cases the investor faces the risk of outright expropriation or nationalization of the productive assets. Second, it is exposed to a more subtle form of expropriation, in which the host country manages to capture the rents generated by the subsidiary through specific actions like modifications of the tax schedule. While in the first case the outcome is similar to the case of repudiation of a debt contract (the foreign firm is left with a status quo payoff of zero in period 2), in the second case it is generally considered that since the firm keeps the property rights over the subsidiary, it can react by taking specific actions that allow it to retain a certain stream of profit, for example shifting back some of its production to another international location. In this last case, the firm being potentially able to recover a fraction of its second period profits, it has a better position in the subsequent renegotiation. Thus, in the case of FDI we simply assume that the foreign firm and the host country anticipate that in expectation the firm will retain a fraction of its second period profits equal to $\theta\Pi^F_2$, where $\theta < 1$ depends both on the probability of both types of expropriation and on the fraction of the profits that can be recovered by

the subsidiary[11]. To sum up, we assume for now that both with debt and FDI, bargaining is over the all surplus and expropriation arise with the same positive probability γ, followed by a renegotiation at $t = 2$ in which the perceived status quo levels depend on which of the debt or the FDI contract has prevailed in period 1.

Now, with a positive probability that the country reneges on its commitment in period 2, the timing of successive events is shown in Figure 2:

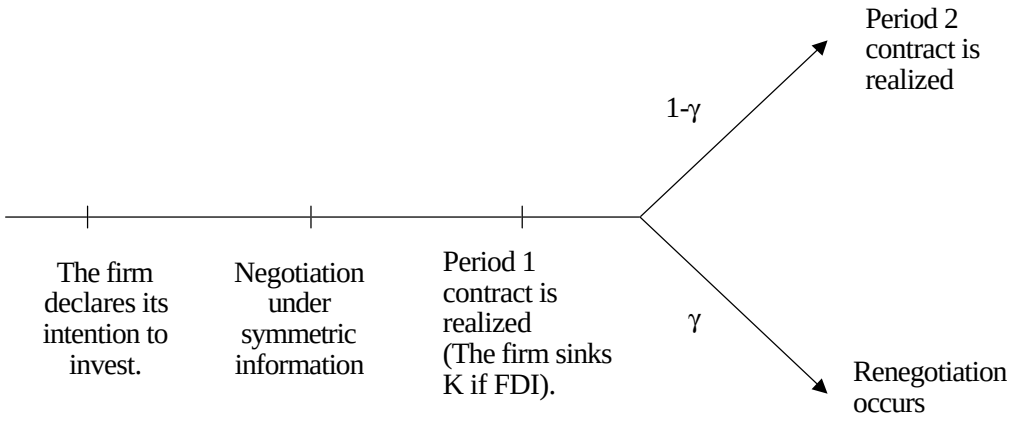

Figure 2: Timing when renegotiation is possible

The outcome of the bargaining process becomes the following.

In case of debt, the first period surplus G_1 is divided evenly, while in the second period in case of renegotiation the firm gets nothing with probability γ (the status quo payoff of the firm at t $= 2$ is 0, while that of country L is G_2), hence:

$$\begin{aligned} U^L_{DEBT} &= \frac{1}{2}G_1 + \frac{1}{2}(1+\gamma)G_2 \\ U^F_{DEBT} &= \frac{1}{2}G_1 + \frac{1}{2}(1-\gamma)G_2 \end{aligned} \tag{6}$$

In case of FDI, following our previous discussion, if the renegotiation does not yield any result, country L keeps both operating firms, and thus the potential second period benefit G_2, but a fraction $\theta\Pi^F_2$ is retained by the

[11]We do not model explicitely at this stage these two different cases, since we want to keep the model tractable when introducing asymmetric information and corruption. See Schnitzer (1997) for a more detailled discusion and a model where both cases of expropriation are considered.

firm. The status quo payoffs at the beginning of period 2 are now $\theta\Pi_2^F$ and $G_2 - \theta\Pi_2^F$ for the firm and the host country respectively. Thus the outcome in this case will be:

$$\begin{aligned} U_{FDI}^L &= \frac{1}{2}(G_1 - K) + \frac{1}{2}(1+\gamma)G_2 - \gamma\theta\Pi_2^F \\ U_{FDI}^F &= \frac{1}{2}(G_1 - K) + \frac{1}{2}(1-\gamma)G_2 + \gamma\theta\Pi_2^F \end{aligned} \tag{7}$$

The interesting thing is now to look at the trade-off faced by the firm between the debt and the FDI option. It is straightforward to obtain:

$$FDI \succ Debt \Leftrightarrow \gamma\theta\Pi_2^F - \frac{K}{2} > 0 \tag{8}$$

The potential renegotiation in period 2 now implies that the foreign firm prefers to undertake foreign direct investment for certain values of the parameters. In particular, the trade-off is more favorable to FDI, the greater the share θ of second period profits that can be recovered in case of contract repudiation, the greater Π_2^F, which is the case when the spillovers are of small magnitude, and the lower the sunk cost K. This very simple setting is thus consistent with the basic empirical evidence on that matter[12].

This simple equation provides a key relationship between the likelihood of FDI vs. debt and the probability of contract repudiation by the host country, namely that a higher risk of repudiation makes FDI more likely. We show below that this is also consistent with the cross-country empirical evidence. In the next section, we want to analyze how this trade-off is affected by the existence of an asymmetry of information between the parties.

3.3 Uncertainty on the Level of Spillovers

In a situation where the foreign firm has developed some specific technology and/or know-how, it is natural to assume that it has private information on its exact characteristics. In our model, this asymmetry of information is about the level of spillover that the introduction of the technology would

[12]Markusen (1995) reports that most empirical studies support the view that the internalization of technological transfers (i.e. FDI) is more likely for R&D intensive firms with new and technically complex products. If we take the view that this type of production is characterized by relative low potential spillovers, because the complexity of its products implies a less intensive linkage with domestic suppliers (which seems to be one key factor for the transmission of externalities, see Blomström and Kokko (1996)), this piece of evidence fits well within our framework.

generate, and implies that the host country does not know exactly the extent of the potential benefit G.

Assume that the net benefit can take two values $\underline{G}$ and $\overline{G}$, such that $\underline{G} < \overline{G}$, so an upper bar (resp. lower bar) will be said to correspond to the "good type" (resp. "bad type") project. Consider a situation where the host country has previous beliefs about the realization of G given by:

$$\begin{aligned} \Pr(G &= \underline{G}) = 1 - \nu \\ \Pr(G &= \overline{G}) = \nu \end{aligned}$$

3.3.1 The Nash Solution with Asymmetric Information

To see the implication of the asymmetry of information for the bargaining problem, consider again the extensive game form introduced above. When one of the players has private information about his type, it obviously matters whether it is the informed party which moves first or not. To avoid the multiplicity of equilibria inherent to a signaling game, and to keep the model as tractable as possible, we stick to the case where the uninformed party (the host country) moves first. The timing of the bargaining procedure is the same as under symmetric information, with the only difference that now, when choosing y_1 at the beginning of the game, country L ignores the true value of G and acts in such a way that its expected payoff conditional on the realization of the firm's type is maximum. The complete resolution of the subgame perfect Nash equilibrium of this extensive game is in Appendix 1.

Again, what happens is intuitively clear. If the country chooses $y_1 = \frac{\underline{G}}{2}$, the complete information solution (thus the Nash solution) is implemented with probability $1 - \nu$ (when $G = \underline{G}$), but with probability ν (when $G = \overline{G}$) it incurs a loss since its initial offer is less than $\frac{\overline{G}}{2}$.

On the other hand, if the country's initial offer is $y_1 = \frac{\overline{G}}{2}$, the complete information solution is now implemented with probability ν (since $G = \overline{G}$), but with probability $1 - \nu$ (when $G = \underline{G}$) the offer is too high and the firm replies with $p = \frac{\underline{G}}{\overline{G}}$ and $x_1 = \frac{\underline{G}}{2}$, so that the country suffers a loss with respect to the Nash solution.

Furthermore, it is shown in the appendix that an intermediate value of y_1 is never optimal, so that depending on the value of the parameters, the best choice of y_1 is given by either $y_1 = \frac{\underline{G}}{2}$ or $y_1 = \frac{\overline{G}}{2}$.

The next table summarizes the outcome of the game for different values of the parameters.

		$\nu \leq \frac{\overline{G}}{\overline{G}+\underline{G}}$	$\nu > \frac{\overline{G}}{\overline{G}+\underline{G}}$
		Host country: $y_1 = \frac{\overline{G}}{2}$	Host country: $y_1 = \frac{\overline{G}}{2}$
MNE	$\overline{G}$	$(\frac{\overline{G}}{2} - \frac{\Delta G}{2}, \frac{\overline{G}}{2} + \frac{\Delta G}{2})$	$(\frac{\overline{G}}{2}, \frac{\overline{G}}{2})$
	$\underline{G}$	$(\frac{\underline{G}}{2}, \frac{\underline{G}}{2})$	$(\frac{\underline{G}^2}{2\overline{G}}, \frac{\underline{G}^2}{2\overline{G}})$

Since in some cases the host country has to give up a rent to the investing firm, a way out is to use an expert to bridge the information gap. Consider this expert to be a bureaucrat working for the government, or equivalently a public institution specialized in dealing with foreign investors.

3.3.2 Intervention of an Expert and Possibility of Corruption

Consider a supervision technology à la Tirole (1992), where the expert gets with some positive probability ξ a verifiable signal σ on the good type investor (see Figure 3)[13].

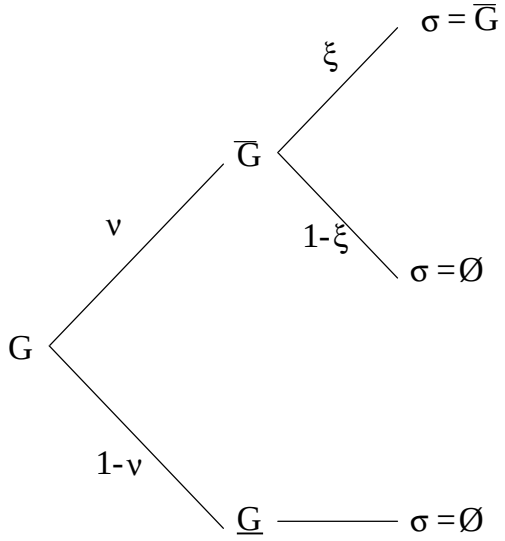

Figure 3: Information structure

The task of the expert gives her decentralized power, in the form of information that is not directly verifiable by the government. To the extent that the expert pursues her own interest, she has an incentive to collude with the foreign firm to extract some of the information rent.

[13]This hard information setting rules out for the moment possibilities of extortion, for example an expert threatening a bad type investor to report the project of being a good type one, that may arise in the soft information case.

In the present case, the only risk of collusion occurs in the case where $\nu \leq \frac{\overline{G}}{\overline{G}+\underline{G}}$, where the investor enjoys an information rent[14]. When the expert detects a good type project of value $\overline{G}$ (which happens with probability ν), she may collude with the firm to report the project of being of the bad type ($\underline{G}$), and share the surplus $\frac{1}{2}\Delta G$.

If collusion occurs, we assume that the expert has all the bargaining power and gets the whole surplus.[15] Moreover, when the firm transfers an amount t to the expert, she receives only kt, where the deadweight loss parameterized by k ($k \leq 1$) corresponds to the transaction cost of collusion[16]. Thus, to prevent collusion, the host government has to give the expert an incentive payment $s = k\frac{1}{2}\Delta G$ when she reveals a good type project.

The timing of the events is now as in Figure 4.

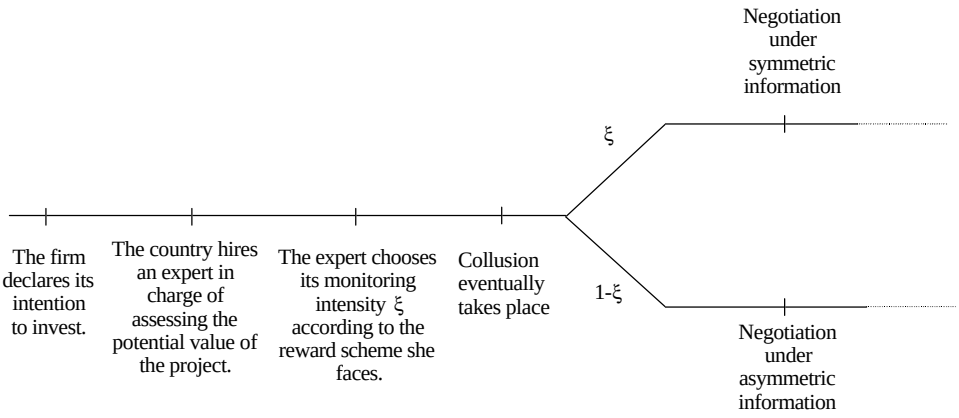

Figure 4: Timing with intervention of an expert

Consider now that in order to have a signal with probability ξ, the expert

[14]Since the only case where the investing firm enjoys a rent is when $\nu \leq \frac{\overline{G}}{\overline{G}+\underline{G}}$, we shall therefore concentrate on this case. It is easily shown that with the information structure postulated above, when $\nu > \frac{\overline{G}}{\overline{G}+\underline{G}}$, the introduction of asymmetric information and the expert intervention have no effect on the trade-off between FDI and debt (see Appendix 3).

[15]This assumption is made for simplicity. Considering that the expert and the firm have relative bargaining power parameterized by α ($\alpha < 1$), and thus get a share of the surplus equal to α and $1-\alpha$ respectively , would not change the following results.

[16]k can be considered to capture both material difficulties in realizing illegal side payments and psychological traits of the corrupt agents, like their relative honesty or their fear to be caught. See Laffont and Tirole (1991) for a discussion.

must exert an effort which has a disutility $\Psi(\xi)$ $(\Psi'(\xi) > 0, \Psi(\xi)'' > 0)$[17]. The government rewards the expert with a payment r for each dollar that her report allows to recover. The expert will thus choose its level of effort so as to solve:

$$\max_{\xi} \xi r \frac{\Delta G}{2} - \Psi(\xi) \tag{9}$$

If we take a simple functional form $\Psi(.) = \frac{\Delta G}{2}\frac{\xi^2}{2}$ for the purpose of normalization, we see immediately that the expert will choose $\xi^* = r$.

Anticipating this, the government will set the reward r so as to maximize its gain from hiring the expert:

$$\max_{r} \xi \frac{\Delta G}{2} - \xi r \frac{\Delta G}{2} = r\frac{\Delta G}{2} - r^2\frac{\Delta G}{2} \tag{10}$$

where the first term is the gain due to the report occurring with probability ξ, and the second term is the cost of the incentive payment to the expert. Thus, it will set $r^* = \frac{1}{2}$, and will receive an informative report with probability $\xi^* = \frac{1}{2}$.

Consider now the case where the expert is potentially corrupt. We have seen in the previous section that she gets $s = k\frac{1}{2}\Delta G$ if the side contract with the firm is enforced. The maximization program of the expert becomes therefore:

$$\max_{\xi} \xi \left[\max(k, r)\frac{\Delta G}{2}\right] - \Psi(\xi) \tag{11}$$

where the side contract prevails if $k > r$ and a thruthfull report is made otherwise. The expert will thus choose $\xi^* = \max(k, r)$. Considering this, it is optimal for the government to choose $r^* = \frac{1}{2}$ as long as $k < \frac{1}{2}$ and $r^* = k$ otherwise. As a result, $\xi^* = \frac{1}{2}$ when $k < \frac{1}{2}$ and $\xi^* = k$ otherwise.

As k increases, i.e. as the environment becomes more prone to corruption because of lower transaction costs, it is thus obvious that the intensity of monitoring ξ^* will also increase and the trade-off will be shifted toward debt[18].

[17] See Mookherjee and Png (1995) for a model where corruptible inspectors choose their monitoring intensity in a similar way.

[18] Similar comparative statics obtain with respect to the effect of corruption if we allow for a more complex information structure where the expert is corrupt with some probability, or equivalently there is a proportion of corrupt experts (see Appendix 2). Wane (2000) has similar results, with corruptible inspectors exerting a higher level of monitoring effort than non corruptible ones.

In this simple informational structure, the collusion proofness principle holds (see for example Tirole, 1992), so that country L will always find it profitable to pay the expert in exchange for a hard signal that the project is good. We can now look at the consequences for the trade-off between debt and FDI. Three cases will occur:

- Case1: with probability $\nu\xi$, the project is good, the expert has a signal $\overline{G}$, reveals it to the government, and the full information solution is implemented.

- Case 2: with probability $\nu(1-\xi)$, the project is good, the expert has no signal, and the asymmetric information solution prevails.

- Case 3: with probability $1-\nu$, the project is bad, the expert have no signal either, and the asymmetric information solution prevails. Note however that this case is similar to the complete information one, since the firm has no rent anyway.

With two types of project and complete information, the trade-off between FDI and debt is given by:

$$FDI \succ Debt \Leftrightarrow \gamma\left(\nu\theta\overline{\Pi}_2^F + (1-\nu)\theta\underline{\Pi}_2^F\right) - \frac{K}{2} > 0 \tag{12}$$

Under asymmetric information, some computations show that the trade-off becomes (see Appendix 3):

$$FDI \succ Debt \Leftrightarrow \gamma\left(\nu\xi\theta\overline{\Pi}_2^F + (1-\nu\xi)\theta\underline{\Pi}_2^F\right) - \frac{K}{2} > 0 \tag{13}$$

which can also be written as:

$$FDI \succ Debt \Leftrightarrow \gamma\theta\underline{\Pi}_2^F - \gamma\xi\nu\theta\left(\underline{\Pi}_2^F - \overline{\Pi}_2^F\right) - \frac{K}{2} > 0 \tag{14}$$

The difference comes now from the fact that when renegotiation is forced, with probability $1-\nu\xi$ (the sum of the probabilities of cases 2 and 3 above) the host country is uninformed about the firm's type. In particular, with probability $\nu(1-\xi)$ (case 2), the good type is able to mimic the bad one (remember that we are in the case where $\nu \leq \frac{G}{\overline{G}+\underline{G}}$, and thus the government offer is $\frac{G}{2}$, which corresponds to a bad type project) and receives an extra gain from negotiating under asymmetric information, thanks to a better status quo position in the renegotiation ($\theta\underline{\Pi}_2^F$ instead of $\theta\overline{\Pi}_2^F$)[19]. Note thus that it is the interaction of the risk of repudiation (which induces renegotiation with a certain probability) and of asymmetric information and potential corruption

[19] $\underline{\Pi}_2^F$ corresponds to the second period profit of the incoming firm if the spillover is low, i.e. if the firm retains a greater competitive edge, and is obviously greater than $\overline{\Pi}_2^F$.

(which modifies the firm's bargaining position in this renegotiation) that together shift the trade-off.

Since $\underline{\Pi}_2^F$ is greater than $\overline{\Pi}_2^F$, it appears that an increase in the probability ξ that the expert has a signal on the good project, shifts the trade-off marginally toward debt. We have seen that when the expert chooses the intensity of monitoring according to her potential reward, ξ is higher in a more corrupt environment (when transaction costs of corruption are lower). We can then conclude that environments more prone to corruption tend to favor debt relatively more than FDI[20].

We sum up the insights from the model in the following proposition:

Proposition 1 *the trade-off of the investing firm is more favorable to FDI the weaker the ability to commit of the host country (the higher γ), while an environment more prone to corruption (lower transaction costs of corruption, thus higher k) has the opposite effect of shifting the choice of investment toward debt. Moreover, the corruption effect is of smaller magnitude and effective through its interaction with the commitment variable.*

We now turn to the empirical evidence.

4 Empirical Evidence

The aim of this section is to test the insights of the preceding model, in particular with respect to the effect on the composition of capital flows (more precisely the relative proportion of FDI and debt flows) of a country's perceived risk and level of corruption. In accordance with the theoretical framework presented, our empirical analysis tries to disentangle the effects of different institutional aspects and to assess their relative importance. Our major findings, documented and discussed below, are the followings.

- First, the share of FDI in capital flows goes up significantly with the perceived risk of repudiation of contract in the host country, taken here as a proxy for the lack of commitment.

- Second, when introduced alone corruption has a similar effect on the share of FDI in total capital than risk , but of lower magnitude and not statistically significant. However, once risk is accounted for, corruption has rather a negative effect, meaning that more corrupt countries have a capital mix relatively more light in FDI, although it is still not significant at conventional levels.

[20]Similar comparative statics obtain with a more complex information structure in which a certain proportion of experts is corrupt (see Appendix 2).

- Third, the introduction of an interaction term between risk and corruption shows that corruption tends to damper partially the effect of risk on the share of FDI, although even in very corrupt countries, the net effect remains positive, i.e. the risk effect appears to be dominant.

- Fourth, the introduction of a dummy variable characterizing countries under the MIGA "umbrella" reveals a negative and significant effect on the share of FDI in total capital, which is consistent with our previous result if we assume that MIGA acts as a risk reducing mechanism through the disciplinary effect on the host country. Thus, this mechanism oriented to stimulate FDI in fact lowers the share of FDI because it reduces the level of country risk.

It is interesting to replace these results in the context of the available empirical evidence on that topic. Concerning the analysis of the composition of capital flows in relation to institutional characteristics like commitment and corruption, the only papers we are aware of are those of Hausmann and Fernández-Arias (2000) and Wei (2000) [21]. The first paper, based on cross-country regressions similar to the ones we perform, concludes: "Hence, a larger share of FDI in capital flows is typical of countries that are poorer, more closed, riskier, more volatile, more distant, less financially developed, with weaker institutions and with more natural resources." We broadly coincide with this assessment, although we find some of the variables mentioned not to be significant. As for the paper by Wei, its main conclusion is that "corruption in a capital-importing country tends to tilt the composition of its capital inflows away from foreign direct investment and towards foreign bank loans." This study relies, however, on different sample and data set. It is based on *bilateral* capital flows data from 13 developed countries to 30 less developed one, thus obviating more developed countries as recipient. Furthermore, debt flows are restricted to bank lending statistics. Let us mention that although our conclusion regarding the effect of corruption on the composition of capital flows is similar to that of Wei, i.e. corruption reduces the proportion of FDI in capital flows, we find its effect to be only residual and dominated by the incidence of country risk.

Next, we present the data set and then the results of the statistical analysis.

[21] It must be noted that the aim of these papers are not enterely coincident with ours. The first one is not restricted to the composition of capital flows, but also look at the determinants of their volume (given our theoretical goal, however, this second aspect is beyond the scope of our empirical analysis), while the second one investigates the relationship between composition of capital flows and currency crises.

4.1 The Data

Foreign Direct Investment as a share of total private capital (FDI/K). To measure the relative prevalence of foreign direct investment (FDI) versus debt in a country's composition of capital flows, we use the amount of foreign direct investment, defined as in section II, as a share of total private capital flows, consisting of private debt (commercial bank lending, bonds, and other private credits) and nondebt flows (FDI and portfolio equity investment). This data correspond to net flows and is from the World Bank's 2000 World Development Indicators (WDI) and Global Development Finance (GDF), which compile them from a variety of public and private sources including the World Bank's Debtor Reporting System and the IMF's International Financial Statistics and Balance of Payments Databases. We also complete a few entries by recurring to OECD and IMF balance of payment figures, getting a cross-country sample of 118 observations covering both developing and developed countries[22].

Risk of repudiation of contracts. To represent the level of a country specific risk in the sense of lack of commitment, we employ here two different measures. The first one is an indicator of the risk of government repudiation of contracts, published in the *International Country Risk Guide* by the private firm *Political Risk Service, Inc.* It is available for 127 countries for 1995 and is rescaled to rank countries from 0 (less risky) to 10 (more risky)[23].

Corruption. We consider two alternative measures of corruption on a cross-country basis. The first measure is the *graft* index compiled by Daniel Kaufmann, Aart Kraay and Pablo Zoido-Lobatón at the World Bank as part of their extensive database on institutional efficiency[24].The corruption or

[22]An open question is whether to use net capital flows (thus a *stock* approach) or gross inflows figures. Although the answer is not straightforward, both methodological and practical aspects advocate for a net flows approach. First of all, as Hausmann and Fernández-Arias (2000) point out, the very financial nature of FDI gives rise to the possibility of "round tripping schemes", in the sense that inflows registered as FDI may easily be transformed domestically into debt and then flow out under a different denomination. Thus to take into account this permanent arbitraging behavior partially motivated by short term events and capture the effect of fundamentals, a stock approach could be more appropriate. Moreover, from a practical point of view, it appears that pure gross inflows are not available for many countries, especially developing ones (African countries are virtually excluded from the sample). In fact, any sample based on gross data is strongly biased toward high and middle income countries. Since we are primarely interested in testing our theory on developing countries, we take the decision to restrict ourselves to net data.

[23]Consistently and for the sake of easy interpretation, all indices used in this paper are rescaled from 0 (less risk, least corrupt) to 10 (more risk, most corrupt).

[24]This data set is based on the compilation of over 300 governance measures from a

graft index results from the aggregation of the available related subjective indicators (16 index from 13 different sources) qualifying aspects as "the frequency of additional payments to get things done" or "the effect of corruption on the business environment". It uses an unobserved components model, in which the observed data are expressed as a linear function of unobserved corruption plus a disturbance term corresponding to perception errors and/or sampling variation. This technique allows them to get observations for 153 countries, i.e. for a much broader set than any individual indicator would permit, thus reducing the risk of sample bias.

The second measure is the result of a "poll of polls", conducted by the German NGO Transparency international (TI), which published a widely publicized yearly report ranking countries according to their level of corruption. The 1998 TI index covers 79 of our sampled countries and considers mainly corruption in the public sector, defined as the abuse of public office for private gain. It is a simple unweighted average of the 12 rankings from seven different sources[25].

Note that abstraction is made from quantitative and descriptive data on cross-country institutional variations. Apart from the difficulty in obtaining such "objective" data, there are more fundamental reasons to focus on subjective data. First, objective data on corruption cases might reflect both the prevalence of corruption, the legal categories of each country, and the effectiveness of the anti-corruption fight (Ades and Di Tella, 1999). Second, there is a revealed preference argument in favor of subjective indices, in the sense that they capture the perceptions of the agents, which are the relevant decision variables. Finally, it can be argued that such data measure both the intrinsic quality of norms and rules and the efficiency of their enforcement.

Instrument variables. When estimating the relationship between the share of FDI in total capital flows and indices of risk or of corruption, the

variety of sources, organized in six clusters, namely "Voice and accountability", "Political Instability and Violence", "Government effectiveness", "Regulatory Burden", "Rule of law" and "Graft". See Kaufmann et al. (1999) for precise definitions and constructions techniques.

[25]Political & Economic Risk Consultancy (Asian Intelligence Unit), Gallup International (50th Anniversary Survey), Institute for Management Development (World Competitiveness Yearbook), World Economic Forum & Harvard Institute for International Development (Global Competitiveness Report), Political Risk Service (International Country Risk Guide), World Bank World Development Report (Private Sector Survey), and Economist Intelligence Unit (Country Risk Service and Country Forecast). For more details on the construction and sources, as well as discussion of the most critical methodological points as for example the interesting issue of the eventual distinction between administrative and political corruption, see http://www.gwdg.de/~uwvw/FD1998.htm, and Transparency International website at http://www.transparency.de.

possibility of endogeneity bias is an important concern, both because the elaboration of the index for any given country might be influenced by the economic performances regarding the kind of outside finance it succeeds in attracting, and because it is unclear whether the particular prevailing capital mix generates default and corruption (some of its component being more prone to these manifestations) or if it is corruption and default which affect the composition of capital. To tackle this issue, we retain the following instrumental variables, which have become of frequent use in the empirical literature on corruption and the quality of institutions.

As for the risk of repudiation of contracts, we use an index of democratic rights from Polity III, which synthesize different aspects as the degree of constraints on the executive branch exerted by other powers, the competitiveness and openness of executive recruitment and political participation, as well as the extent to which the executive might be dominated by one individual. A more democratic society, in the sense captured by the Polity index, namely in terms of openness and stability of its institutional functioning, may be more likely to avoid extreme situations like outright repudiation of contracts or forced renegotiations. Furthermore, the "objective" way the index is build, based on specific criteria, makes it unlikely that the result be influenced by any feature of the capital structure. In addition, we use a measure of the number of free newspaper in circulation per 1.000 hab., drawn from the World Bank 1998 World Development Indicators, which proxies the degree of civil society participation and the monitoring pressure on the public sector. These measures cover respectively 148 and 174 countries. The correlation coefficient of the risk of repudiation index with the democratic index is of -0.544, while the correlation coefficient with the newspapers index is of -0.602, both significant at the 1% level. Finally, we take the now widely used index of ethnolinguistic fragmentation. Mauro (1995), who popularized it in this instrumental role, argues that the index of ethnolinguistic fragmentation is a suitable instrument for both corruption and political instability and thus for institutional efficiency. The series we use groups 155 observations, and the correlation coefficient of the ethnolinguistic fragmentation index (a higher score on this index indicates a more fragmented country) is of 0.517 with our measure of risk.

To instrument the corruption indices, we follow Mauro (1998) and use a dummy variable indicating whether the country ever was a colony after 1800, a legal origin dummy equal to one if the country's legal code is of English origin, drawn from La Porta et al. (1998), who show that it is a significant determinant of the level of corruption, and an index of the exchange rate black market premium, from Freedom House (rated from 0 to 10, higher score meaning a smaller premium). This last variable is a proxy for the level of rents

due to price distortions and protectionism, pointed out as significant sources of corruption, for example by Ades and Di Tella (1999). The correlation coefficients of these three instruments with the corruption indices are of 0.14, -0.38 and -0.15 for the Kaufmann at al. index, and of 0.36, -0.36 and -0.11 for the TI index respectively. We deliberately avoid other variables generally used as instruments for corruption (see Mauro, 1998), such as measures of openness, stock or exports of natural resources, since the relationship of such economic concepts with flows of capital and investment cast doubt on their exogeneity with respect to our dependent variable.

Tables 1 shows the first stage of the IV regressions for risk and corruption respectively. All the instruments considered have statistically significant coefficients. Moreover, the signs are as expected: more fragmented countries tend to be riskier, while better performance in terms of democratic stability and a higher degree of public sector monitoring by the civil society result in lower overall risk. As for corruption, countries with a colonial past are more corrupt, while those with a legal system derived from the English tradition are on average less so. Finally, a more important black market premium is a significant predictor of a more corrupt country. A standard Hausman test support the validity of the instruments chosen.

Insurance against political risk. In practice, there exist investment insurance programs aimed at protecting investors against loses arising from political risk. Beside a number of private firms active in this market, the Multilateral Investment Guarantee Agency (MIGA) created in 1985 by the World Bank Board of Governors, provides insurance against four types of political risk: transfer restrictions, direct or indirect expropriation, war and civil disturbances, and breach of contract by a host government[26]. Additionally, it also has a mandate of technical assistance, through research, dissemination of information and support of national promotion capabilities. In the fifteen years elapsed since its creation, the agency has been very active. As of 1998, a total of 348 guarantees had been issued, for US$ 4.2 billion in coverage and an estimated of about US$ 25 billions in FDI facilitated. The insurance activity is supposed to have both a direct effect compensating the specific country risk, and an indirect effect, related to the fact that the issuance of an investment guarantee requires the consent of the host government, so that "beyond providing financial compensation for actual losses, MIGA's involvement in a proposed project was meant to mitigate the likelihood that such losses would occur", and "the umbrella of protection against breach of contract that comes from MIGA's presence derives, therefore, not simply from the compensation its guarantees provides but also from its role in deterring

[26]Detailled information on MIGA can be found at http://www.miga.org.

any abrogation of promises solemnly entered into by a host country."[27] It is thus interesting to test the effect of such mechanisms on the structure of capital flows. We expect *a priori* that a country formal compromise with the MIGA/World Bank mechanism would mitigate the risk of expropriation of FDI. Since guarantees typically cover only specific projects, what we are testing strictly speaking is more the referred disciplinary effect that stems from the fear of negative consequences in others World Bank and international donors related activities. To do so, we construct a dummy variable indicating whether a country is host to any outstanding MIGA guaranteed FDI project as of 1998. This is the case for 52 countries.

Other data. In addition, we use the following variables: as control variables, the level of development measured by GDP per capita, the openness of the economy measured by the ratio of imports to GDP, from the World Bank 1998 World Development Indicators, an index of macroeconomic stability, which is an average of inflation and fiscal deficit indices, from the Inter-American Development Bank, a measure of the value of the subsoil natural wealth of a country, from the World Bank, and the measure of distance of a country to major world markets, from Barro and Lee. Part of this data set was kindly provided by the Inter-American Development Bank Research Department.

4.2 Empirical Results

A preliminary step is to test the effect of the risk of repudiation of contracts, or level of commitment, represented by γ in the model. We begin by presenting anecdotal time series evidence, which support the positive relationship postulated in our model between risk and the share of FDI in total private capital flows. Plot 1 presents the evolution of the ratio of FDI to total capital flows for a sample of Latin American countries between 1992 and 1999. The jump in the ratio of FDI to capital at the time of the 1995 tequila shock, which implied an increase in the risk of default on debt, is clearly observed. Hausmann and Fernández-Arias (2000) argue that after a rise in total capital flows to Latin America and a decrease in the share of FDI in these flows at the beginning of the 90s, due to better perceived economic prospects and lower risk, the trend reversal after 1995 is precisely linked to the change in perceptions brought about by the Mexican crisis starting December 1994, and later on by the Asian and Russian crisis.

Plot 2 shows the ratio of FDI to total capital versus the index of risk, showing a strong positive association. Note that the correlation coefficient is

[27] See http://www.miga.org/tenyrs/guarant.htm.

of 0.512, significant at the 1% level.

To go beyond these first evidence, a natural test is then to run a set of cross-country regressions of the share of FDI in total capital flows on the index of risk of contracts repudiation and additional control variables.

The results in table 2 support our hypothesis: the perceived risk of repudiation of contracts, as captured by the PRS index, is of positive sign and generally statistically significant in all the specifications tested, even when different control variables are included. This means that a higher value of this index (higher risk of contract repudiation) corresponds to a higher share of FDI in total private capital flows. This relationship is maintained when instrumenting risk, as shown in regressions (6) and (7). Furthermore, the two stages least squares estimates are slightly greater than the corresponding OLS estimates. The effect is also economically significant, as a one-step increase in risk (on a 10 points scale) corresponds to an increase of the relative part of FDI of between 7.4% and 13,3%.

Some remarks are worth making at this stage. With respect to the different control variables used, only the level of development, proxied by per capita GDP, appears systematically significant. In all the specifications, the coefficient of per capita GDP is of similar magnitude and negative sign, meaning that more developed countries have a capital mix with a higher proportion of debt. This may simply indicate that these countries have better developed capital markets and thus attract more debt capital. In term of the model, extrapolating somewhat the results to the context of cross-country comparisons, the less developed the host country the greater the technological edge the firms investing in it are likely to have, so the more important the potential profit Π_2^F, and the more favorable the trade-off to FDI. This might give an additional motive for the negative sign of the coefficient of GDP per capita in table 2.

As for other control variables, as openness, macroeconomic stability, natural resources wealth or distance to the world markets, they generally lack significance. In fact, while we should expect these variables to be significant determinants of the volume of capital flows (total flows or FDI as a ratio to GDP), i.e. on whether to invest or not[28], we are not surprised to see that they have no predominant effect on the decision about the form of the involvement (FDI or debt). According to these results, in what follows, we restrict our control set to GDP per capita and combine our basic regressions with data about corruption.

[28] As documented for example in Wei (1997).

Following our model, we aim at testing a specification of the form:

$$\text{FDI / total priv. K} = \alpha + \beta_1 \text{ risk} + \beta_2 \text{ risk*corruption} + \beta_3 \text{ control var.} + u \quad (15)$$

As for the effect of corruption alone, preliminary regressions, not reported here, show that it is similar to that of risk (it favors FDI against debt), but not statistically significant and of smaller magnitude, about one third of the risk effect. Given the high positive correlation between the risk and the corruption indices, it may be argued that corruption acts as a proxy for country risk. The introduction of both aspects at the same time indeed changes this picture. Columns 1 and 2 in table 3 show that when regressing the share of FDI on GDP per capita, risk and corruption, the risk coefficient stays positive, of similar magnitude than before, and statistically significant, while the corruption coefficient is now negative, of still smaller magnitude (between 1/3 and 1/8 of the risk coefficient) and never significant. One interpretation is that the impact of corruption on the trade-off between FDI and debt is mainly through its effect on the level of perceived country risk, with only a small residual effect opposed to that of risk, i.e. in favor of debt.

The introduction of the interaction terms in columns 3 and 4 further indicates that as the level of corruption increases, this tends to decrease marginally the impact of risk, although given the small size of the interaction term coefficient, the net effect remains positive. All these results are maintained when instrumenting risk, corruption, and the interaction term between corruption and risk, as can be seen in columns 5 to 8.

The results are robust to the introduction of dummy variables for Latin America and Carribean, East Asian, as well as more developed countries (Table 4)[29]. On the other hand, although the introduction of the Sub-Saharan Africa dummy seems to invalidate the results, when excluding from the sample Sub–Saharan Africa and other low income countries, the statistical relationships remain (columns 4 and 5).

Finally, we run again our principal regressions, introducing the MIGA dummy variable. The results are shown in columns 6 to 7. The sign of the MIGA dummy turns out to be systematically negative and significant, meaning that countries in which MIGA investment insurance mechanisms are at work receive a relatively smaller fraction of their outside capital in the form of FDI. Although this result may seem at first surprising, since MIGA is intended to stimulate FDI, it is in fact consistent with our framework and our previous empirical results. In effect, if, as postulated, a country's MIGA membership acts as a country risk reducing mechanism through a

[29]The EUNAO dummy groups countries from Europe and North America as well as Australia and New Zeland.

global deterrence effect linked to the formal commitment assumed by the country with the World Bank, then following our model it should precisely shift the trade-off for incoming investments toward debt and away from FDI. We then have the surprising conclusion that an FDI insurance program aimed at avoiding investment expropriation has the final effect of lowering the share of FDI in capital flows, presumably because it effectively reduces the level of country risk [30].

5 Conclusion

We have modeled the boundaries of the multinational firm, in the sense of the form it uses to finance its involvement in a foreign country, by looking at a simple trade-off between FDI (internal expansion) and debt (arm's length expansion). We have then analyzed the effects of institutional constraints in host countries, i.e. credit constraints, problems of commitment, and potential corruption.

Several insights are derived from the model. First flows of capital are more likely to take the form of FDI, the lower the ability to commit of the recipe, because in case of contract repudiation (default or expropriation), the firm is able to recover a bigger fraction of its second period profit, for example shifting back some of its production to another location. Second, the model implies that the effect of corruption is of smaller magnitude and is effective through its interaction with the risk of repudiation variable. As for the sign of this effect, it goes counter the commitment effect.

These predictions are broadly supported by the empirical evidence. We regress, in a cross-country sample, the share of FDI in total private capital flows on indices of risk, corruption, as well as several standard control variables like the level of development, macroeconomic stability, openness, etc. The effects of risk in our sample is positive, corresponding to the prediction that riskier countries have a capital mix heavier in FDI. Furthermore, the magnitude of the risk effect indeed appears to dominate that of corruption. Finally, the corruption variable is only significant when an interaction term between risk and corruption is introduced. As for the direction of the corruption effect, once risk is accounted for, it appears to negative, thus more corruption shifts the trade-off marginally toward debt.

Finally, when adding a dummy variable indicating the existence of a

[30] Although the MIGA dummy variable can obviously not be considered exogenous with respect to the composition of capital flows, note that its correlation with the PRS risk index is of only 0.047, which seems to indicate that there is not a systematic selection bias toward more risky countries.

MIGA FDI investment insurance program in the host country, we find that the effect of this mechanism is indeed to shift the trade-off away from FDI and toward debt finance. This result, FDI insurance lowers the share of FDI in total capital, is consistent with our theoretical framework if we assumed that MIGA involvement acts as a country risk reducing instrument.

APPENDIX 1

The extensive game with complete information is represented in figure 5

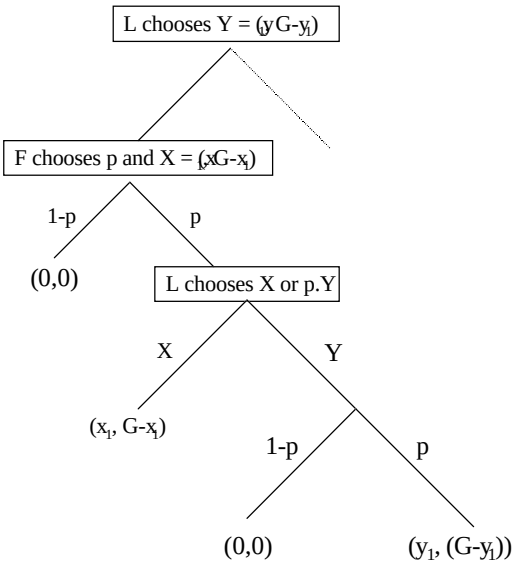

Figure 5: Extensive game with complete information

• In **Stage 1**: Country L proposes a payoff y_1(implicitly a pair $Y = (y_1, G - y_1)$, where $y_1 \leq G$).

• In **Stage 2**: The Firm F replies by proposing a payoff x_1(implicitly a pair $X = (x_1, G - x_1)$, where $x_1 \leq G$), and a probability $p \in [0, 1]$. With probability $1 - p$ the game ends and the outcome is the status quo. With probability p it continues.

• In **Stage 3**: Country L chooses either X or the lottery $p.Y$ (i.e. the lottery giving Y with probability p and the status quo with probability $1-p$). Its choice is the outcome.

Analyzing the game backwards, we get that in stage 2, the firm chooses p (under the constraint $p \leq 1$)and x_1 so as to maximize its final payoff, which is given by either $pp(G - y_1)$, if country L chooses $p.Y$, or $p(G - x_1)$ if the country's choice is X. Formally, the firm's program is:

$$\begin{aligned} &\max_{p,x_1} \left[\min\left(pp(G - y_1), p(G - x_1)\right)\right] \\ &s.t. \qquad p \leq 1 \end{aligned} \tag{16}$$

Anticipating that in stage 3, country L chooses between X and $p.Y$ by picking up the highest value between px_1 and ppy_1,it is straightforward to

see that the firm will thus set p and x_1 such that $px_1 = ppy_1$. Indeed, there is no point in choosing p and x_1 such that $px_1 < ppy_1$, since in this case X will not be chosen anyway. On the other hand, if $px_1 > ppy_1$, F can improve its payoff by reducing x_1 until $px_1 = ppy_1$, still ensuring country L's indifference between X and $p.Y$. The firm program thus reduces to:

$$\begin{aligned} &\max_{p,x_1} [p(G - x_1)] \\ &s.t. \qquad x_1 = py_1 \\ &and \qquad p \leq 1 \end{aligned} \tag{17}$$

Substituting for x_1, and leaving aside the constraint for the moment:

$$\max_{p} [p(G - py_1)] \tag{18}$$

which yields $p = \frac{G}{2y_1}$. Taking now into account the constraint, two cases arise depending on the value of y_1. Specifically, if $y_1 \geq \frac{G}{2}$, $p = \frac{G}{2y_1}$ (the constraint is slack, which corresponds to the case where the firm punishes the country for setting y_1 too high, by picking a p lower than 1) and $x_1 = \frac{G}{2}$, while if $y_1 < \frac{G}{2}$, $p = 1$ (the constraint is now binding) and $x_1 = y_1$.

Anticipating this, country L will choose y_1 in stage 1, such that its payoff is maximal. It is straightforward to see that its optimal choice is also $y_1 = \frac{G}{2}$, thus leading the firm to choose $x_1 = \frac{G}{2}$ and $p = 1$, so that the outcome of the game is the Nash solution $\left(\frac{G}{2}, \frac{G}{2}\right)$. Indeed, a value of y_1 less than $\frac{G}{2}$ would clearly be suboptimal, since the firm would simply choose $x_1 = y_1$ and $p = 1$, yielding to the country a lower payoff than for $y_1 = \frac{G}{2}$. On the other side, if the country chooses $y_1 > \frac{G}{2}$, the firm's rule leads it to react choosing $x_1 = \frac{G}{2}$ and $p = \frac{G}{2y_1}$, yielding again to the country a payoff lower than $\frac{G}{2}$ (i.e. $\frac{G^2}{4y_1}$).

We now turn to the extensive game with asymmetric information:

• **Stage 1**: Country L chooses a payoff y_1 (at this stage a pair $Y = (y_1, E(G) - y_1)$, since it ignores what the true value of G is).

• **Stage 2**: The Firm, knowing its type, chooses a payoff x_1 (implicitly a pair $X = (x_1, G^R - x_1)$, where $x_1 \leq G^R$, the realized value of G, and $p \in [0, 1]$. With probability $1 - p$ the game ends and the outcome is the status quo. With probability p it continues.

• **Stage 3**: Country L chooses either X or the lottery $p.Y$ (where $Y = (y_1, G^R - y_1)$). Its choice is the outcome.

As we see, the only difference with the complete information case is that in stage 1, country L faces the problem of choosing y_1 such that its expected payoff conditional on the realization of the firm's type is maximum. Using

the same approach as before concerning the firm's best response to any value of y_1, we see immediately the following:

If $y_1 = \frac{\underline{G}}{2}$:

A bad type $(\underline{G})$ chooses $x_1 = y_1 = \frac{\underline{G}}{2}$, $p = 1$, so the outcome is similar to the complete information case.

A good type $(\overline{G})$ chooses again $x_1 = y_1 = \frac{\underline{G}}{2}$, $p = 1$,(as in the complete information setting when $y_1 < \frac{G}{2}$).

The total expected payoff for country L is $\nu\frac{\underline{G}}{2} + (1-\nu)\frac{\underline{G}}{2} = \frac{\underline{G}}{2}$.

If $y_1 = \frac{\overline{G}}{2}$:

A good type $(\overline{G})$ chooses $x_1 = y_1 = \frac{\overline{G}}{2}$, $p = 1$, so the outcome is similar to the complete information case.

A bad type $(\underline{G})$ chooses $x_1 = \frac{\underline{G}}{2}$, $p = \frac{\underline{G}}{\overline{G}}$,(as in the complete information setting when $y_1 > \frac{G}{2}$).

The total expected payoff for country L is now $\nu\frac{\overline{G}}{2} + (1-\nu)\frac{\underline{G}^2}{2\overline{G}}$.

Lets now consider the case $\frac{\underline{G}}{2} < y_1 < \frac{\overline{G}}{2}$: (it is easily shown that $y_1 < \frac{\underline{G}}{2}$:and $y_1 > \frac{\overline{G}}{2}$ are dominated by $y_1 = \frac{\underline{G}}{2}$:and $y_1 = \frac{\overline{G}}{2}$ respectively)

A good type $(\overline{G})$ chooses $x_1 = y_1$, $p = 1$,(again, as in the complete information setting when $y_1 < \frac{G}{2}$).

A bad type $(\underline{G})$ chooses $x_1 = \frac{\underline{G}}{2}$, $p = \frac{\underline{G}}{2y_1}$,(as in the complete information setting when $y_1 > \frac{G}{2}$).

The expected payoff for country L is $\nu y_1 + (1-\nu)\frac{\underline{G}^2}{4y_1}$. This payoff is a convex function of y_1, so that the value that maximizes country L's expected payoff is either $y_1 = \frac{\underline{G}}{2}$ or $y_1 = \frac{\overline{G}}{2}$ depending on the values of $\nu, \underline{G}$ and $\overline{G}$. Simple computations show that there is a threshold value $\nu^* = \frac{\underline{G}}{\overline{G}+\underline{G}}$. For ν below this value, $y_1 = \frac{\underline{G}}{2}$, while for ν above it $y_1 = \frac{\overline{G}}{2}$, yielding the outcome described in the text.

APPENDIX 2

It can be shown that the comparative statics results obtained in the text with respect to corruption are still valid with a more complex information structure, as in figure 6. Indeed, it is straightforward to see that an increase in the proportion of corrupt experts (thus a decrease in β) implies that the complete information case prevails more often and thus the trade-off becomes more favorable to debt. Note that with the same reasoning that in the text, $\xi_1 = \frac{1}{2}$ and $\xi_2 = k \geq \frac{1}{2}$.

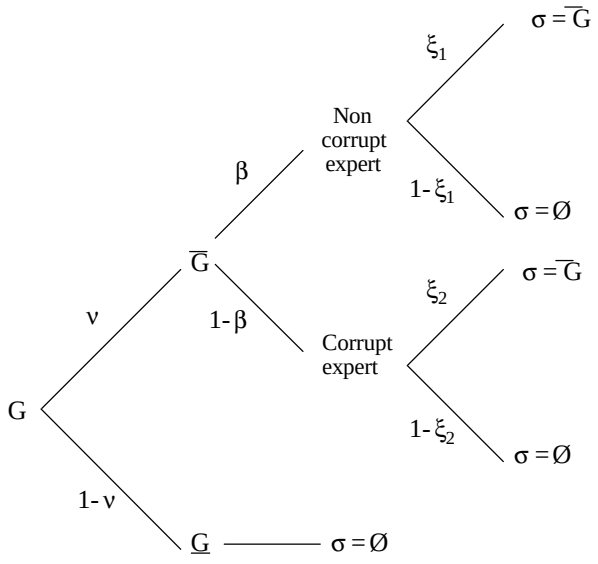

Figure 6: Information structure with heterogenous experts

APPENDIX 3

To see the effect of asymmetric information, we have to decompose the payoff from the project into its two periods components. Since we assume the uncertainty to be about the potential spillovers in the host industry, the difference between a good type and a bad type project will be sensible only in period 2, when the spillover effect takes place. Thus, we have:

$$\begin{aligned} \overline{G} &= G_1 + \overline{G}_2 \\ \underline{G} &= G_1 + \underline{G}_2 \end{aligned}$$

When $\nu \leq \frac{\underline{G}}{\overline{G}+\underline{G}}$, the firm's payoffs from engaging in debt and FDI becomes (the subscripts CI and AI denote *complete information* and *asymmetric information* respectively):

$$\begin{aligned} \overline{U}^F_{DEBT,CI} &= \frac{1}{2}G_1 + \frac{1}{2}(1-\gamma)\overline{G}_2 \\ \overline{U}^F_{DEBT,AI} &= \frac{1}{2}(G_1 + \Delta G_1) + \frac{1}{2}(1-\gamma)(\overline{G}_2 + \Delta G_2) \\ \underline{U}^F_{DEBT} &= \frac{1}{2}G_1 + \frac{1}{2}(1-\gamma)\underline{G}_2 \end{aligned} \tag{19}$$

and

$$\begin{aligned} \overline{U}^F_{FDI,CI} &= \frac{1}{2}(G_1 - K) + \frac{1}{2}(1-\gamma)\overline{G}_2 + \gamma\theta\overline{\Pi}^F_2 \\ \overline{U}^F_{FDI,AI} &= \frac{1}{2}((G_1 + \Delta G_1) - K) + \frac{1}{2}(1-\gamma)(\overline{G}_2 + \Delta G_2) + \gamma\theta\underline{\Pi}^F_2 \\ \underline{U}^F_{FDI} &= \frac{1}{2}(G_1 - K) + \frac{1}{2}(1-\gamma)\underline{G}_2 + \gamma\theta\underline{\Pi}^F_2 \end{aligned} \tag{20}$$

The three payoffs above are received by the firm with respective probabilities $\nu\xi$, $\nu(1-\xi)$, and $1-\nu$. Simple computations yield the trade-off:

$$FDI \succ Debt \Leftrightarrow \gamma\left(\nu\xi\theta\overline{\Pi}^F_2 + (1-\nu\xi)\theta\underline{\Pi}^F_2\right) - \frac{K}{2} > 0. \tag{21}$$

When $\nu > \frac{\underline{G}}{\overline{G}+\underline{G}}$, the payoffs are:

$$\begin{aligned} \overline{U}^F_{DEBT,CI} &= \frac{1}{2}G_1 + \frac{1}{2}(1-\gamma)\overline{G}_2 \\ \overline{U}^F_{DEBT,AI} &= \frac{1}{2}G_1 + \frac{1}{2}(1-\gamma)\overline{G}_2 \\ \underline{U}^F_{DEBT} &= \frac{1}{2}G_1 + \frac{1}{2}(1-\gamma)\frac{\underline{G}_2^2}{\overline{G}_2} \end{aligned} \tag{22}$$

and

$$\begin{aligned}
\overline{U}^F_{FDI,CI} &= \frac{1}{2}(G_1 - K) + \frac{1}{2}(1-\gamma)\overline{G}_2 + \gamma\theta\overline{\Pi}^F_2 \\
\overline{U}^F_{FDI,AI} &= \frac{1}{2}(G_1 - K) + \frac{1}{2}(1-\gamma)\overline{G}_2 + \gamma\theta\overline{\Pi}^F_2 \qquad (23) \\
\underline{U}^F_{FDI} &= \frac{1}{2}(G_1 - K) + \frac{1}{2}(1-\gamma)\frac{\underline{G}^2_2}{\overline{G}_2} + \gamma\theta\underline{\Pi}^F_2
\end{aligned}$$

Similar computations as before show that in this case the trade-off is the same as under complete information.

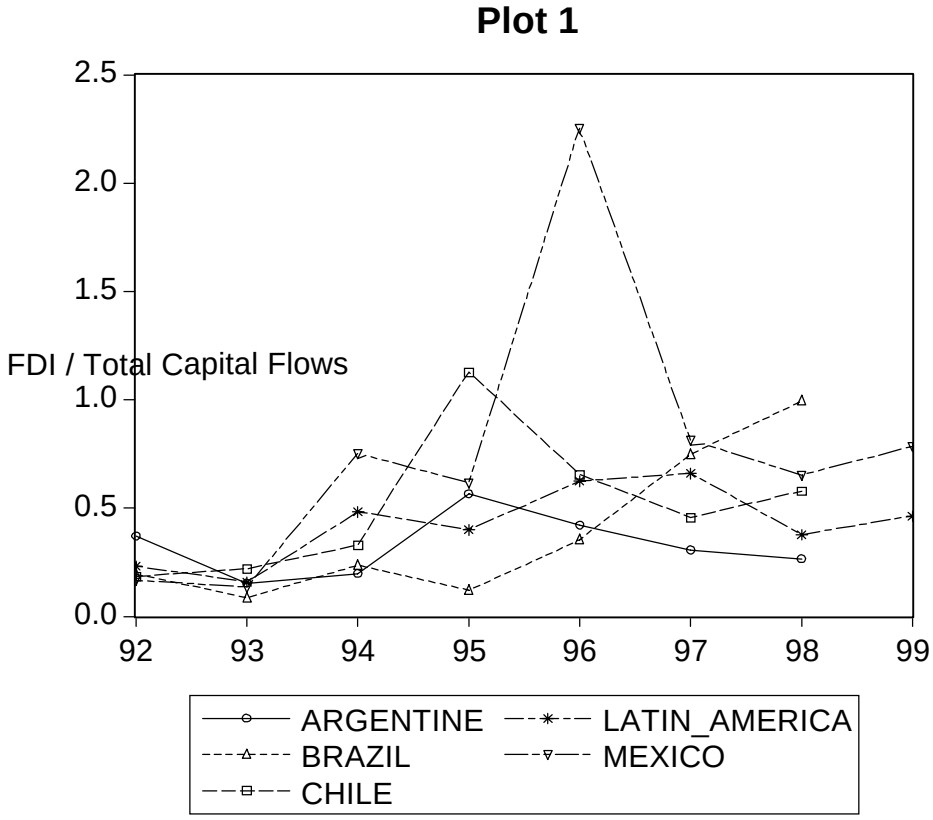

Figure 7: Plot 1

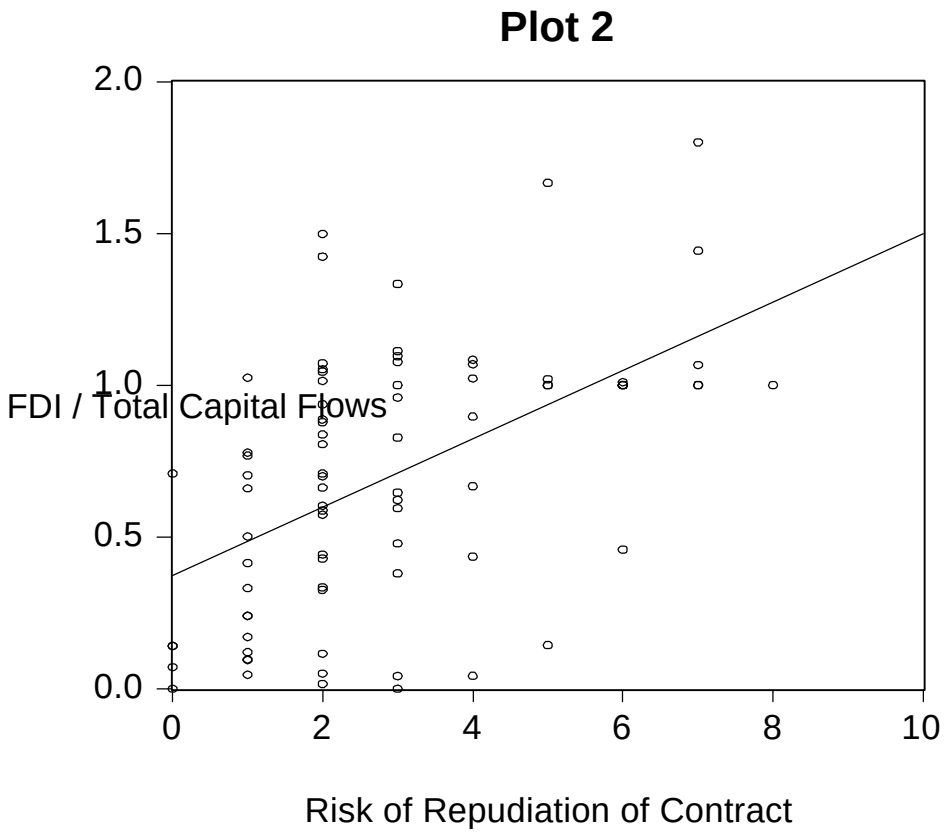

Figure 8: Plot 2

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Table 1. First stage IV regressions

	Independent variables		
	Risk of repudiation of contracts	Corruption (Kaufmann et al.)	Corruption (Transparency International)
Constant	3.601*	7.791*	9.933*
	(6.53)	(13.03)	(6.09)
Ethnolinguistic fragmentation	1.306***		
	(1.75)		
Democratic rights	-0.121**		
	(-2.30)		
Newspapers per 1000 hab.	-0.006*		
	(-5.93)		
Colonial dummy		2.120*	2.290*
		(4.73)	(4.34)
Black market premium		-0.378*	-0.609*
		(-6.25)	(-3.77)
English legal code dummy		-1.474*	-2.036*
		(-3.15)	(-3.43)
Adj. R^2	0.51	0.30	0.32
N	100	116	77

White corrected t-statistics in parentheses.
* Significant at the 1% level.
** Significant at the 5% level.
*** Significant at the 10% level.

Table 2. Dependent variable: *Share of FDI in total private capital flows*

Estimation method	OLS	OLS	OLS	OLS	OLS	2SLS	2SLS
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.372*	0.560*	0.448*	0.111	0.552***	0.482*	-0.267
	(5.54)	(6.01)	(3.97)	(0.43)	(2.03)	(2.93)	(-0.27)
GDP		-0.025*	-0.023*	-0.028*	-0.027**	-0.021**	-0.024**
		(-4.40)	(-3.97)	(-4.06)	(-2.34)	(-2.46)	(-2.24)
Risk of contracts repudiation	0.113*	0.074*	0.078*	0.087*	0.105**	0.105**	0.133
	(5.90)	(3.06)	(3.25)	(3.50)	(2.38)	(2.19)	(1.24)
Openness			0.233				
			(1.06)				
Macroeconomic Stability				0.543***			0.894
				(1.96)			(0.95)
Soil Resources					-0.016		
					(-0.30)		
Distance					-0.002		
					(-0.07)		
N	81	71	69	45	36	62	43
Adj. R^2	0.25	0.32	0.32	0.35	0.35	0.37	0.37

White corrected t-statistics in parentheses.
* Significant at the 1% level.
** Significant at the 5% level.
*** Significant at the 10% level.

Figure 9: Table 1 and 2

Table 3. Dependent variable: ***Share of FDI in total private capital flows***

Estimation method	OLS	OLS	OLS	OLS	2SLS	2SLS	2SLS	2SLS
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.619*	0.621**	0.552*	0.507*	0.698*	0.643*	0.470*	0.458*
	(3.14)	(2.45)	(5.53)	(3.46)	(3.12)	(3.52)	(2.66)	(2.48)
GDP	-0.027*	-0.027*	-0.025*	-0.024*	-0.024*	-0.024**	-0.021**	-0.021**
	(-3.11)	(-2.87)	(-4.35)	(-3.38)	(-2.98)	(-2.90)	(-2.50)	(-2.35)
Risk of contracts	0.076*	0.102***	0.099	0.155	0.116**	0.119**	0.186	0.174
repudiation	(2.80)	(1.73)	(1.39)	(0.74)	(2.13)	(2.07)	(1.50)	(1.61)
Corruption 1	-0.010				-0.041			
(Kaufmann et	(-0.29)				(-0.92)			
al.)								
Corruption 2		-0.017				-0.032		
(TI)		(-0.39)				(-0.95)		
Risk * Corr1			-0.003				-0.012	
			(-0.40)				(-0.86)	
Risk * Corr2				-0.008				-0.009
				(-0.30)				(-0.89)
N	71	52	71	52	62	60	62	60
Adj. R^2	0.31	0.29	0.31	0.29	0.37	0.36	0.37	0.35

White corrected t-statistics in parentheses.
* Significant at the 1% level.
** Significant at the 5% level.
*** Significant at the 10% level.

Table 4. Dependent variable: ***Share of FDI in total private capital flows***

Estimation method	2SLS	2SLS	2SLS	2SLS	OLS	2SLS	2SLS
Sample restriction				GDP>750$ SSA=0			
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.528**	0.390**	0.870**	0.439	0.702*	0.651*	0.634*
	(2.28)	(2.14)	(2.09)	(1.20)	(6.08)	(3.51)	(3.26)
GDP	-0.024**	0.010	-0.038**	-0.022	-0.032*	-0.029*	-0.030*
	(2.16)	(0.71)	(-2.06)	(-1.42)	(-4.45)	(-2.92)	(-2.87)
Risk of contracts	0.167	0.224***	-0.059	0.280	0.062*	0.082***	0.148
repudiation	(1.25)	(1.72)	(-0.023)	(1.37)	(2.69)	(1.74)	(1.34)
Risk * Corr1	-0.011	-0.016	0.001	-0.025			-0.010
	(-0.71)	(-1.08)	(0.05)	(-1.23)			(-0.76)
LAC dummy	-0.045						
	(-0.37)						
EA dummy	-0.023						
	(-0.12)						
SSA dummy			0.445				
			(0.98)				
EUNAO dummy		-0.52*					
		(-3.38)					
MIGA dummy					-0.174***	-0.164	-0.164
					(-1.87)	(-1.66)	(-1.63)
N	62	62	62	39	71	62	62
Adj. R^2	0.34	0.35	0.25	0.31	0.34	0.40	0.39

White corrected t-statistics in parentheses.
* Significant at the 1% level.
** Significant at the 5% level.
*** Significant at the 10% level.

Figure 10: Table 3 and 4