

# The Economics of a Multilateral Investment Agreement\*

Jiahua Che

Chinese University of Hong Kong

Gerald Willmann<sup>†</sup>

Katholieke Universiteit Leuven

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## Abstract

This paper models a multilateral agreement on investment (MAI) as a coordination device. Multinational enterprises can invest in any number of countries. Without a multilateral investment agreement, expropriation triggers an investment stop by the single MNE. Under a multilateral agreement, expropriation leads to a joint reaction by all MNEs. Switching to such a regime increases worldwide FDI and raises the world interest rate. Distinguishing three groups of countries, we show that industrialized countries experience an outflow of capital but benefit overall due to an increase in repatriated profits. Middle income countries are likely to gain from increased inward FDI, whereas least developed countries lose because they receive less FDI. Our results explain the stylized fact that a multilateral investment agreement was opposed by least developed nations and certain groups in rich countries.

*Keywords:* multilateral investment agreement, FDI, trade policy.

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<sup>†</sup>Corresponding author: Department of Economics, Naamsestraat 69, Katholieke Universiteit Leuven, 3000 Leuven, Belgium; phone: +32 16 326790; fax: 326732; email: gerald.willmann@econ.kuleuven.be.

# 1 Introduction

A multilateral agreement on investment (MAI) is an agreement between sovereign states which is meant to safeguard the investments that companies undertake in foreign countries. Given the ubiquitousness of foreign direct investment, one would expect to find such an agreement at the top of every international organization's agenda. In fact, this was the case only a few years ago. The OECD started negotiations in 1995 and the newly established WTO set up a working group in 1996. At the time, however, those attempts failed. The negotiations at the OECD were suspended in 1998 and the WTO did not move beyond TRIMS, the Agreement on Trade-Related Investment Measures that is limited, *nomen est omen*, to the subset of trade-related investments.

Judging from the public debate at the time, there were two main reasons responsible for derailing the project: One is political opposition and the other the lack of empirical evidence for the effectiveness of bilateral investment treaties. The political opposition has come from two distinct groups: On the one hand, from the anti-globalization lobby that represents a subset of the population in rich industrialized countries; on the other, from poor, least-developed countries that were opposed to the agreement even though they were never obliged to join in. In this paper, we explain these stylized facts and renew the case for a multilateral investment agreement.<sup>1</sup>

The main hurdle for such an agreement to succeed is that it has to be self-enforcing, since no-one can effectively prevent a sovereign country from expropriating foreign property.<sup>2</sup> Unlike in the trade context, however, the game is not played eye-to-eye between countries, but rather between the FDI-receiving country and a single foreign company or investor. The key feature of our approach is therefore to envisage the agreement as a coordination device that allows companies to react jointly should one of them be subject to renegotiation or outright expropriation in any one country. Note that due to the absence of any agreement in practice, the mechanism we envisage and analyze is merely one possible form.

The model we propose features a continuum of multinational enterprises (MNEs) that can invest in a continuum of different countries. At the same time that a company decides on its investment in a particular country, it negotiates the rate at which its revenue will be taxed in that country. To capture the general

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<sup>1</sup>The lack of progress towards establishing a MAI clearly does not imply that such an agreement would not be beneficial. As for the empirical evidence, Hallward-Driemeier (2003) provides one of the rare studies and concludes that there is little evidence that bilateral investment treaties have stimulated additional investment. In contrast, more recent empirical work on bilateral treaties by Egger and Pfaffermayr (2004) does find a positive effect of implementing bilateral investment treaties on the stock of FDI. And recent policy measures in countries such as Bolivia and Venezuela that have moved to expropriate foreign oil companies emphasize the potential benefits from closer cooperation in this important area of global economic integration.

<sup>2</sup>Even US military might failed to do so in the case of Cuba.

equilibrium effects of a world capital market, the marginal cost of capital is assumed to be increasing. Once an investment has been undertaken, the country can potentially renegotiate the tax rate or even expropriate the investment, in which case it obtains the capital invested but forgoes (its share of) future profits as a result of retaliation. Without a multilateral investment agreement, this retaliation takes the form of a perpetual investment-stop by the single MNE. Under a multilateral agreement, on the other hand, expropriation triggers a joint investment-stop by all MNEs *vis-à-vis* that particular country.

We show that switching to a MAI regime increases worldwide FDI and consequently raises the interest rate. Industrialized countries lose inward FDI due to the higher interest rate, and because the expropriation risk is zero to begin with and cannot be reduced any further. However, taking into account its role as home countries, the industrialized world benefits over-all as it now receives more repatriated profits from the MNEs that are predominantly based there. Middle income countries stand to be the main beneficiaries from increased FDI because the agreement reduces the risk of expropriation in these countries and thereby makes investments there more attractive. Least developed countries, on the other hand, that had very little FDI to start with do not reduce their expropriation risk by much and therefore tend to suffer a reduction in FDI due to increased interest rates.

Our results explain the stylized facts of the obstacles that have stalled past proposals for a MAI. Even though the industrialized countries stand to gain in the aggregate, these gains would be concentrated in the hands of those that have a stake in MNEs. Other parts of the population would lose through outsourcing and therefore oppose the agreement. The least-developed countries do not have enough FDI at the outset to take advantage of the coordination and to constrain themselves from expropriating foreign investments. They therefore lose due to the increased interest rate and lower FDI, essentially being crowded out by the middle income countries. In addition, our approach also sheds light on the lack of empirical evidence for the benefits from bilateral investment agreements. Coordination is clearly more effective the more countries, and hence companies, participate.

To the best of our knowledge this is the first attempt to rigorously model a MAI as a coordination device.<sup>3</sup> We do draw on prior literature, though. The idea of self-enforcing international trade agreements has been developed and refined by Bagwell and Staiger (2002) and many of their students. The paper that is most closely related to ours is Maggi (1999), who uses the concept of "third party sanctions" going back to Bendor and Mookherjee (1990) and Kandori (1992) to explain the role of the WTO. Contrary to the trade

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<sup>3</sup>Turrini and Urban (2003) modeled a MAI as an exogenously-assumed uniform, absolute reduction in the share of profits retained by the host country. Their model does not capture the expropriation risk, nor does it account for the fact that industrialized countries have high tax rates.

context where WTO rules do not envisage coordinated punishment, we are free to consider it for a future MAI and will argue that it would be quite effective.

The remainder of the paper is organized as follows: In Section 2, we present the theoretical model. Section 3 introduces the multilateral investment agreement. In Section 4, we analyze the effects of changes in incentive slackness and then use this analysis in Section 5 to derive the effects of joining an existing MAI. In Section 6, we analyze the effects of instituting a MAI, focusing on specific cases. Section 7 offers concluding remarks.

## 2 Model

In this section we outline the theoretical model. Given that a multilateral investment agreement is meant to safeguard the investments of companies in foreign countries, our framework revolves around these two types of players. Let there be a continuum of countries indexed by  $i \in [0, 1]$  that are open to foreign direct investment. And investments are carried out by a continuum of companies, indexed by  $j \in [0, 1]$ , which we think of as large (multinational) corporations.<sup>4</sup> We will use the term multinational enterprise (MNE) through-out the paper as these firms turn into multinationals the moment they invest in another country. Though one might think of them as supra-national or even state-less players, we require that each MNE is headquartered in a particular country where its repatriated profits accrue. We then consider each country in terms of two roles: home country and host country. As home country, it receives repatriated profits from companies that are based there. As host country, it receives (foreign and domestic) companies' investments. We assume that each country is home to a unit measure of firms.<sup>5</sup> In reality, of course, some countries might not play home to any MNE. Our framework allows for this possibility as we can think of a companies from such a country as having negative profits wherever they invest.

As a host, each country  $i$  represents an investment opportunity (not necessarily a profitable one) for every company  $j$ . These investment opportunities are characterized by potential profits of  $\pi_{i,j}(K_{i,j}, K) \equiv R_{i,j}(K_{i,j}) - r(K)K_{i,j}$ , where the revenue  $R_{i,j}(K_{i,j})$  depends on the amount of capital  $K_{i,j}$  invested by company  $j$  in country  $i$ , and  $r(K)$  is the cost of capital, which is affected by the total amount invested world-wide  $K = \int_0^1 \int_0^1 K_{i,j} di dj$ . With respect to the revenue function, we assume that production requires a fixed

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<sup>4</sup>The assumption of continua allows us to focus on the interaction between companies and countries by eliminating any strategic interaction between players of the same type, such as tax competition, for example.

<sup>5</sup>The measure of companies in the world is thus  $[0, 1] \times [0, 1]$ . For simplicity, we assume that each host country offers only a continuum of investment opportunities. In other words, companies potentially investing in a host country are randomly drawn from among the entire set.

amount of capital before it starts to generate positive output. Furthermore, we take revenue to be net of costs other than the cost of capital that the MNE invests in the country. In other words, it is operating profit excluding the cost of the foreign direct investment. Note that having the operating profit depend only on the own capital stock is a simplifying assumption that excludes negative competition effects as well as positive spill-overs from other FDI. Let us emphasize that  $K_{i,j}$  can be zero, of course, and typically will be for many company-country pairs. As for the cost of capital  $r(K)$ , we assume that it depends positively on the total amount of investment world-wide in order to capture general equilibrium price effects once the MAI brings about an increase in investment. For simplicity, we assume that capital depreciates completely at the end of each period. Investments are thus decided anew, or reviewed, every period.

As for the timing within periods, we envisage the following sequence: First, the prospective investor and the country negotiate a tax rate while the company simultaneously decides how much to invest. Since companies are often lured with promises of special tax breaks and other niceties, such as cheap real-estate or tailor-made infrastructure, we assume that the tax rate  $t_{i,j}$  negotiated between country  $i$  and company  $j$  is company-specific. Even though a country's official tax rate is most likely uniform for all companies, netting out special deals leaves us with a company-specific effective tax rate. At the same time that the tax rate is agreed upon, the company decides whether, and, if it does, how much to invest in a particular country. In doing so, it counts on the government to stand by its promise and charge the agreed upon rate. However, once the investment is in place, the country can renegotiate or even expropriate the investment. This is the key problem we are concerned with in this paper. We assume for simplicity that as soon as this happens, the company resorts to a trigger strategy of never investing in that country again. Faced with such a strategy, the only deviation worth considering from the country's point of view, is to expropriate the entire investment. Note that even though we will frame the game in terms of outright expropriation, we take this strategy to stand for renegotiation more generally.

Solving the problem backwards, if country  $i$  stands by its promise, it will collect a (previously negotiated) share  $t_{i,j}$  of company  $j$ 's profit  $\pi_{i,j}(K_{i,j}, K)$  from its investment  $K_{i,j}$  in country  $i$  every period. Alternatively, if country  $i$  decides to expropriate the investment, then it receives the value of the investment in that period but nothing in the future. The incentive constraint (IC) of country  $i$  thus takes the form:

$$\frac{t_{i,j}\pi_{i,j}(K_{i,j}, K)}{1 - \delta_i} \geq K_{i,j} \quad (1)$$

where  $\delta_i$  denotes the discount factor of the country which reflects its rate of time preference. In other words,

from the country's perspective it is worthwhile to refrain from expropriating the foreign direct investment as long as the discounted present value of the country's share in the profit stream on the left hand side exceeds the one-time pay-off from deviation on the right hand side.

Before the country can potentially expropriate, the company and the country have to agree on a tax rate and the company has to decide how much to invest. We assume that the negotiation takes the form of Nash-bargaining, subject to the country's IC-constraint from equation (1) above. That is, the company and the country maximize the Nash-product :

$$\max_{t_{i,j}} [t_{i,j} \pi_{i,j}(K_{i,j}, K) - 0]^\alpha \times [(1 - t_{i,j}) \pi_{i,j}(K_{i,j}, K) - 0]^{1-\alpha}, \quad (2)$$

subject to

$$\frac{t_{i,j} \pi_{i,j}(K_{i,j}, K)}{1 - \delta_i} \geq K_{i,j},$$

where  $\alpha$  indicates the relative bargaining power of the country *vis-à-vis* the company. The outcome of this bargaining process is  $t_{i,j} = \max\{\alpha, \hat{t}_{i,j}(K_{i,j}, K)\}$ , where  $\hat{t}_{i,j}(K_{i,j}, K)$  is the minimum tax rate that satisfies the country's IC-constraint which in turn depends on the capital stock the company chooses.

The company's investment decision thus depends, via the tax rate, on the country's IC-constraint. Suppose it is not binding, then company  $j$  solves the following optimization problem:

$$\max_{K_{i,j}} (1 - \alpha) \pi_{i,j}(K_{i,j}, K) \quad (3)$$

The tax rate in this case is  $\alpha$  and the investment is determined by the familiar zero marginal profit condition. If the country's IC-constraint is binding, then company  $j$ 's optimization takes the form:

$$\max_{K_{i,j}} (1 - \hat{t}_{i,j}(K_{i,j}, K)) \pi_{i,j}(K_{i,j}, K) \quad (4)$$

The corresponding first order condition is  $\partial \pi_{i,j} / \partial K_{i,j} = 1 - \delta$  which implies that  $K_{i,j}$  is smaller than in the unconstrained case. The tax rate might be higher than  $\alpha$  if it is profitable for the company to accept a higher tax rate rather than to reduce its investment further in order to satisfy the country's IC-constraint at a tax rate of  $\alpha$ .<sup>6</sup> If the country's IC-constraint cannot be satisfied even at a tax rate of 100 %, then the company, facing certain expropriation, will not invest. To conclude our exposition of the model, let us quickly point out that

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<sup>6</sup>We will return to this problem and analyze it in greater detail in the next section.

the company's participation constraint, namely that profits be non-negative, will never be binding for any positive investment. This is because a negative profit would *a fortiori* violate the country's IC-constraint.

### 3 Multilateral Agreement

We now consider a multilateral investment agreement which is the focus of attention in this paper. Given that such an agreement does not yet exist in practice, we propose a type of agreement that we consider to be plausible. In particular, we think of a MAI as a coordination device for companies. While it is the countries that sign the agreement, it will be the companies based in those countries and facing renegotiation or even expropriation in other member countries that can take advantage of the agreement.<sup>7</sup> We envisage that the agreement institutes a reporting mechanism that verifies and disseminates information as soon as companies face renegotiation or expropriation in a country that has signed up to be part of the MAI. Note that the FDI-receiving country must have signed up to the agreement because only a participating member country can be expected to cooperate in the verification procedure. Once it is verified and made public that a company has been forced to renegotiate or has been expropriated, then this information allows all companies to coordinate their response *vis-à-vis* the offending country. Note that for the time being we do not specify the set of countries that take part in the agreement. Instead, we simply assume that the MAI comprises a subset of countries of strictly positive measure. We will return to the question which countries have an incentive to join below.

Under such a multilateral investment agreement then, whenever a country that is part of the agreement deviates, this will trigger an investment-stop not just by the company affected but rather by all companies. Faced with such a coordinated reaction to any single deviation, the country need only consider expropriating the entire stock of FDI within its borders. The country's (now aggregate) incentive constraint thus takes the following form:

$$\int_0^1 \frac{t_{i,j} \pi_{i,j}(K_{i,j}, K)}{1 - \delta_i} dj \geq \int_0^1 K_{i,j} dj \quad \forall i \in I. \quad (5)$$

Note that there are no longer separate incentive constraints *vis-à-vis* single companies, but only one incentive constraint per member country that applies to all of its inbound foreign direct investment. Under this regime, a country will refrain from expropriation as long as its share in the profit stream of all companies invested (the LHS) exceeds the stock of foreign direct investment (the RHS).

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<sup>7</sup>We assume for simplicity that all MNEs can use the agreement. Most MNEs are based in rich, industrialized countries and as we will show below these countries have every incentive to join the agreement.

To compare the country's incentive constraint under a MAI regime to the constraints it faces without a MAI, we define, for each country  $i$ ,  $\Delta IC_{i,j}$  satisfying

$$\int_0^1 \Delta IC_{i,j} dj = 0,$$

which allows us to rewrite condition (5) as

$$\frac{t_{i,j}}{1 - \delta_i} \pi_{i,j}(K_{i,j}, K) + \Delta IC_{i,j} \geq K_{i,j} \quad \text{for all } j \in [0, 1], \quad (6)$$

We refer to  $\Delta IC_{i,j}$  as the variation in incentive slackness needed to keep the country's relation with company  $j$  incentive compatible. Without a MAI country  $i$  may have strictly positive incentive slackness with respect to a company  $j$  for an investment of  $K_{i,j}$  (in the sense that  $\frac{t_{i,j}}{1 - \delta_i} \pi_{i,j}(K_{i,j}, K) - K_{i,j} > 0$ ), or negative incentive slackness if the constraint is violated. Under MAI, a unified incentive constraint effectively allows the country to extend spare IC-slackness from some companies to others. As this spare IC-slackness is always "distributed" from one company to another, the integral of  $\Delta IC_{i,j}$  over  $j \in [0, 1]$  always equals zero.

## 4 Variations in Incentive Slackness

Having introduced the crucial concept of variations in IC-slackness in the previous section, we want to analyze the effects that such variations have on the investment behavior of a MNE in a particular country as well as on the tax rate. Elucidating these effects in pure form will prove helpful when we return to analyze the effects of a MAI in the subsequent sections. To begin our analysis, we rewrite condition (6) as:

$$\pi_{i,j}(K_{i,j}, K) \geq \frac{1 - \delta_i}{t_{i,j}} (K_{i,j} - \Delta IC_{i,j}). \quad (7)$$

Figure 1 depicts the profit of company  $j$  in country  $i$  as a function of the capital the company invests in that country. The linear downward sloping part reflects the fixed cost needed for positive production, and the kink indicates where production starts. The various upward sloping lines in the diagram represent the RHS of equation (4) above for different variations of IC slackness. Consider a country-company pair where the IC-constraint is so stringent — possibly because the profitability of the investment opportunity is low — that it cannot be satisfied even at a tax rate of a 100 percent. This case is represented by the left-most



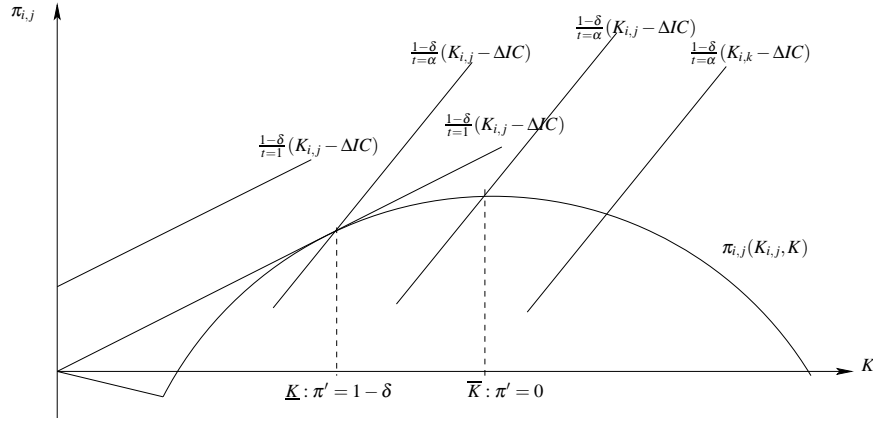


Figure 1: Variations in incentive slackness

incentive constraint in Figure 1. The constraint has a slope of  $1 - \delta$  corresponding to a tax rate of a 100 percent and we see that there is no positive investment that satisfies the constraint. The company therefore chooses not to invest.<sup>8</sup>

Now suppose the constraint is relaxed because more outside IC-slackness becomes available or — a slight abuse of the diagram — because the investment is more profitable. Once the constraint touches the profit curve, the company invests according to its constrained first order condition  $\pi' = 1 - \delta$  at a tax rate of a 100 percent. If we add more slackness to the system the company will still invest the same amount and the IC-constraint rotates counter-clockwise through the tangency point as the tax rate goes down, until it is eventually reduced to  $\alpha$ .

Once the tax rate reaches  $\alpha$  and we further relax the constraint by adding even more outside IC-slackness, the company slowly increases its investment. As long as the IC-constraint is binding, however, the company keeps its investment below the optimum to avoid a higher tax rate. In other words, the company reduces its investment to keep the tax rate down because it is preferable to forgo the marginal gain from more investment rather than to accept a higher profit tax on the entire investment.

Eventually — as more IC-slackness becomes available — the company chooses the optimal unconstrained investment characterized by  $\pi' = 0$ . If the constraint is relaxed beyond this point the investment does not increase anymore and the tax rate remains at  $\alpha$ . This case is represented by the right-most IC-constraint.

<sup>8</sup>Note that if the decision not to invest is due to the unprofitability of the investment opportunity, i.e.  $\pi_{i,j} < 0$ , then additional incentive slackness does not change this decision. Additional incentive slackness can only relax the IC-constraint, not the participation constraint of the company.

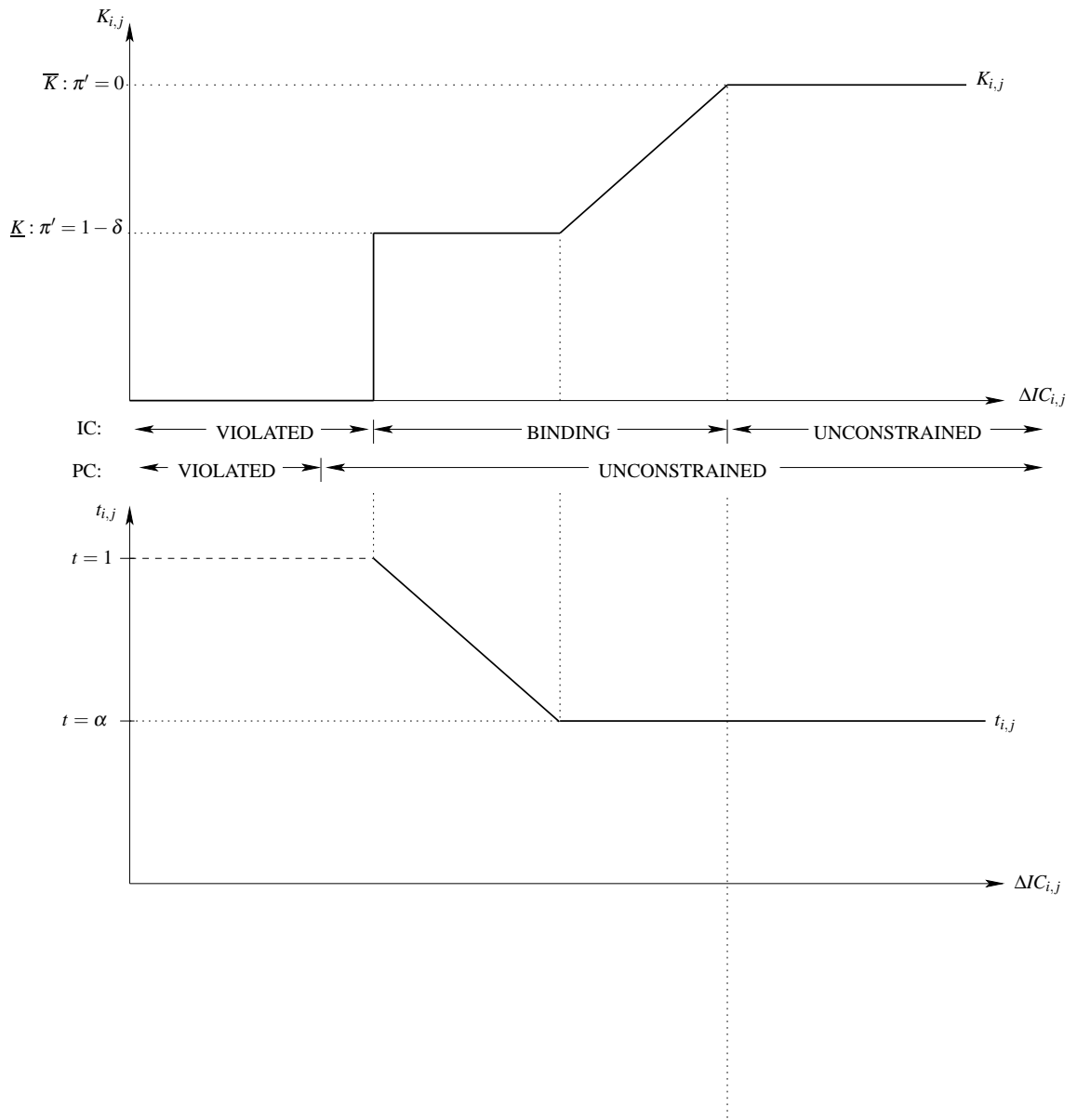


Figure 2: Effects on tax rate and investment

Figure 2 summarizes the discussion above. In this figure, we consider a country-company pair such that without a MAI no investment is incentive compatible. Under a MAI regime, as slackness increases we move from the left-most region where the IC-constraint is unsatisfiable and no investment takes place to the middle region where the IC-constraint is (merely) binding. In the left part of this range, the tax rate comes down from 100 percent to  $\alpha$  while the investment is unchanged at its constrained optimum,  $\underline{K}$ , characterized by  $\pi'(\underline{K}) = 1 - \delta$ . In the right part of this range, the tax rate is  $\alpha$  and the investment increases towards its unconstrained optimum as slackness becomes available. To the right of the optimum, a further relaxation does neither affect the tax rate nor the size of the investment which stay unchanged at  $\alpha$  and  $\bar{K} : \pi'(\bar{K}) = 0$  respectively.

In the following we assume that the government of country  $i$  “allocates” the variations in incentive slackness in order to maximize

$$\max_{\{\Delta IC_{i,j}\}_{j \in [0,1]}} \int_0^1 \frac{t_{i,j}}{1-\delta} \pi_{i,j}(K_{i,j}, K) dj \quad \text{s.t.} \quad \int_0^1 \Delta IC_{i,j} dj = 0 \quad (8)$$

To facilitate the rest of our analysis, we imagine that each company has a (potential) investment opportunity in every host country and we introduce the following simplifying assumption:

**Assumption 1.** *For any (host) country  $i$ , there exists a mapping  $\kappa_i(j) \in [0, 1]$  which indexes company  $j \in [0, 1]$  in such a way that*

$$R_{\kappa_i(j)}(\tilde{K}) \equiv \max\{0, f(\tilde{K}) + c(\kappa_i(j))\} \quad \forall \tilde{K}$$

where  $f : \mathfrak{R}^+ \rightarrow \mathfrak{R}$  is a concave, strictly increasing function with  $\lim_{\tilde{K} \rightarrow 0} f(\tilde{K}) = -\infty$ , and  $c : \mathfrak{R} \rightarrow \mathfrak{R}$  is a strictly increasing function.

Assumption 1 says that, in each host country, companies can be sorted according to the amount of revenue they obtain for a given amount of investment  $\tilde{K}$ , and that, among these companies, the difference in the level of revenue is independent of  $\tilde{K}$ . Along with this assumption, we define three ‘benchmark companies’ for a host country  $i$  at a given capital cost  $r$ :  $\kappa_i^1(r) \in \mathfrak{R}$  which invests the optimal level  $\bar{K}(r) \in \mathfrak{R}$  and is at the borderline of becoming constrained,  $\kappa_i^2(r) \in \mathfrak{R}$ , which invests the minimal amount  $\underline{K}(r)$  while paying a tax rate of  $\alpha$ ; and  $\kappa_i^3(r) \in \mathfrak{R}$ , which just invests  $\underline{K}(r)$  while facing a tax rate of 100%. Figure 3 illustrates Assumption 1 and highlights these three ‘benchmark companies’. As shown in the diagram, the profit function shifts upward across companies. Accordingly, it is clear from the diagram that  $\kappa_i^1(r) > \kappa_i^2(r) > \kappa_i^3(r)$  for any given  $r$ .

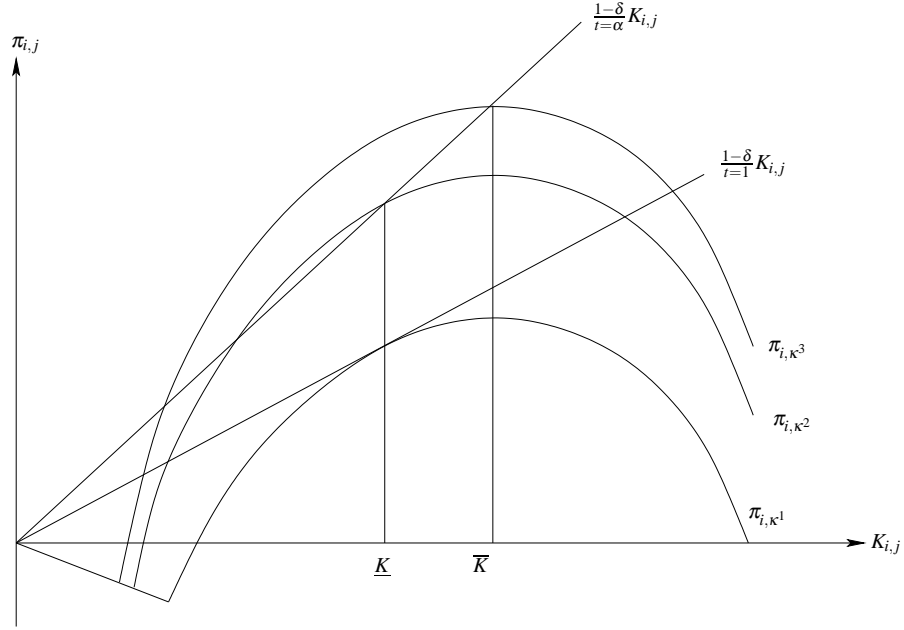


Figure 3: The  $H$  correspondence

In contrast to our earlier Figure 1, the diagram does not directly feature any variations in incentive slackness and therefore describes the situation of country  $i$  before joining a MAI. It does so implicitly, however. Note that changes in the cost of capital shift  $\kappa_i^1(r)$ ,  $\kappa_i^2(r)$ , and  $\kappa_i^3(r)$  on the real line  $\mathfrak{R}$ . Thus, depending on the capital cost,  $\kappa_i^h(r)$ ,  $h \in \{1, 2, 3\}$  may fall to the left of, into, or to the right of, the  $[0, 1]$  interval in which *actual* companies are indexed. We can in turn determine whether, prior to joining a MAI, the host country  $i$  enjoys some spare variations of slackness with respect to some companies (when  $\kappa_i^3(r) < 1$ ), and/or has some negative variations of slackness *vis-à-vis* some others (when  $\kappa_i^1(r) > 0$ ).

## 5 Marginal Effect of Joining a MAI

We are now in a position to analyze the effects of forming a multilateral investment agreement. In this section we derive general results. Given the level of generality of our framework, we will subsequently illustrate these results by discussing specific cases in the next section. The driving force behind our results will be the relaxation of the countries' incentive constraints, which is brought about by the multilateral agreement.

The first interesting result concerns the total amount of investment each MNE undertakes worldwide. We are able to show that:

**Proposition 1.** *Given the cost of capital  $r(K)$ , the global investment  $K_j \equiv \int_0^1 K_{i,j} di$  of company  $j \in [0, 1]$  weakly increases under a MAI regime.*

*Proof.* Suppose the global investment of company  $j$  did go down. This implies that  $K_{i,j}$  decreases in at least one country  $i$ . Consider the variation of incentive slackness  $\Delta IC_{ij}$  available to company  $j$  in country  $i$  under the MAI. This variation in incentive slackness can be i) positive, ii) zero, or iii) negative. Consider the three cases in turn:

- i) If the variation is positive, then the IC-constraint is relaxed and the investment weakly increases as shown in the last section.
- ii) If the variation is zero, then the IC-constraint remains unchanged and  $K_{i,j}$  remains unchanged.
- iii) If the variation is negative, then other investors in country  $i$  are using up some of company  $j$ 's IC-slackness. This implies that company  $j$  has reduced its investment and its after-tax profits are lower than before. However, it could declare not to make use of the agreement in country  $i$  and not to participate in any third-party punishment, hence face the original IC-constraint which would leave it with a higher after-tax profit.

Each case generates a contradiction and therefore the global investment of company  $j$  must be weakly increasing, conditional on the cost of capital. □

The intuitive reason behind this result is clear: the relaxation of the IC-constraints in all participating countries leads to more investment. There are several direct implications of Proposition 1. We summarize them in the following corollary:

**Corollary 1.** *From Proposition 1 it follows that:*

- i) *Given the cost of capital, world-wide investment  $K = \int_0^1 \int_0^1 K_{i,j} di dj$  weakly increases under a MAI regime.*
- ii) *The cost of capital  $r(K)$  weakly increases under a MAI regime.*
- iii) *World-wide investment  $K$  weakly increases under a MAI regime.*
- iv) *Worldwide surplus weakly increases under a MAI regime.*

Part i) follows from Proposition 1. It implies that the demand function for global capital shifts out. Given this shift in demand and our assumption that supply is upward-sloping, Part ii) says that the price of capital increases and Part iii) that the amount invested must increase. The increase in investment in turn implies that the surplus must go up. This is important as it suggests that establishing a MAI regime is desirable from the world's perspective.

The results above do not establish a sufficient condition for a strict increase in capital investment. Such a condition is given in the following proposition:

**Proposition 2.** *Given the cost of capital  $r(K)$ , the global investment  $K_j \equiv \int_0^1 K_{i,j} di$  of company  $j \in [0, 1]$  strictly increases under a MAI regime, if there exists a set of host countries  $H$  of positive measure, such that the following two conditions hold:*

- i)  $\kappa_i^3(r) < 1$  for all  $i \in H$ , and
- ii)  $\kappa_i^2(r) < \kappa_i(j) < \kappa_i^3(r)$  for all  $i \in H$ .

Conditions i) and ii) state that there exists a non-trivial set of host countries, each of which has spare variations of incentive slackness *vis-à-vis* some companies, and where in each the company under consideration will increase its investment if some spare variation of incentive slackness becomes available. The same sufficient condition can be applied to the corollary above to yield strict increases.

Let us turn to an individual country and examine whether it benefits from joining the MAI, *conditional on* other countries' participation decision in the MAI. We leave to the next section the discussion of the collective decision of a group of countries whether to form or take part in a MAI. Given the existence of a MAI, whether an individual country participates in the MAI has no effect on the global cost of investment (given that there is a continuum of countries). Thus, we can apply Proposition 1 and conclude that a country always (weakly) benefits from joining the MAI *as a home country*. The home country is strictly better off provided that some of its companies strictly benefit from the MAI, i.e. satisfy the conditions of Proposition 2 above.

As a host, a country can benefit from joining an MAI only if there exist companies with  $\kappa_i(j) > \kappa_i^3(r)$ , that is, only if there are companies that did not face a binding incentive constraint before the country joined the MAI, and which hence can contribute variation in incentive slackness to other companies investing in that country. Suppose such companies do exist, then a host country strictly benefits from "reallocating" these variations in line with the maximization per equation (8) to companies with  $\kappa_i(j) \in [\kappa_i^2(r), \kappa_i^3(r)]$  as

these companies will subsequently increase their investments in the host country. It can also strictly benefit from reallocating to companies with  $\kappa_i(j) < \kappa_i^1(r)$  if these companies begin to invest in the host country after a sufficient amount of variation is allocated to them.

However, when companies with  $\kappa_i(j) \in [\kappa_i^1(r), \kappa_i^2(r))$  begin to take advantage of these variations, they will be able to negotiate a lower tax rate, as illustrated in Figure 3. In this case, the host country's welfare may be reduced. Accordingly, a host country  $i$  will first allocate excess IC slackness to companies with  $\kappa_i(j) \notin [\kappa_i^1(r), \kappa_i^2(r))$ . If these companies cannot exhaust the excess in IC slackness, the host country has no way to prevent companies with  $\kappa_i(j) \in [\kappa_i^1(r), \kappa_i^2(r))$  from taking advantage of the remaining variations and negotiate down the tax rate.

The following proposition establishes a sufficient condition for home and host countries to gain from unilaterally joining an existing MAI:

**Proposition 3.** *Given the cost of capital  $r(K)$ , a home country  $i$  is always weakly better off joining an existing MAI and is strictly better off if there exists a set of companies based in country  $i$ ,  $\tilde{J}_i$ , of positive measure, such that for all  $j \in \tilde{J}_i$  conditions i) and ii) of Proposition 2 above hold.*

*Furthermore, a host country  $i$  is weakly better off joining an existing MAI and is strictly better off if*

- i)  $\exists J$  of positive measure, such that for all  $j \in J$  condition i) of Proposition 2 holds, and*
- ii)  $\exists \tilde{J}$  of positive measure such that for all  $j' \in \tilde{J}$  condition ii) of Proposition 2 holds, and*
- iii)  $\forall j, \alpha \pi_{i,j}(\bar{K}_i(r)) \geq \pi_{i,j}(\underline{K}_i(r))$ .*

*Proof.* We have argued for the case of a home country in the text. Here we focus on a host country. Condition i) of the proposition ensures that there exist firms with positive IC slackness. Condition ii) guarantees that there exist firms that can use the slackness to invest more. Condition iii) implies that if slackness goes to firms that can reduce their tax rate, then they will be moved all the way to the optimal amount and generate more tax revenue for the host country despite the lower tax rate.  $\square$

## 6 Joint MAI Participation Decisions

The previous section focused on a country's unilateral decision to join a MAI. In this section we turn our attention to the joint participation decisions of selected groups of countries. While the analysis above, due

to the assumption that countries are infinitesimal, treated the cost of capital as constant, the impact on the global cost of capital can no longer be ignored when a positive measure of countries join their decisions. However, the challenge of analyzing the joint participation decisions is that one can think of many possible groups, each with different combinations of countries. To focus our discussion, we examine two specific cases that illustrate the explanatory power of the general framework developed so far. First, we discuss a symmetric case which we take to represent the effects of a MAI among OECD countries. Subsequently, we turn to a three-country-group framework where one group represents rich, industrialized countries, a second group is made up of middle-income countries, and the third group includes poor developing countries. Finally, as we consider the change in the global cost of capital for investments, we must also take into account its implication on the income of capital owners, which in turn depends on the distribution of capital ownership across countries.<sup>9</sup> We will specify this distribution as we analyze the two specific cases.

Before moving on to specific cases, we make one observation which states that, if a group of countries jointly decide not to participate in a MAI, they will also be against the existence of such an international agreement, provided that, when there does not exist a MAI, each of these countries import capital from outside the group for the last unit of investment in the country. The reason is as follows. If the countries choose not to join, the only impact of an existing MAI on their welfare is the rising global cost of capital as investments expand within MAI member countries. And since the last unit of investment relies on capital from outside the group, these countries must be made worse-off on the last unit of investment by the emergence of an MAI.<sup>10</sup>

**Proposition 4.** *Suppose a group of countries jointly decide not to participate in a MAI and suppose further that each of them import capital for the last unit of investment from outside the group when there does not exist a MAI. Then these countries must be worse off as a result of the existence of a MAI.*

Turning now to the first case of symmetric countries, symmetry in our context involves the following two aspects: First, for any global cost of capital  $r$ , each host country offers the same profile of investment opportunities and each home country has the same profile of investment opportunities faced by its companies. Second, all investments are financed within these countries and for any  $r$ , each of these countries supplies the same amount of capital. Given that all countries are symmetric in this sense, we imagine them

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<sup>9</sup>In a general equilibrium setting, income of factors are likely to be affected by the presence of MAI as well. However, owing to the partial equilibrium nature of our framework, we will not be able to elaborate on this aspect in details.

<sup>10</sup>For intra-marginal investments, however, the effect of an MAI is at best neutral to these countries when capital owners of all the intra-marginal investments are citizens of these countries, in which case the higher investment cost of capital is offset by higher income of capital owners within these countries.



as one group, deciding whether or not to establish a MAI among themselves. We know from our analysis in the previous section that the global surplus increases. By symmetry then, every country must be better off. Looking closer at the distribution of the surplus, we have the same marginal effects as above and, in addition, the increase in the cost of capital due to the MAI. For capital owners, the higher cost of capital implies a higher capital income. For all types of companies, the MAI combines the marginal effects already discussed with the effect of the higher cost of capital on investments. Note that within the existing investment the latter is purely redistributive, and hence, since capital ownership is symmetric across countries, cancels out with the increase in capital income from the individual country's perspective.

**Proposition 5.** *Suppose all countries are symmetric. Then these countries as a group are (weakly) better off by establishing a MAI.*

The three-country-group case is more complex and at the same time more interesting. We assume that each country  $i$  is a member of one of the following three subsets of countries of equal measure: rich countries  $R$ , middle-income countries  $M$ , and poor countries  $P$ . Countries within each group are identical. Only rich countries are home to companies that potentially generate positive profits in other countries. All three groups of countries host companies that can potentially generate profits there. Moreover, we assume that for all relevant costs of capital,  $\kappa_R^3(r) < 1$  and  $\kappa_R^3(r) < \kappa_M^3(r) < \kappa_P^3(r)$ , i.e. rich countries have a larger (and strictly positive) measure of unconstrained companies with excess IC-slackness than middle countries, which in turn have more unconstrained companies than the representative poor country. Finally, we assume that all capital owners reside in rich and middle-income countries.

A joint participation decision affects the global cost of capital, which in turn changes the fraction of companies that invest the optimal amount, the minimal amount, and those with investments in between. As the cost of capital goes up, it shifts  $\pi_{i,j}(K_{i,j}, r)$  as illustrated in the following diagram. In Figure 4,  $r' > r$ . As a result, for all  $K_{i,j}$ ,  $\pi_{i,j}(K_{i,j}, r') < \pi_{i,j}(K_{i,j}, r)$  and  $\frac{\partial \pi_{i,j}(K_{i,j}, r')}{\partial K_{i,j}} < \frac{\partial \pi_{i,j}(K_{i,j}, r)}{\partial K_{i,j}}$ . This has the following implication:

**Lemma 1.** *For any country  $i$ ,  $\kappa_i^1(r)$  and  $\kappa_i^2(r)$  are increasing in the cost of capital  $r$ , and  $\kappa_i^3(r)$  is increasing in the cost of capital  $r$  if  $-R''(\bar{K}, r)\bar{K} > (1 - \delta)/\alpha$ .*

*Proof.* To prove the first part, note that  $\kappa_i^1$  and  $\kappa_i^2$  are defined by  $\pi_\kappa(\underline{K}) = \frac{1-\delta}{t}\underline{K}$ , where  $t = 1$  for  $\kappa_i^1$  and  $t = \alpha$  for  $\kappa_i^2$ . Differentiation with respect to  $r$ , and taking into account that the slope with respect to  $K$  evaluated at  $\underline{K}$  equals  $(1 - \delta)/t$ , yields  $\frac{\partial R}{\partial \kappa} \frac{\partial \kappa}{\partial r} = \underline{K}$ . The result then follows, because the first partial derivative and

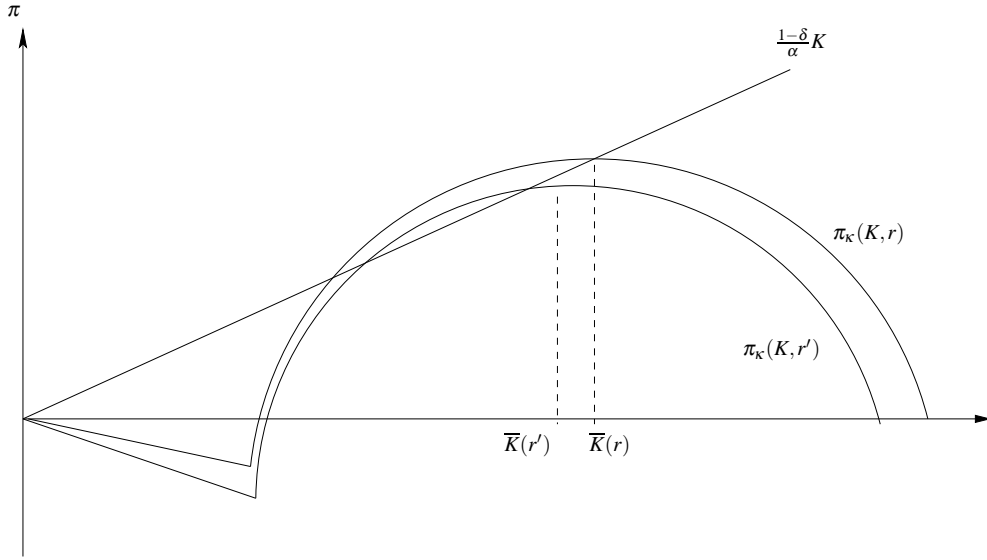


Figure 4: The cost of capital effect

the RHS are both positive. Regarding the second part,  $\kappa_i^3$  is defined by  $\pi_{\kappa^3}(\bar{K}) = \frac{1-\delta}{\alpha}\bar{K}$ . Differentiating as before, and using the fact that the partial derivative with respect to  $K$  evaluated at  $\bar{K}$  equals zero, we obtain the stated result.  $\square$

Note that despite the fact that for small increases in  $r$  the threshold  $\kappa_i^3$  might decrease when the condition given above does not hold, this effect disappears for larger, discrete changes of  $r$ . Therefore, Lemma 1 implies that, as the global cost of capital increases, in each country, there will be fewer companies contributing variations in incentive slackness, each contributing company will contribute a smaller amount of variation in incentive slackness, whereas at the same time there will be more companies in need for such variations in incentive slackness in order to satisfy the incentive compatibility constraints.

Turning now to our specific case, we define  $W^i(\omega, r(\omega))$  as the welfare received by a representative country  $i \in \{R, M, P\}$  where  $\omega \in \{R, RM, RP, RMP, \emptyset\}$  is the possible group configuration for a MAI.  $\omega = R$  indicates a MAI consisting of all rich countries and rich countries only.  $\omega = RM$  represents a MAI made of rich and middle-income countries, and so forth. No MAI exists when  $\omega = \emptyset$ . Note that because only rich countries play the role of home countries, a MAI is not feasible without the participation of rich countries.  $r(\omega)$  is the equilibrium cost of capital that depends on the group configuration in a MAI.

The joint decision game among the three country groups is then defined as each group choosing whether to participate, given its anticipation of other groups' participation choice. The equilibrium MAI is the

resulting Nash equilibrium in participation decisions.

We start by establishing that the group of rich countries finds any MAI beneficial compared to no MAI, and thus is willing to institute such an agreement even if the other two groups do not participate:

**Proposition 6.**  $W^R(\omega = R) \geq W^R(\emptyset)$ . Furthermore, for any  $\omega \notin \{R, \emptyset\}$ ,  $W^R(\omega) \geq W^R(\emptyset)$  if  $\kappa_R^3(r(\omega)) \leq 0$ .

*Proof.* The first inequality follows *a fortiori* from the previous proposition. As for the second inequality, the condition that  $\kappa_R^3(r(\omega)) \leq 0$  guarantees that the rich countries gain even if investment is diverted to the middle or poor income countries. This is because the increase in interest income is the change in the interest rate times the amount of investment diverted, whereas the loss in tax revenue as a result of the diversion is only part of the change in marginal product times the investment diverted. And the change in marginal product is bound by the change in the interest rate given the condition that no companies are constrained under the MAI and hence will not be constrained without the MAI by Lemma 1.  $\square$

Note the distributional implications behind this result. The capital owners (whether in rich or middle income countries) always benefit from the formation of a MAI. For claimants of companies' after-tax profits there are two effects: companies that were constrained and now use others' excess slackness benefit, while those that were unconstrained *ex ante* now face a higher cost of capital and reduce their investment. As for tax revenue, there is the same ambiguity. In addition to those who own companies, other stakeholders such as workers or complementary factors also might suffer from the contraction of domestic industries. Note that this can happen even if the company itself benefits, but does so only by investing more in other countries. This implies that workers in rich countries are more likely to lose than company owners.

Proposition 6 allows us to focus on the interaction between middle-income countries and poor countries in their group participation decisions. The crucial difference to the analysis above is that the rich countries must always be part of any MAI, and hence decide whether there will be a MAI, while middle income and poor countries only decide whether to join the club. Consider the decision on the part of the middle-income countries. Depending on its anticipation of the choice by the poor countries, the middle-income countries jointly decide to participate if

$$W^M(RMP, r(RMP)) > W^M(RP, r(RP)), \text{ or } W^M(RM, r(RM)) > W^M(R, r(R)).$$

In each of the two scenarios, the middle-income countries face the following trade-off. By joining the MAI, these countries expand the demand for investments as they offer better commitment to property rights

protection. However, as the scale of investments increases in this group of countries, the global cost of capital increases as well, making both the existing investments and newly increased investments more costly. Whether these countries will benefit from the participation in the MAI depends on two factors: the extent to which they import capital to finance their investments before entering the MAI, and the marginal increase in the cost of capital. Evidently, if before entering the MAI a middle-income country exports capital or imports capital at the margin (i.e. for an infinitesimal amount of investment), it will always be better off by joining the MAI as the increase in capital cost is dominated by a higher income of their domestic capital owners. On the other hand, if a middle-income country already imports a substantial part of the capital invested there before entering the MAI, whether it can benefit from joining the MAI depends on how much the capital cost increases and hence on the elasticity of the global capital supply.

To simplify matters, we assume that the global capital supply is of constant price elasticity,  $\varepsilon$ . Define  $K^M(\omega)$  as the measure of capital utilized by a representative middle-income country under  $\omega$  configuration, and  $K_{im}^M(\omega) \in (-\infty, K^M(\omega)]$  as the the measure of imported capital by the country under the corresponding MAI.<sup>11</sup>

**Proposition 7.** *Fix  $K^M(\omega)$  where  $\omega \in \{R, RP\}$  and assume that the global supply of capital is of constant elasticity  $\varepsilon$ . There exists a threshold for the import of capital, in the form of  $K(\varepsilon, \omega)$  with  $\partial K / \partial \varepsilon \geq 0$ , such that middle-income countries are better off collectively joining the existing MAI with group configuration  $\omega$  than not joining provided that  $K_{im}^M(\omega) \leq K(\varepsilon, \omega)$ .*

*Proof.* We want to show that the losses are smaller than the gains. The losses stem entirely from the increased capital expenses. A high enough elasticity will always reduce the change in the interest rate sufficiently to keep the loss smaller than the gain. Likewise, for a given elasticity, a small enough capital import can always keep the loss smaller than the gain.  $\square$

Turning now to the joint decision of the poor countries, the same analysis applies qualitatively, except for the fact that the poor countries import all the capital for the investments from outside the group. Accordingly, the increase in cost of capital due to their participation in the MAI will not be transferred to higher capital income within these countries. Therefore, these countries can benefit from jointly entering the MAI if and only if the global capital supply is sufficiently elastic.

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<sup>11</sup>The country exports capital under the MAI of configuration  $\omega$  when  $K_{im}^M(\omega) < 0$ .

**Proposition 8.** *Assume that the global supply of capital is of constant elasticity  $\varepsilon$ . There exists  $\varepsilon^P(\omega)$  such that poor countries are better off collectively joining the existing MAI with group configuration  $\omega \in \{R, RM\}$  only if  $\varepsilon \geq \varepsilon^P(\omega)$ .*

We are now in a position to determine what configuration of MAI will emerge in equilibrium.

**Proposition 9.** *Suppose that  $\varepsilon^M(\omega = R) < \varepsilon^P(\omega = R)$  and  $\varepsilon^M(\omega = RP) < \varepsilon^P(\omega = RM)$ . Then the equilibrium MAI under joint decision making has the following “pecking order”.*

- i)  $\omega = R$  if  $K_{im}^M(R) > K(\varepsilon, R)$
- ii)  $\omega = RM$  if  $K_{im}^M(R) \leq K(\varepsilon, R)$  and  $\varepsilon < \varepsilon^P(RM)$
- iii)  $\omega = RMP$  if  $\varepsilon > \varepsilon^P(RM)$  and  $K_{im}^M(RP) \leq K(\varepsilon, RP)$ .

The proof of this proposition follows directly from the previous propositions.

Importantly, even when a group of countries collectively decides to join an existing MAI, it does not imply that this group (with the exception of rich countries) would necessarily welcome the existence of the MAI in the first place. Formally, this is the case for the poor country group if

$$W^P(RM, r(RM)) < W^P(RMP, r(RMP)) < W^P(\emptyset, r(\emptyset)).$$

The first inequality implies that the poor countries find it beneficial to join, given that the other two groups form a MAI. The second inequality in turn says that the poor country group would find it even better not to have any such agreement at all.<sup>12</sup> The reason why these two inequalities may hold simultaneously is that  $r(RM) - r(\emptyset) \gg r(RMP) - r(RM)$ . In other words, the formation of a MAI between rich and middle countries does much more to raise the cost of capital, than the accession of the poor countries to such a MAI. This is because, due to the assumption that  $\kappa_M^3(r) < \kappa_P^3(r)$ , the middle income countries tend to take the most advantage of such a MAI and hence increase investment and thus the capital cost the most.

The same issue could potentially arise for the middle income country group if

$$W^M(R, r(R)) < W^M(RM, r(RM)) < W^M(\emptyset, r(\emptyset)).$$

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<sup>12</sup>Note that we could discuss similar inequalities with respect to a MAI formed only by the rich and the poor countries, but as shown previously this case does not arise in equilibrium.

This scenario is less likely to arise, however, because on the one hand, capital owners in middle income countries benefit from the increase in capital cost, while on the other hand, it is the middle income countries themselves whose accession to the MAI raises the cost of capital the most, while the formation of a MAI by the rich countries alone does not raise the capital cost substantially, or not at all if  $\kappa_R(j) \geq \kappa_R^3(r(R))$  (in which case,  $r(R) - r(\emptyset) = 0 < r(RM) - r(R)$ ).

Combining both lines of argument, poor countries would oppose the formation of any MAI, while the middle income countries along with the rich countries will embrace the formation of a MAI when most of the companies investing in poor (rich) countries are constrained (unconstrained), while in middle income countries there is a balance between the two groups of companies, so that sufficient IC-slackness can be used to increase investment in the middle income country group and hence substantially increases the interest rate. We summarize this argument in the following proposition:

**Proposition 10.** *Suppose of the conditions in Propositions 8 and 7 are satisfied. If both  $K(r(R)) - K(r(\emptyset))$  and  $K(r(RMP)) - K(r(RM))$  are sufficiently small, and  $K(r(RM)) - K(r(R))$  is sufficiently large, then both rich and middle-income countries welcome, whereas poor countries oppose the formation of a MAI.*

## 7 Conclusion

Despite the ubiquitousness of foreign direct investment — in the real world as well as in economics research — the question of policy towards FDI has so far received surprisingly little attention. In this paper, we start to fill the void by analyzing the fascinating topic of a multilateral investment agreement. Such an agreement figured prominently on the agendas of international organizations only a few years ago, but then was stalled by the opposition from NGOs and the least developed countries along with the lack of evidence for the effectiveness of bilateral agreements. The theory we present in this paper is able to explain these obstacles and at the same time makes a strong case for a multilateral investment agreement. It views such an agreement as a coordination device that allows multinational enterprises to coordinate their reaction if one of them is expropriated by a host country.

The effects of an agreement, viewed from the perspective we adopt, differ depending on the type of country. To illustrate our results, we distinguish rich developed countries, middle income countries in the process of development, and poor least developed countries. We show that the industrialized countries gain from the agreement. They are never tempted to expropriate and thus do not lose from increased coordination on part of the companies. The only negative effect for them is the reduction in investment brought about

by higher world interest rates, that leads to capital outflows or outsourcing from these countries. However, this effect is dominated by the positive effect of an increase in repatriated profits, since large multinationals are predominantly based in industrialized countries. Despite the aggregate gain, there will be distributional effects, as outsourcing and repatriated profits affect different groups in these countries.

It is the middle income countries that have already attracted some FDI that really gain from an agreement directly by attracting more inward FDI. This is because the coordination of multinationals reduces the risk of expropriation and thus enables more companies to invest in these countries. Even though, the investment per firm decreases somewhat due to higher interest rates, the total effect is clearly welfare enhancing. For least developed countries, that have in the past attracted FDI in at most a few resource intensive or agricultural sectors, the picture looks bleak. There is not much incentive slackness that can be extended to new entrants and therefore there will be hardly any new FDI and the only effect is the reduction in investment due to the increased interest rates.

Our approach explains that attempts to establish a multilateral investment agreement were stalled by opposition from less favored groups in industrialized countries along with objections from least developed countries that were never obliged to join in but that even staying out would not have shielded from the adverse effects of higher interest rates. As for the missing evidence for the effectiveness of bilateral treaties, it is clear that the coordination effect we emphasize in this paper is most effective when the majority of countries takes part in the agreement whereas a treaty between two countries, especially if small, would have little effect.

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