

# Winners and losers from an international investment agreement

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## Abstract

Recent attempts at reaching an international investment agreement have been met with considerable opposition and failed. An important reason for this failure is the diverging interests between the parties involved. The present paper focuses on the interests of host countries, with difference in market size as the source of conflict. We analyse the welfare effects of an international investment agreement as a function of the intensity of technological spillovers, the technology gap between the investor and host country firms, intra-regional trade costs, and the difference in market size.

**JEL:** F12, F23, L13, O33

**Keywords:** International Investment Agreement; Foreign Direct Investment; Technological Spillovers, Investment Policy; Welfare Effects.

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# 1 Introduction

The need for an international investment agreement (IIA) has been a much debated and highly controversial issue for at least a decade<sup>1</sup>. There are now initiatives to place this theme on the agenda for the new round of negotiations in the World Trade Organization (WTO). From a host country perspective, an important argument in favor of an IIA is the need to limit the potentially harmful incentives-based competition for foreign direct investment (FDI). The result of such competition could be that the investor receives most of the value added from the investment, leaving little benefit for the host country.<sup>2</sup> Today's system of bilateral investment agreements cannot deal with the issue of policy competition for investment. The problem is international in nature and the solution to the problem must therefore be found in an international agreement.

The present paper analyses the consequences of an IIA that restricts potential host countries' use of incentives to attract FDI. Our main interest is the conflicting interests that may arise between host countries on such an agreement. Their interests may of course conflict for a number of reasons, including differences in the level of economic development, geographical location, and whether or not the countries enjoy privileges from existing bilateral or regional agreements. In the present study we focus on difference in market size as the source of conflict.

Our study shows that a large country may have a greater incentive to subsidize foreign investment inflows. Large countries can therefore be expected to win the policy competition for FDI. An agreement limiting countries' ability to take part in policy competition for FDI may therefore not be in the larger country's interest.

There may, however, be strong arguments for the multinational enterprise (MNE) to invest in the larger country even in the absence of subsidies. After all, the larger country provides a larger local market in which the MNE can sell its products. If market size provides a sufficiently strong locational advantage for the large country, it may indeed be in the interest of this country to support the introduction of an international investment agreement. With

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<sup>1</sup>For an excellent overview of the debate and earlier attempts at reaching such an agreement, in particular the failed MAI-initiative by the OECD in the mid-1990s, see Nunnenkamp and Pant (2003).

<sup>2</sup>For a discussion of the adverse effects of incentives competition for FDI, see Oman (2001).

the implementation of the agreement, the large country will still attract FDI, and without having to engage in a costly policy competition.

Small countries, too, may dislike a restriction on their use of investment incentives. An investment subsidy may be a necessary tool to attract FDI that would otherwise be limited to countries with larger markets. In this way, the small country may be able to capture spillovers associated with such investments.

We analyse how these interests are affected by technological spillovers from the foreign investment, intra-regional trade costs, spillover intensity, technological gap between MNE and local firms, and relative country size. The theoretical framework is a simple, partial-equilibrium model with imperfect competition.

Our paper is closely related to Fumagalli (2003). She considers a region consisting of two host countries, differentiated by the technology of their local firms. Technological spillovers from FDI are stronger in the less advanced country, because the technological gap between the investing firm and the local firm is greater there. The two countries are perfectly integrated; there are no trade costs and prices are equalized. When the MNE invests in the region, the investment is necessarily located in the more advanced country, since this limits the extent of spillovers. The firm's incentive to protect its technology by locating FDI in a region where spillovers are less pronounced, is a "protection" argument for the locational choice of FDI. Allowing for investment subsidies shifts investment to the less advanced country, since this country has more to gain from the investment in terms of spillovers to the local industry. Since the investment subsidy in this way directs the investment to the country with the higher spillovers, aggregate welfare in the two countries may increase. Hence, prohibiting investment subsidies may be a bad idea.

As stated above, our focus is on differences in country size as the source of conflict. Different from Fumagalli, we consider segregated markets. In this way we introduce a "proximity" argument in favor of locating in the larger market. If this argument is sufficiently strong, the MNE may prefer to invest in the larger market even though spillovers are also greater there. Moreover, our analysis also opens up for the MNE investing in both countries. Thus our paper introduces some mechanisms not present in the article by Fumagalli, and opens up for a much more complex set of location outcomes, and hence a richer welfare analysis. For instance, in our study the impact of government intervention on the investment decision of the MNE and on national welfare is

far from trivial. Depending on where the MNE would locate in the absence of subsidies, whether subsidies offered are large enough to offset initial location advantages, and whether a country is able to attract a second investment in the region, both the small and the large country can gain or lose from an IIA. The focus of our analysis is on the potential conflict of interests that host countries may have on the issue of an IIA, rather than on aggregate welfare effects.

Barros and Cabral (2000) also emphasize the proximity argument in the context of a subsidy competition for FDI. In their paper, alleviating unemployment is the benefit of attracting FDI and the location decision of the MNE is driven by the size of the market on one hand and employment gains on the other hand. They conclude that investment subsidies may increase total welfare, but that there is necessarily a conflict of interest between the two countries in the absence of side payments. However, they do not take into account spillover effects on local firms, so that they cannot capture the “proximity-protection” trade-off described in this paper. Moreover, like Fumagalli, they consider only single-plant investment in the region.

The remainder of the paper is organized as follows. Section 2 presents the model. Section 2.1 addresses the case without government intervention, and 2.2 the effect of government intervention on location. The main topic of the paper, namely the welfare implications of an investment agreement, is presented in 2.3. Section 3 discusses technological differences between host countries. Section 4 concludes.

## 2 Model

Consider a region consisting of two countries,  $A$  and  $B$ . Demand in country  $J = A, B$  is given by

$$Q_J = \sigma_J(1 - p_J), \quad (1)$$

where  $Q_J$  is the quantity demanded,  $p_J$  is the market price in country  $J$ , and  $\sigma_J$  is a parameter denoting the size of the market. The two markets differ in size, with market  $A$  being larger than market  $B$ , i.e.  $\sigma_A \geq \sigma_B$ .

Prior to the investment by the foreign firm, there is one local firm in each market, firm  $a$  in country  $A$  and firm  $b$  in country  $B$ . The local firms are assumed to service local demand only. We can think of these firms as facing prohibitively high costs of entering new markets. One reason could be that

they are credit constrained and therefore cannot raise the money to pay for advertisement etc. that would allow them to sell their goods abroad.

A multinational wishes to invest in the region in order to service regional demand.<sup>3</sup> There are two possible modes of entry: Investing in both countries or investing in one of the two countries and servicing the other through exports. We will refer to the latter strategy as export platform FDI. Setting up a plant requires fixed costs  $F$ , assumed to be identical in both regions. Intra-regional exports carry a per unit trade cost  $t$ .

Foreign and local firms produce an identical product, but the MNE is technologically more advanced than the local firms. We normalize the marginal costs of the multinational to zero,  $c_m = 0$ . The two local firms are assumed to be identical in terms of their initial technology, i.e. prior to potential spillovers associated with the foreign investment, with marginal costs given by  $c \geq 0$ . Here,  $c$  also serves as a measure of the initial technology gap between the multinational and the local firms.

The literature on foreign direct investment (FDI) suggests that technological spillovers are, at least potentially, significant.<sup>4</sup> In addition, Audretsch and Feldman (1996), Bransetter (2001), and Keller (2001) report that such spillovers are primarily local in nature, i.e., intra-national, rather than international. Typical channels for spillovers include backward and forward linkages between foreign affiliates and local firms, “demonstration effects”, and labor turnover.

Following this empirical literature, we assume that when the MNE sets up a plant in a country, some of its technological advantage spills over to the local competitor in that country. The technological spillovers are assumed to be local in nature. This means that they occur only in a market where the MNE is present with a production facility. In our model, spillovers are simply a fraction  $s \in [0, 1]$  of the difference in marginal production costs. i.e.  $sc$ . Thus, post-spillover marginal production costs are given by  $c - sc$ . If  $s = 0$ , there are no spillovers. If  $s = 1$ , spillovers are sufficiently strong to make the local firm equally efficient as the MNE.

The timing of the game is as follows. At stage one, the multinational firm decides where to invest. At stage two, the firms simultaneously decide on

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<sup>3</sup>Trade costs associated with exporting from the multinational’s home country to the region are assumed to be prohibitively high, so that access to regional consumers requires an investment. The trade versus investment choice is well understood from the literature on horizontal FDI, and it is not the focus of our analysis.

<sup>4</sup>For a survey, see Blomström and Kokko (1998).

quantities supplied. The equilibrium is therefore determined by a standard Nash-Cournot duopoly solution. Operating profits for a the MNE in country  $J$  when present with a local production unit are given by

$$\pi_J^I = \frac{1}{9}\sigma_J(1+c-sc)^2, \quad (2)$$

and when reaching market  $J$  with exports from  $K \neq J$  as

$$\pi_J^X = \frac{1}{9}\sigma_J(1+c-2t)^2, \quad (3)$$

where superscript  $I$  indicates investment and  $X$  exports. We assume  $c < \frac{1}{2}$  to ensure that the local firms make positive profits, and  $t < \frac{1}{2}$  so that intra-regional exports is always profitable for the MNE. Total operating profits in the multi-plant case are denoted by

$$\pi^{II} = \pi_A^I + \pi_B^I = \frac{1}{9}(\sigma_A + \sigma_B)(1+c-sc)^2, \quad (4)$$

and in the case of an export platform in  $J$  by

$$\pi_J^{IX} = \pi_J^I + \pi_K^X = \frac{1}{9}\sigma_J(1+c-sc)^2 + \frac{1}{9}\sigma_K(1+c-2t)^2. \quad (5)$$

Profits net of investment costs in the multi-plant case is  $\Pi^{II} = \pi^{II} - 2F$ , and in the export platform case  $\Pi_J^{IX} = \pi_J^{IX} - F$ . The advantage with multi-plant investment is that trade costs are eliminated since the MNE is present in both markets. There are two disadvantages with this investment strategy. First, it requires fixed costs in each market. Second, spillovers increase the competitiveness of the local competitors in both markets.

The most interesting issue in the investment decision concerns the MNE's choice of location in the case of a single plant (export platform case). On the one hand, locating in the larger market  $A$  is attractive since it saves on trade costs. On the other hand, locating in this market means tougher competition on a larger share of its total sales, as spillovers close at least part of the technological gap between the local firm and the multinational.

We begin by analyzing the MNE's location decision in the absence of government intervention on the part of the potential host countries. Then we add the possibility for governments to tax or subsidize the MNE entry, and describe the optimal policies. We then study the MNE's entry decision given these policies. Finally, we calculate the welfare effect for the countries in the region from introducing an international investment agreement prohibiting investment incentives.

## 2.1 Entry Choice Without Government Intervention

As mentioned earlier, the investment decision problem facing the MNE is whether to invest in both countries or in a single country, and in the latter case, in which country to locate. We can think of the investment decision as a two-stage process. First, the firm considers which country is the more profitable location for a single-plant investment. Second, it considers whether or not it shall add an investment in the other, and less profitable, market. Accordingly, consider first the question of investment location for a single plant. Using (5) we find that:

$$\pi_A^{IX} - \pi_B^{IX} = \frac{1}{9} (\sigma_A - \sigma_B) (2t - cs) \phi, \quad (6)$$

where  $\phi \equiv 2(1-t) + c(2-s) > 0$ . For  $\pi_A^{IX} > \pi_B^{IX}$ , the MNE locates in  $A$ , for  $\pi_A^{IX} < \pi_B^{IX}$ , it locates in  $B$ . From (6) we see that:

**Lemma 1** *Without government intervention, the MNE locates a single-plant investment in the larger market  $A$  if  $2t > cs$ , whereas it locates in the smaller market  $B$  if  $2t < cs$ .*

If spillovers are sufficiently important relative to trade costs, the MNE prefers to establish an export platform in the smaller country. In this case, the disadvantage of being located at a distance from the main market, country  $A$ , is dominated by the limitation of spillovers that the MNE achieves by locating in the smaller market. If spillovers are less important relative to trade costs, the single investment is made in country  $A$ . Thus, Lemma 1 describes what we will call a “proximity-protection” trade-off: The advantage of being close to the consumers in the larger market must be weighed against the greater protection of the firm’s technology that locating in the smaller market provides.<sup>5</sup>

Consider next the question of multi-plant investment. Let  $\pi_J^I \equiv \pi_J^I - \pi_J^X - F$  define the added profits from investing in  $J$  relative to servicing that market with exports from  $K$ , which using (4) and (5) can be expressed as

$$\pi_J^I \equiv \frac{1}{9} \sigma_J \phi (2t - sc) - F. \quad (7)$$

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<sup>5</sup>Empirical evidence for the relevance of the “protection” argument can be found in Shaver and Flyer (2000). Using data on the location and survival of foreign greenfield investments in the United States, they find that more technologically advanced firms tend to locate at some distance from their competitors.

Define as

$$F_J^* \equiv \frac{1}{9} \sigma_J \phi (2t - sc) \quad (8)$$

the critical level of fixed costs at which the firm is indifferent between adding a plant in  $J$  or not, i.e. when  $\pi_J^I = 0$ . When  $\pi_J^I > 0$  ( $F < F_J^*$ ), the MNE prefers to add an investment in  $J$ , when  $\pi_J^I < 0$  ( $F > F_J^*$ ), it prefers to service market  $J$  through an export platform in market  $K$ . Since,  $\sigma_A > \sigma_B$  we know that  $F_A^* > F_B^*$ . Hence, multi-plant investment takes place only if  $F < F_B^*$ . If  $F > F_B^*$ , a single-plant investment is made in  $A$ . Note also that  $F_J^* < 0$  if  $t < \frac{sc}{2}$ . This means that if the export platform is located in the small country, the MNE never sets up a second plant in the larger country. The reason is that if spillovers are large, the protection motive is driving the location decision, and the MNE will restrict its foreign operations to just one plant.

The investment decision of the MNE in the absence of government intervention can be summarized as follows:

**Proposition 1** (i) *If trade costs are low relative to spillovers, such that  $2t < sc$ , the MNE makes a single-plant investment in the smaller country  $B$ . (ii) If trade costs are high relative to spillovers, such that  $2t > sc$ , the MNE makes a single-plant investment in the larger market  $A$  if fixed costs are above the critical level  $F_B^*$ , and invests in both countries if fixed costs are below this critical level.*

The optimal investment decision in the absence of government intervention is illustrated in Figure 1, which measures fixed costs  $F$  on the vertical axis and trade costs  $t$  on the horizontal axis.<sup>6</sup>

Figure 1 captures the proximity-protection trade-off. Locating in the smaller country to a larger extent protects the firm's technology. This takes place when spillovers are important relative to trade costs, i.e. for  $t < cs/2$ . When spillovers are relatively less important, proximity to the larger market carries the larger weight in the investment decision. For  $t > cs/2$ , the firm locates in the larger market, and when fixed costs are sufficiently low, i.e. below  $F_B^*$ , also in the smaller market.

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<sup>6</sup>The Figure is based on  $c = \frac{1}{3}$ ,  $s = \frac{1}{2}$ , and  $\sigma_B = 1$ .

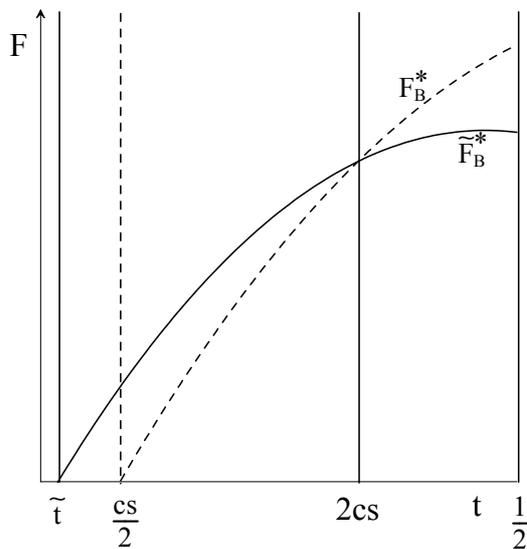


Figure 1: Location without intervention

## 2.2 Entry choice with government intervention

So far we have abstracted from government intervention. But clearly, given the potential gains to the local producers from spillovers, governments may have an incentive to attract foreign investment through an investment subsidy.<sup>7</sup> In this section we describe the policy competition for FDI and analyse how these policies affect the location decision of the MNE.

FDI has effects on both consumer and producer interests in the host countries. Quite clearly, consumers gain from FDI relative to imports since it adds to the competitive pressure in the market and therefore reduces prices. The effect on local producer surplus is less clear. There are two effects. On the one hand, local producers dislike the added competition that the establishment of a foreign affiliate implies. On the other hand, there are technological spillovers that benefit the local producer. When the foreign firm invests in that market, local profits,  $\mu_J$ , are given by

$$\mu_J^I = \frac{1}{9} \sigma_J (1 - 2(c - cs))^2. \quad (9)$$

<sup>7</sup>In practice, investment incentives come in various forms, including tax holidays and cheap access to public land.

If the foreign firm reaches market  $J$  through exports, the local firm's profits are

$$\mu_J^X = \frac{1}{9}\sigma_J(1 - 2c + t)^2. \quad (10)$$

Let the government maximize net profits, defined as local firm profits minus net investment subsidies,  $S$ . A negative  $S$  means a tax.<sup>8</sup> When a foreign firm invests in country  $J$  and receives a subsidy  $S$ , net profits are given by:

$$W_J^I = \mu_J^I - S_J, \quad (11)$$

and in case no FDI takes place in the country:

$$W_J^X = \mu^X. \quad (12)$$

The equilibrium subsidy (or tax) is given by a Nash bargaining solution, with the bargaining strength of the investing firm relative to that of the host country given by  $\gamma$ . Let  $S_J^{\max}$  represent the reservation price of the host country, and  $S_J^{\min}$  the reservation price of the investing firm. The equilibrium subsidy is therefore:

$$S_J^* = \gamma S_J^{\max} + (1 - \gamma) S_J^{\min}. \quad (13)$$

We first turn to the host countries' willingness to pay for the investment,  $S_J^{\max}$ . This is given by the added local profits from an investment relative to imports from abroad, i.e.  $W_J^I - W_J^X$ . Using (9) and (10) we find that:

$$S_J^{\max} = \mu_J^I - \mu_J^X = \frac{1}{9}\sigma_J(2cs - t)\psi, \quad (14)$$

where  $\psi = t + 2(1 - c(2 - s))$ , which is positive since  $c < \frac{1}{2}$  and  $s \leq 1$ . From (14) we see that:

**Lemma 2** *If  $t < 2cs \Rightarrow S_J^{\max} > 0$ , the country gains from FDI. If  $t > 2cs \Rightarrow S_J^{\max} < 0$ , the country loses from FDI.*

Note that  $S_J^{\max}$  is increasing in  $\sigma_J$ . Hence, if  $t < 2cs$ , the larger country has more to gain from FDI inflows than the smaller country. On the other

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<sup>8</sup>This means that we abstract from the effect of investment decisions on local consumer interests. But since this effect is obvious (investment always benefiting consumer interests), we abstract from this concern.

hand, if  $t > 2cs$ , the larger country loses more than the smaller country from FDI inflows.

We wish to analyse the consequences of an IIA that eliminates incentives-based competition for FDI. Hence, the agreement does not regulate the taxation of inward investment. Since taxing FDI is indeed what the countries would do if  $t > 2cs$ , the agreement would not affect the outcome for this range of trade costs. Hence, we limit our attention to  $t < 2cs$ . However, even for  $t < 2cs$ ,  $S_J^*$  may be negative if the location advantage of region  $J$  and the bargaining power of the host government are sufficiently strong. This would imply taxing FDI, and the IIA would not affect this policy. If the bargaining power of the multinational is sufficiently strong, we know that  $S_J^* > 0$  for all levels of  $t < 2cs$ , since  $S_J^{\max} > 0$  for all  $t < 2cs$ . Hence, given sufficiently strong bargaining power for the MNE, we know that an IIA will affect host country welfare.

Let us now turn to the reservation price of the investing firm,  $S_J^{\min}$ . What is the lowest subsidy that a country must offer in order to attract an investment? Again, we start by analysing the single-plant case. The minimum subsidy of country  $J$  is then given by:

$$S_J^{IX \min} = \pi_K^{IX} - \pi_J^{IX} + S_K^{\max}. \quad (15)$$

In words, country  $J$  must offer a subsidy such that the MNE makes at least as much money by investing in  $J$  as it would by investing in  $K$ , given that  $K$  has offered its maximal subsidy. Using (15), we see that  $S_J^{\max} - S_J^{IX \min} = S_J^{\max} - S_K^{\max} + \pi_J^{IX} - \pi_K^{IX}$ , which implies that

$$S_A^{\max} - S_A^{IX \min} = S_B^{IX \min} - S_B^{\max}. \quad (16)$$

Hence, if  $S_A^{\max} > S_A^{IX \min}$ , we know that  $S_B^{IX \min} > S_B^{\max}$ , and vice versa. Using (3) and (14), (15) can be expressed as

$$S_J^{IX \min} = \frac{1}{9}(\sigma_K - \sigma_J)(2t - sc)\phi + \frac{1}{9}\sigma_K(2cs - t)\psi. \quad (17)$$

From this expression we can show that:

**Lemma 3**  $S_J^{IX \min} = S_J^{\max}$  for  $t \equiv \tilde{t} = \frac{1}{5} + \frac{4}{5}c - \frac{1}{5}\sqrt{\xi}$ , where  $\xi = 1 + 8c + 16c^2 + 10sc - 50s^2c^2 + 25s^2c^4 > 0$ .<sup>9</sup> For  $t < \tilde{t}$ ,  $S_J^{IX \min} < S_J^{\max}$  which we know implies

<sup>9</sup>A second critical  $t$  also exists for which, given by  $t = \frac{1}{5} + \frac{4}{5}c + \frac{1}{5}\sqrt{\xi} > 2sc$ . Since we would then be in the taxation regime, this critical trade cost is not relevant for our discussion here.

$S_A^{IX \min} > S_A^{\max}$ , and for  $t > \tilde{t}$ ,  $S_A^{IX \min} < S_A^{\max}$ , and therefore  $S_B^{IX \min} > S_B^{\max}$ . We can also show that  $\tilde{t} < \frac{sc}{2}$ , i.e. below the level of trade costs at which the investor is indifferent between the two locations in the no-intervention case.

Clearly, for a country to be able to attract the single-plant investment, its willingness to pay,  $S_J^{\max}$ , must exceed the minimum offer it needs to make to attract the investment,  $S_J^{IX \min}$ .

Consider next the issue of a second plant in the region. How much does a country have to pay to induce FDI inflows, given that the foreign firm has already made an investment in the other country? This is a rather straightforward question to answer, since the policy of the rival country is irrelevant: Countries are now not rivals for a single plant, and there is no policy competition for FDI. The minimum subsidy required by the MNE to invest in country  $J$ , given that it has already invested in  $K$ , is given by:

$$S_J^{II \min} = \pi_J^X - (\pi_J^I - F). \quad (18)$$

Using (2) and (3), (18) can be expressed as

$$S_J^{II \min} = \frac{1}{9} \sigma_J (sc - 2t) \phi + F. \quad (19)$$

Whether country  $J$  will attract a second plant in the region, depends on whether  $S_J^{II \min}$  is smaller or greater than  $S_J^{\max}$ . Define the critical fixed investment cost for which  $S_J^{II \min} = S_J^{\max}$  as:

$$\tilde{F}_J^* \equiv \frac{1}{9} \sigma_J [(2cs - t) \psi + (2t - sc) \phi]. \quad (20)$$

Clearly, since  $\sigma_A > \sigma_B$ , we see that  $\tilde{F}_A^* > \tilde{F}_B^*$ . Hence, for  $F < \tilde{F}_B^*$ , there will be multi-plant investment. For  $F > \tilde{F}_B^*$  there will be single-plant investment in  $A$ . We can summarize the investment decision in the investment subsidy case as:

**Proposition 2** (i) If trade costs are low relative to spillovers, i.e. for  $t < \tilde{t}$ ,  $S_B^{\max} > S_B^{IX \min}$  and the single-plant investment is made in country  $B$ . (ii) For higher trade costs relative to spillovers, i.e. for  $t > \tilde{t}$ ,  $S_A^{\max} > S_A^{IX \min}$ , the firm makes a single-plant investment in  $A$  if fixed costs are above the critical level  $\tilde{F}_B^*$ , and invests in both countries if fixed costs are below this critical level.

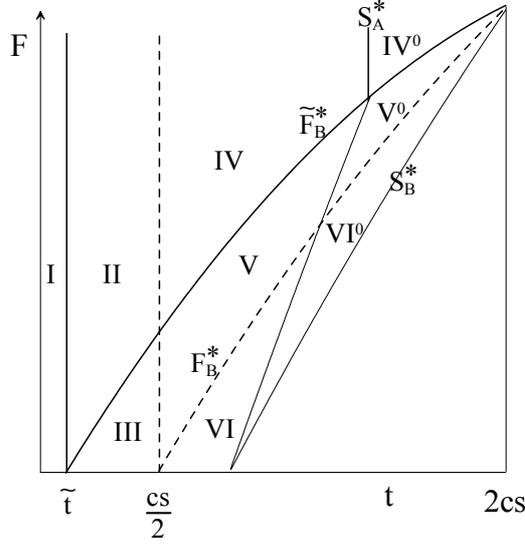


Figure 2: Location with intervention

Figure 2 illustrates equilibria with government intervention.<sup>10</sup>

Figure 2 shows that subsidy competition for FDI causes the region in which there is a single-plant investment in  $B$  to shrink. Without intervention, this was given by  $t < \frac{cs}{2}$ , with intervention by  $t < \tilde{t} < \frac{cs}{2}$ . This is not surprising, given that the larger country has the larger willingness to pay for the investment. Figure 2 also shows that for  $t < 2cs$ , the area for which multi-plant investment takes place, increases. Without intervention, this was given by the area below the  $F_B^*$ -curve, with intervention below the  $\tilde{F}_B^*$ -curve. Again, this is not surprising since an investment subsidy makes it more attractive for the MNE to undertake investment. For  $t > 2cs$ , on the other hand, multi-plant investment becomes less likely, simply because investments are then taxed.

### 2.2.1 Welfare implications of an IIA

Table 1 illustrates the location and welfare effects of an IIA that prohibits the use of investment-incentive policies, given that  $S_j^* > 0$  for both countries

<sup>10</sup>Figure 2 is based on the same parameter values as Figure 1.

i.e. that the agreement indeed affects the policies of the countries.<sup>11</sup>

In Table 1, “low” trade costs are  $t < \tilde{t}$ , “intermediate” trade costs:  $t \in (\tilde{t}, \frac{cs}{2})$ , and “high” trade costs are  $t \in (\frac{cs}{2}, 2cs)$ . Similarly, “low” fixed costs are  $F < F_B^*$ , “intermediate” fixed costs are  $F \in (F_B^*, \tilde{F}_B^*)$ , and “high” fixed costs are  $F > \tilde{F}_B^*$ . “Location” in Table 1 reports the location of FDI in the absence of investment subsidies, whereas “Location\*” reports the outcome with subsidies.

Table 1. Location and welfare effects of introducing an IIA

Case	Trade costs $t$	Fixed costs $F$	Location	Location*	$\omega_A$	$\omega_B$
<i>I</i>	Low		$B$	$B$	0	+
<i>II</i>	Intermediate	High	$B$	$A$	−	+
<i>III</i>	Intermediate	Interm. & Low	$B$	$A + B$	−	+
<i>IV</i>	High	High	$A$	$A$	+	0
<i>V</i>	High	Intermediate	$A$	$A + B$	+	−
<i>VI</i>	High	Low	$A + B$	$A + B$	+	+

Case *I* describes the situation where trade cost are very low relative to spillovers. In this case, the protection of technology argument dominates both with and without policy intervention. An increase in trade costs relative to spillovers strengthens the proximity argument of locating in the larger market. Given the higher subsidies offered by the larger country, the MNE invests exclusively in  $A$  if fixed costs are sufficiently high (case *II*), and in both markets if fixed costs are low or intermediate (case *III*). Proximity to the larger market is the dominating force with a further increase in trade costs relative to spillovers. If fixed costs are high, there will be investment only in the larger market (case *IV*), if fixed costs are at an intermediate level, investment subsidies lead to an additional plant in the region, located in country  $B$  (case *V*), and if investment costs are high the firm invests in both markets (case *VI*).

The last two columns of Table 1 describe welfare effects of introducing an IIA prohibiting the use of investment subsidies. The general picture is that the small country gains from an IIA for low and intermediate trade costs (cases *I* – *III*), whereas the large country gains for high trade costs (cases *IV* – *V*). In *VI*, both countries would gain from an agreement that eliminated

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<sup>11</sup>As discussed above, this is not necessarily the case, even for  $t < 2cs$ . This fact will be clarified in connection with the discussion of Figure 3 below.

the use of investment incentives, since the MNE invests in both countries even in the absence of investment incentives. Figure 3 below illustrates the welfare effects.<sup>12</sup> We restrict our attention to the case where subsidies are relevant, i.e.  $t < 2cs$ .

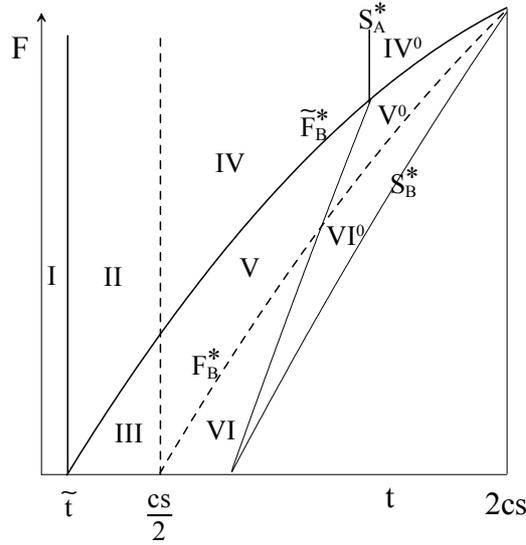


Figure 3: Welfare implications

The regions with roman numbers refer to the cases in Table 1. Note however the introduction of two new lines relative to Figure 2, namely  $S_A^*$  and  $S_B^*$ . These two lines illustrate, respectively, the combination of fixed costs and trade costs for which  $S_A^* = 0$  and  $S_B^* = 0$ , for a given distribution of bargaining strength between the investor and the host country. To the right of the  $S_B^*$ -line,  $S_A^* < S_B^* < 0$ , and hence both countries are able to tax FDI, and would hence be unaffected by an IIA. To the right of the  $S_B^*$ -line, therefore,  $\omega_A = \omega_B = 0$ . Between the  $S_B^*$ -line and the  $S_A^*$ -line,  $S_B^* > 0$  but  $S_A^* < 0$ . Hence, in this region only country  $B$  has to subsidize FDI. Country  $A$ , due to its larger size and hence stronger location advantage, taxes the investor. Only  $B$  would then be affected by an investment agreement, and we denote this with superscript zero in the figure. In region  $VI^0$ , therefore,  $\omega_A = 0, \omega_B > 0$ , in region  $V^0$ ,  $\omega_A = 0, \omega_B < 0$ , and in region  $IV^0$ ,  $\omega_A =$

<sup>12</sup>Figure 3 is based on the same parameter values as Figures 1 and 2, and in addition equal bargaining strength between investor and host country, i.e.  $\gamma = \frac{1}{2}$ , and  $\sigma_A = \frac{3}{2}$ .

$\omega_B = 0$ . An increase in the bargaining power of the multinational, i.e. an increase in  $\gamma$ , would shift the  $S_B^*$ -line and the  $S_A^*$ -line to the right. Similarly, a reduction in  $\gamma$  would shift these lines to the left.

Intuitively, the smaller country has a strong location advantage when trade costs are low relative to spillovers, due to the protection effect. Given this advantage, the small country would support an IIA, knowing that it would be the preferred location for FDI after an agreement has been signed. For high trade costs relative to spillovers, the larger country has the stronger location advantage, given by the proximity argument. The larger country would then support an IIA, since the MNE would anyway invest in the larger country.

We are particularly interested in conflicting interests between the two countries. In the case of low and intermediate trade costs, country *A* is either indifferent to an IIA (case *I*) or loses from such an agreement (cases *II*, and *III*). For intermediate trade costs, country *A* dislikes the agreement because only through subsidies will it be able to attract FDI. For sufficiently low trade costs, the larger country is indifferent, since it is unable to attract FDI with or without subsidies. When trade costs are high relative to spillovers, the small country may be either indifferent to an IIA (case *IV*), lose from such an agreement (case *V*), or gain from the agreement (case *VI*). Country *B* loses in case *V* since offering a subsidy in this case is the only way for the country to attract FDI. In case *IV* the smaller country is indifferent since it never attracts FDI, with or without subsidies. Hence, only when trade costs are high and investment costs are low are the two countries' interests aligned on the question of an IIA. In this case, the investment agreement precludes the MNE from entering into negotiations with the two countries which, by use of the MNE's bargaining power, would result in investment subsidies for investments that would take place even without such incentives.

### 3 Technological differences

This section addresses a second source of differences across potential host countries, namely technology. We do not offer a thorough analysis of the case with difference in local technologies, for two reasons. First, it is a more complex scenario in terms of welfare analysis. Second, the main insights derived from our analysis above can be applied in a rather straightforward way also to the case of different technologies. The purpose of this section is

therefore to give the reader a flavor of the analogy and the added complexity.

Let  $c_A > c_B > 0$ , so that the firm in market  $B$  is characterized by a higher technology than the firm in market  $A$ . In order to isolate the impact of technological differences and their interplay with spillovers on the multinational's location decision, we abstract from differences in market size all together and assume that both markets are of the same size, i.e.  $\sigma_A = \sigma_B = 1$ .

The location decision is now determined by a "competition-protection" trade-off. *Ceteris paribus*, since the firm in country  $B$  is the stronger competitor, the MNE captures a larger market share in market  $A$  than in market  $B$ . This is an argument in favor of locating in the market of the low-tech firm, country  $A$ . On the other hand, the MNE wishes to protect its technology. This is an argument in favor of locating in  $B$ , since spillovers to the more advanced local firm are smaller than to the less advanced local firm. Note the analogy with our analysis in the previous section, where countries differed in size only. In that case, country  $B$  offered greater protection for the MNE's technology because of the smaller size of its market. In the present case, country  $B$  offers the greater protection of technology since the local firm has less to learn from the MNE. Similarly, country  $A$  offers a larger market for the MNE, either because of a larger market size or because of a less advanced local firm.

Without policy intervention, allowing for differences in technology in (5), the condition  $\pi_A^{IX} = \pi_B^{IX}$  can be expressed in terms of trade costs as

$$\bar{t} = \frac{1}{2}s \left( 1 + \frac{1}{2}(c_A + c_B)(2 - s) \right). \quad (21)$$

If  $t < \bar{t}$ , the MNE sets up its export platform in country  $B$ , whereas if  $t > \bar{t}$ , the MNE invests in country  $A$ .<sup>13</sup>

It is noteworthy that the MNE's location decision does not depend on the differences in technologies in the two markets, but only on the average technology in the region, i.e.  $\frac{1}{2}(c_A + c_B)$ . There are two effects: First, a greater technological advantage in the low-tech country,  $B$ , and a stronger competitor in the high-tech country,  $A$ , makes an investment in  $B$  relatively more attractive. At the same time, however, a greater technological advantage implies larger spillovers, thereby reducing the attractiveness of investing

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<sup>13</sup>Note that  $t > \bar{t}$  requires that  $\bar{t} < \frac{1}{2}$  because  $t$  is limited to  $t \in (0, \frac{1}{2})$ . Hence, an export platform in  $B$  is only profitable if spillovers are not too large, i.e. if  $s < 1 + \frac{1 - \sqrt{1 + (c_A + c_B)^2}}{(c_A + c_B)} < 1$ . If spillovers are complete ( $s = 1$ ), the MNE never locates in  $B$ .

in  $B$ . These two effects cancel out as long as the average technology in the region remains constant.

Similar to the previous analysis, the decision of whether to set up an export platform versus multi-plant production is determined by the level of fixed costs  $F$ . The equivalent of (8) in the country-size case can be found as:

$$F_J^* = \frac{1}{9} \phi_J (2t - c_J s), \quad (22)$$

where  $\phi_J = (2(1-t) + c_J(2-s))$ . Hence, given that  $t < \frac{1}{2}sc_J$ ,  $F_A^* < F_B^*$ , and the MNE sets up an additional plant in country  $B$  if  $F < F_A^*$ . With government intervention, the equivalent of (14) is:

$$S_J^{\max} = \frac{1}{9} (2c_J s - t) \psi_J, \quad (23)$$

where  $\psi_J = t + 2(1 - c_J(2 - s)) > 0$ . If  $t < 2c_J s$ , country  $J$  offers a subsidy, and if  $t > 2c_J s$ , it levies a tax. This result is similar to the result in the previous section, only that in this case the switching point from offering a subsidy to levying a taxes is different for the two countries. Since the low-tech country  $A$  has a larger gain from the spillovers, it is more inclined to offer a subsidy than the high-tech country  $B$ . Denote the critical levels of  $t$  for the two countries by  $t_A = 2c_A s$  and  $t_B = 2c_B s$  and note that since  $c_A > c_B$ , it follows that  $t_A > t_B$ . Then, for  $t \in (t_B, t_A)$ , country  $B$  taxes FDI while country  $A$  offers an investment subsidy. The critical level of trade costs at which the MNE is indifferent between locating a single-plant investment in  $A$  or  $B$ , given investment subsidies, is now given by:

$$\tilde{t} = \frac{5}{4} \left( \frac{1}{2} (c_A + c_B) s (2 - s) - \frac{1}{5} s \right), \quad (24)$$

which has its counterpart in  $\tilde{t}$  defined in Lemma 3 in the country-size case. If  $t < \tilde{t}$ , the MNE prefers to locate the export platform in country  $B$ , and if  $t > \tilde{t}$ , in country  $A$ . Similarly, we can find the equivalent of (20) as:

$$\tilde{F}_J^* = \frac{1}{9} (2c_J s - t) \psi_J + \frac{1}{9} (2t - c_J s) \phi_J. \quad (25)$$

The added complexity of the present scenario relative to the case where only market size differed, is that now it is much more difficult to establish a ranking of the various critical levels of  $t$  ( $\tilde{t}, \bar{t}, t_A, t_B$ ). There are only three

inequalities that hold for the entire range of admissible parameter values:  $t_A > t_B$ ,  $\tilde{t} < \bar{t}$ , and  $\tilde{t} < t_B$ . The first inequality is a direct consequence of assuming that  $B$  is the high-tech country. It illustrates that the low-tech country has a higher incentive to offer a subsidy. The second inequality states that allowing investment subsidies makes an investment platform in the low-tech country more likely, simply because this country would offer the higher investment subsidy. The third inequality states that the low-tech country is indeed able to attract an export platform through subsidies if trade costs are in the range  $(\tilde{t}, t_B)$ . This leaves five possible rankings: (i)  $\tilde{t} < t_B < t_A < \bar{t}$ , (ii)  $t_B < \tilde{t} < t_A < \bar{t}$ , (iii)  $t_B < \tilde{t} < \bar{t} < t_A$ , (iv)  $\tilde{t} < t_B < \bar{t} < t_A$ , and (v)  $\tilde{t} < \bar{t} < t_B < t_A$ . This clearly illustrates the fact that the technology case is indeed far more complex than the size case discussed in the previous section. However, the mechanisms guiding the location outcomes and welfare effects are similar to the mechanisms discussed in the previous section. Take case (v) as an example.<sup>14</sup> In this case, the location outcome and the welfare effects are described in Table 2. “Low” trade costs refer to  $t < \tilde{t}$ , “intermediate” trade costs to  $t \in (\tilde{t}, \bar{t})$ , and “high” trade costs to  $t \in (\bar{t}, t_b)$ .

Table 2. Location and welfare: The technology case

Case	Trade costs $t$	Location	Location*	$\omega_A$	$\omega_B$
<i>I</i>	low	$B$	$B$	0	+
<i>II</i>	intermediate	$B$	$A$	−	+
<i>III</i>	high	$A$	$A$	+	0

The similarity to cases *I*, *II*, and *IV* in table 1 is striking. The results are driven by the “competition-protection” trade-off which is essentially very similar to the “proximity-protection” trade-off in the previous section.

## 4 Conclusion

An international investment agreement limiting the use of investment subsidies to attract foreign direct investment, is likely to create winners and losers amongst host countries. In the present paper we have focussed on differences in market size as the source of conflicting interests between host countries. We have shown that there may be strong market specific reasons

<sup>14</sup>In case (v) the two potential host countries are fairly similar in terms of technology, but their disadvantage relative to the MNE is fairly large, so that  $c_b > c_a > \frac{1}{2+s}$ .

for an MNE to invest in the smaller and/or the larger country, either to limit the spread of technology in the smaller country, or to save on trade costs in the larger country. If the market specific attractions for investing in a given country are strong, the MNE is likely to invest in that country even after an investment agreement prohibiting investment subsidies has been signed. The relevant host country would in this case welcome an agreement that eliminates international subsidy competition for FDI. The country gets the investment anyway, and with an investment agreement, without having to offer a subsidy to the MNE.

When the market based attraction for investing in a country is not very strong, however, investment subsidies affect the investment choice of the MNE. A small country may either benefit or lose from the possibility to subsidize. It benefits if by offering an investment subsidy it is able to attract FDI, which it would not get in the absence of such an investment incentive. It loses, however, if the MNE makes a single investment in the region, and the larger country is able to change the investment decision of the MNE from the small to the large country by offering a more generous investment subsidy.

Conflicting interests between host countries is an indication that negotiations on an investment agreement are likely to be difficult. In addition to the potentially conflicting views of host countries, there are of course differences between investor countries, not to mention investor countries versus host countries.

Naturally, our results are limited by the framework of the analysis. The setup of our analysis was chosen in order to emphasize the trade-offs involved for both local governments as well as for the multinational enterprise. We have abstracted from a number of relevant issues, such as product differentiation or oligopolistic market structures (beyond duopoly). Product differentiation, for instance, reduces the impact of spillovers for the MNE and thus provides the larger (low-tech) country with a stronger locational advantage. It could also be interesting to explore strategies for protecting technology other than choice of location. Finally, it would be interesting to investigate potential conflicts between different investor countries regarding an IIA, and between investor countries and host countries. We leave this for future research.

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