

Policy competition for foreign direct investment between asymmetric countries

Kjetil Bjorvatn*

Norwegian School of Economics and Business Administration

Carsten Eckel†

University of Göttingen

September 28, 2004

Abstract

Discussion Paper 19/04

The present paper analyses policy competition for foreign direct investment between a larger and industrially more developed country and a smaller and industrially less developed country. We demonstrate how policy competition affects the location decision of the foreign investor and derive welfare implications. The key variables in our analysis are intra-regional trade costs, differences in market size, and minimum wages.

JEL: F12, F23, L13, O33

Keywords: Foreign Direct Investment, Policy competition, Welfare

1 Introduction

Competition for foreign direct investment (FDI) is pervasive, and on the rise.¹ An increasing number of countries, including transition and developing

*NHH, Department of Economics, Helleveien 30, N-5045 Bergen, Norway, Tel.: +47 55 95 95 85, Email: Kjetil.Bjorvatn@nhh.no

†University of Göttingen, Department of Economics, D-37073 Göttingen, Germany, Tel.: +49 (551) 39 72 98, Email: ceckel@uni-goettingen.de

¹For an overview of policy competition for foreign direct investment, see UNCTAD (1996) and Oman (2000).

countries, actively seek to attract FDI. Competition for FDI is mostly intra-regional. Typically, an investor makes a short-list of countries or locations within a country that are considered relevant candidates for the investment. National or sub-national governments on this list are then invited to compete for the investment. The incentives offered can be significant, often in excess of \$100 000 per job. Hence, while an investment decision is typically dominated by economic fundamentals, incentives may affect the location decision when the potential host countries are fairly similar.²

For instance, in 1996, General Motors announced its intention of building a \$500 million car plant in Asia.³ Thailand and the Philippines fought fiercely for this investment, both countries offering generous tax incentives. In the end, Thailand won the contest by matching the offer by the Philippines, and in addition, giving a 100 per cent tax refund on raw materials for car exports and a \$15 million grant for establishing a General Motors training institute.

Another case involves Canon Inc, which in 2001 intended to establish a large production facility in East Asia involving the creation of 300 new jobs. Vietnam offered a substantial incentives package, including a ten-year tax holiday, and thereby won the competition for the investment over its rival, the Philippines.

In European transition economies, too, there are signs of incentives competition taking place. Until 1998, the Czech Republic had been reluctant to offer tax breaks to foreign investors. But after losing out to neighbouring countries in the competition for foreign direct investment, most notably Hungary and Poland, and countries in Western Europe, the Czech government changed its policy position and opened up for a range of investment incentives.

There are concerns that competition between jurisdictions for FDI may have undesirable effects. The main concern is that “bidding wars” may arise that weaken public finances and distort the allocation of investment. Indeed, UNCTAD (1996) calls for international cooperation to contain excesses of incentives competition for investment.⁴

However, competition for FDI is not necessarily negative, for two reasons. First, competition for FDI may induce countries to upgrade their physical and

²Devereux and Griffith (1998) provide evidence that taxation of profits affects multinationals’ investment decision.

³The cases that follow are from Charlton (2003).

⁴For a discussion of earlier attempts at reaching an international investment agreement, and in particular OECD’s MAI initiative, see Nunnenkamp and Pant (2003).

legal infrastructure and implement stable macroeconomic policies. Clearly, such measures are likely to benefit the economy as a whole. Second, investment incentives may create foreign direct investment that would otherwise not take place, or lead to a reallocation of foreign direct investment to regions or countries where these investments create the largest benefits.

There are a number of reasons why governments may wish to attract foreign direct investment. Job creation is often emphasised. The access to cheaper and perhaps higher-quality goods for consumers is also relevant, although perhaps not at the forefront of the policy debate. Technological spillovers is yet another effect that has received a lot of attention.

On the other hand, there are certainly sound economic reasons for why governments may *not* be so eager to attract foreign direct investment. Foreign entry may lead to profit shifting away from local firms, and possibly to the bankruptcy of local firms. Hence, intensified competition in the goods market is not necessarily in the interest of local governments. Indeed, even countries that have attracted a lot of foreign investment typically also shield certain sectors of the economy from foreign entry.

Here, we study the impact of policy competition on the location decision of MNEs and on the welfare of the host countries. We focus on policy competition between asymmetric countries. More specifically, one country is larger than the other. Moreover, the larger country houses a local firm that competes with the foreign investor in the regional market, whereas there are no relevant competitors located in the smaller country.

Our paper is 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.

In the paper by Fumagalli, technological spillovers play a crucial role. However, the presence of technological spillovers, and in particular the assumption that spillovers are increasing in the technology gap, are controversial issues. Empirical evidence suggests that when the technological gap between investor and host country firms is very large, the absorptive capacity of the local firms is limited, and hence spillovers small (Aitken and Harrison, 1999; Haskel, Pereira and Slaughter, 2002; Girma and Görg, 2002). Our paper analyses policy competition for FDI without relying on spillovers.

Our paper is also related to Barros and Cabral (2000). In their paper, there is a small country with an unemployment problem and a large country without an unemployment problem. There are no local firms and hence no profit-shifting or technological spillover effects associated with foreign entry. The larger country is the more attractive location for the foreign firm in the absence of policy intervention. However, because of the unemployment problem, the smaller country has more to gain from attracting the investment. Subsidy competition may therefore induce the investor to locate in the smaller country. The authors demonstrate that investment subsidies may increase total welfare. In the absence of side payments, there is, however, a conflict of interest between the two countries in the policy game for FDI.

The present paper also deals with job creation as a motive for attracting FDI. However, we do not base our argument on the fairly ad hoc assumption in the paper by Barros and Cabral that the small country has an unemployment problem and the large country not. In our paper, there are interesting trade-offs between locating in the larger or smaller market even if the gap between nominal and shadow wage is the same in both countries. The reason is that we add a local producer, and hence a competition effect, the strength of which depends on the location choice of the foreign firm.

Haufler and Wooton (1999) study policy competition for FDI between two countries of different size. In their paper, the investor faces no regional competition for its product, and it is not able to price discriminate between the two countries in the region. In equilibrium, the firm always invests in the larger country. Our paper differs from theirs by analysing regional competition and price discrimination. Haaland and Wooton (1999) analyse policy competition for FDI within a general equilibrium framework. The investor in their model does not aim at supplying local markets. Hence, minimizing costs is the only concern of the investor when choosing the optimal location. Finally, our paper is related to the tax competition literature in public

finance, such as Bucovetsky (1991), Wilson (1991) and Kanbur and Keen (1993). The main difference between the public finance literature on tax competition and the literature on competition for foreign direct investment, is that the latter deals with markets of imperfect competition and the former with perfect competition.

Our model naturally has some limitations. The mechanisms we focus on are more relevant for market seeking FDI than for other investment motives. Note, however, that our analysis does not exclude the possibility of the investor also exporting to countries outside the region. But, implicitly, we assume that the extra-regional export potential is the same in both countries, and hence does not affect the choice of location.

Our paper is organized as follows. We start by presenting the model. Then we apply the model to two different scenarios. First, in section 3, we analyse the situation where the host countries have no unemployment problem, so that job-creation is not an argument for subsidizing FDI. Then, in section 4, we analyse the situation with unemployment. Section 5 concludes.

2 Model

Consider a region consisting of two countries, A and B . Country A is a larger economy with a more developed industrial base than B . Demand in country A is given by

$$Q_A = \alpha (1 - p_A), \tag{1}$$

and in B

$$Q_B = 1 - p_B, \tag{2}$$

where Q_J is the quantity demanded in country J , p_J is the market price, and $\alpha > 1$ measures the market size of A relative to B . The industrial base is more developed in A in the sense that prior to the entry of a foreign investor, there is a single producer in the region, firm a , located in country A .⁵

A foreign firm, which we shall sometimes refer to as “the multinational”, wishes to invest in one of the two countries in order to service regional demand. Transaction costs associated with exporting to the region are assumed

⁵Allowing an extra firm in each country, so that the foreign investor faces competition from two producers in A and one producer in B would not change the qualitative results of the model.

to be prohibitively high, so that access to regional consumers requires an investment.⁶ The investment cost is assumed to be the same in both countries.

The multinational produces a good identical to that of firm a . We simplify by assuming that the marginal production costs, denoted by c , are the same for the local and the foreign producer. Exports involve a per unit trade cost t . After entry, there is Cournot competition between the two firms. If the foreign firm, which we shall denote by f , invests in country A and exports to B , the operating profits of both firms are given by

$$\pi_f^A = \pi_a^A = \frac{\alpha(1-c)^2}{9} + \frac{(1-c-t)^2}{9}, \quad (3)$$

where the first term is profits in market A and the second term profits in B . Similarly, if firm f invests in B its operating profits are

$$\pi_f^B = \frac{\alpha(1-c-2t)^2}{9} + \frac{(1-c+t)^2}{9}, \quad (4)$$

while those of firm a are:

$$\pi_a^B = \frac{\alpha(1-c+t)^2}{9} + \frac{(1-c-2t)^2}{9}. \quad (5)$$

Note that the trade costs t perform an important function. They separate the two markets, so that the location decision has real implications. If trade costs were zero, the location decision within the region would have no impact on profits: $\pi_f^A = \pi_a^A = \pi_f^B = \pi_a^B$.

A country's welfare consists of consumer surplus, and, for country A , the producer surplus of firm a . In addition, we open up for the possibility of the wage rate exceeding the shadow price of labor. In this case, domestic welfare also includes the workers' surplus from being employed. If the investment takes place in A , the consumer surplus in A is:

$$\sigma_A^A = \frac{\alpha(2-2c)^2}{18}, \quad (6)$$

⁶The reason for this assumption is simply that the trade versus investment choice is well understood from the literature on foreign direct investment, and that it is not the focus of our analysis. See, however, Fumagalli (2003) for an analysis that includes exports as a mode of servicing a foreign market.

while the consumer surplus in B in this case is given by:

$$\sigma_B^A = \frac{(2 - 2(c + t))^2}{18}. \quad (7)$$

If the investment takes place in B , consumer surplus in A is:

$$\sigma_A^B = \frac{\alpha(2 - 2c - t)^2}{18}, \quad (8)$$

and in B :

$$\sigma_B^B = \frac{(2 - 2c - t)^2}{18}. \quad (9)$$

The equations show the well known influences on the consumer surplus. Consumer surplus rises when the size of the market rises (α) or when marginal cost components (c and t) fall.

In order to analyse the job-creation motive for FDI, we wish to allow for the possibility of involuntary unemployment in our model. Let the shadow price of labor be given by γ and assume that $c \geq \gamma$. If $c > \gamma$, there is a surplus from being employed which is given by the difference $(c - \gamma)$ per employed worker. As in Barros and Cabral (2000), labor is the only variable factor of production and production of one unit of output requires one unit of labor. Employment is then equal to output, and c can be interpreted as the wage rate. With these assumptions, calculating the worker surplus in a country, defined by l , is straightforward. When the investment takes place in country A , the worker surplus in country A is given by $l_A^A = (c - \gamma)(Q_A + Q_B)$:

$$l_A^A = (c - \gamma) \left[\frac{2\alpha c(1 - c)}{3} + \frac{2c(1 - c - t)}{3} \right]. \quad (10)$$

Naturally, when both firms produce in country A , there is no production in country B . Hence, there is no worker surplus in B , and $l_B^A = 0$. When the firm invests in B , the worker surplus in B is

$$l_B^B = (c - \gamma) \left[\frac{\alpha c(1 - c - 2t)}{3} + \frac{c(1 - c + t)}{3} \right], \quad (11)$$

where the first term in the square brackets represents firm f 's production for market A and the second term firm f 's production for market B . Similarly, when the firm invests in B the worker surplus in A is:

$$l_A^B = (c - \gamma) \left[\frac{\alpha c(1 - c + t)}{3} + \frac{c(1 - c - 2t)}{3} \right], \quad (12)$$

where the first term in the square brackets represents firm a 's production for market A and the second term firm a 's production for market B . We can now determine the welfare (W) of each country. Welfare consists of consumer and worker surplus plus local profits (in A). Investment subsidies or taxes are not included, but we will deal with them later. If the foreign firm invests in A , country A welfare, excluding any investment subsidies or taxes, is given by:

$$W_A^A = \pi_a^A + \sigma_A^A + l_A^A, \quad (13)$$

and country B welfare by:

$$W_B^A = \sigma_B^A. \quad (14)$$

If the investment is located in country B , country B welfare is given by:

$$W_B^B = \sigma_B^B + l_B^B, \quad (15)$$

and country A welfare by

$$W_A^B = \pi_a^B + \sigma_A^B + l_A^B. \quad (16)$$

Note that without unemployment, $c = \gamma$ and hence $l_A^A = l_A^B = l_B^B = 0$. In this case, regional welfare would consist of only consumer surplus and, for country A , firm a profits.

In the following we will simplify notation by assuming that the shadow price of labor is zero, $\gamma = 0$. In this way, c captures both the absolute wage rate and the difference between the wage rate and the shadow price of labor. It is useful to proceed by first considering the investment choice with exogenous government policy as a benchmark. We then move on to endogenising the investment policies, and consider the impact of policy competition on aggregate welfare.

2.1 Investment location with exogenous policy

For simplicity, in the analysis of investment location with exogenous policy we assume that the two countries have *identical* policies. In this way, policy does not affect the investor's location choice. The investor compares π_f^A and π_f^B . The critical level of trade costs for which the investor is indifferent between investing in A and B , i.e. where $\pi_f^A = \pi_f^B$, can be found from (3) and (4) as:

$$t^* = \frac{(1-c)(\alpha-1)}{\alpha}. \quad (17)$$

Proposition 1 *With identical policies, there exists a critical t^* so that $\pi_f^A = \pi_f^B$. If $t < t^*$, $\pi_f^A > \pi_f^B$, and the firm chooses to invest in A . If $t > t^*$, $\pi_f^A < \pi_f^B$, and the firm invests in B .*

Proof. Evaluated at $t = t^*$, $\frac{\partial(\pi_f^A - \pi_f^B)}{\partial t} = -\frac{4}{9}(1-c)(\alpha-1) < 0$. ■

Intuitively, the location decision in the absence of policy competition is determined as a trade-off between the “market size” effect, i.e. the advantages of locating in the larger market A , and the “competition” effect, i.e. the benefits of being the single producer in B , and hence operating in a less competitive environment. The higher are trade costs, the more protected are national markets from international competition, and the more important is the competition argument in favor of location in B . Higher marginal production costs c reduce the relative importance of market size, and hence is also an argument in favor of locating in B .

2.2 Investment location and welfare with endogenous policy

Investment policies are determined by welfare maximizing governments. Any fiscal incentive offered by a country’s government to a potential investor must reflect the country’s benefits of the investment. Thus, in order to determine equilibrium policies, it is useful to define the net benefits a country derives from hosting the investment:

Definition 1 *Country A ’s net benefit from hosting the foreign firm is defined as $w_A \equiv W_A^A - W_A^B$. Similarly, country B ’s net benefit from hosting the foreign firm is defined as $w_B \equiv W_B^B - W_B^A$.*

Naturally, w_A and w_B describe the maximal fiscal incentives that the respective governments would be willing to offer. Clearly, $w_B = \sigma_B^B - \sigma_B^A + l_B^B > 0$. This is due to the fact that there are no local firms in country B so that the impact of an investment on consumer and worker surplus is unambiguously positive. Consequently, country B is always willing to pay a

subsidy to attract the foreign investor. This is different for country A . We find that $w_A = 0$ for

$$t_1 = \frac{4(1-c)}{3(\alpha+2)}. \quad (18)$$

Evaluated at $t = t_1$, $\frac{\partial w_A}{\partial t} = \frac{1}{9}(2(c-1) - 3\alpha c) < 0$. Hence, for $t < t_1$, country A benefits from hosting the investment and would therefore be willing to offer a subsidy to attract the foreign investor. For $t > t_1$, A would require a tax to host the foreign firm.

If trade costs are low, the two markets are only weakly separated, so that the multinational's location decision has little impact on firm a 's profits. In this case, the concern for consumer surplus and employment outweighs the concern for local profits in A . But if trade costs are high, local firms profit from keeping the multinational at a distance, so that local governments start taxing foreign entry.

The equilibrium policy is determined by an auction where the country making the most attractive offer gets the investment. When comparing the two countries, the investor considers both what the locations offer in terms of profits from sales and what the local government offers in terms of investment incentives. Similarly, a country that wishes to attract the investment must consider what the investor would earn by investing in the other country, including the incentives offered by that country.

To determine the equilibrium of the policy contest, we first determine the bid that a country needs to make to out-bid the rival government. The investment goes to the country that is actually willing to make this bid. Consider for instance country B . In order to be certain to attract the foreign investment, the government in B needs to look at what firm f could alternatively make by investing in A . This includes the investor's profits from sales when located in A , given by π_f^A . Moreover, it includes an investment subsidy or tax. For B to out-bid A , it needs to consider the most generous offer by A , given by w_A . The investor's profit by investing in A , including the best offer by the government of A , is then given by:

$$\pi_A^{\max} = \pi_f^A + w_A. \quad (19)$$

The minimum subsidy that B must offer to attract the investment can therefore be expressed as:

$$s_B^{\min} = \pi_A^{\max} - \pi_f^B. \quad (20)$$

Whether or not country B is willing to make this offer, depends on B 's willingness to pay, given by w_B . If $w_B > s_B^{\min}$, then clearly B has an incentive to out-bid A in the competition for f . Since the highest bidder gets the investment, country B gets the investment for $w_B > s_B^{\min}$, offering an investment subsidy given by s_B^{\min} . Similarly, the investor's profit by investing in B , including the best offer by the government of B , is given by:

$$\pi_B^{\max} = \pi_f^B + w_B. \quad (21)$$

The minimum subsidy A must offer to attract the investment is given by

$$s_A^{\min} = \pi_B^{\max} - \pi_f^A. \quad (22)$$

Whether or not country A would be willing to offer s_A^{\min} depends on w_A . If $w_A > s_A^{\min}$, firm A is able and willing to out-bid B . In this case, the firm would invest in A and be offered a policy s_A^{\min} . If $w_A < s_A^{\min}$, the firm would invest in B . Note that⁷:

$$s_A^{\min} - w_A = w_B - s_B^{\min}. \quad (23)$$

Hence, $s_A^{\min} > w_A$ implies $s_B^{\min} < w_B$, and vice versa. The condition $w_A = s_A^{\min}$ (or equivalently $w_B = s_B^{\min}$) can be expressed as:

$$t^{**} = \frac{(8 - 2c)(\alpha - 1)}{3 + 11\alpha}. \quad (24)$$

Proposition 2 *With endogenous policy, for $t > t^{**}$, $w_B > s_B^{\min}$, and the firm invests in B . For $t < t^{**}$, $w_A > s_A^{\min}$, and the firm invests in A .*

Proof. Evaluated at $t = t^{**}$, $\frac{\partial(s_A^{\min} - w_A)}{\partial t} = \frac{1}{9}(4 - c)(\alpha - 1) > 0$. ■

As in the case with exogenous policy, we see from (24) that the larger is country A relative to B , the more likely it is that the firm invests in A . Higher trade costs and higher marginal production costs are arguments in favor of investing in B . Clearly, t^* and t^{**} are not identical per se. Hence, it is clear that policy competition may affect the multinational's location decision.

⁷To see this, observe that inserting (21) in (22) results in $s_A^{\min} = \pi_f^B + w_B - \pi_f^A$. Similarly, from (19) and (20) we find that $s_B^{\min} = \pi_f^A + w_A - \pi_f^B$. Hence, $s_B^{\min} - w_A = \pi_f^A - \pi_f^B = w_B - s_A^{\min}$, which in turn can be expressed as (23).

2.3 Policy competition and aggregate welfare

Since policy competition may affect the location decision of the investor, it may also affect aggregate welfare, or efficiency, defined as the sum of the two countries' welfare and the investor's profits. We can demonstrate that:

Proposition 3 *The investment decision with policy competition maximizes aggregate welfare.*

Proof. Define $\Omega \equiv w_A - w_B + \pi_f^A - \pi_f^B$, which can be interpreted as the aggregate welfare gain of locating in A over B . Using (21) and (22), we get:

$$w_A - s_A^{\min} = \Omega.$$

If $w_A < s_A^{\min}$, then policy competition leads to an investment in B . Clearly, $w_A < s_A^{\min}$ implies that $\Omega < 0$, so that locating in B is also the optimal decision from an aggregate welfare perspective. Similarly, $w_A > s_A^{\min}$ implies that $\Omega > 0$, and the investment takes place in the welfare maximizing location, A . If $t = t^{**}$, $\Omega = 0$. ■

Hence, from an aggregate perspective, policy competition leads to an efficient outcome.⁸ However, efficiency is only half the story. Policy competition creates winners and losers. For instance, if policy competition is intense, the equilibrium investment subsidy may be such that the region as a whole loses from policy competition, even if this competition leads to an increase in aggregate welfare. We will return to distributional effects of policy competition later in the analysis.

There are two arguments in favor of attracting FDI in our model, increased consumer surplus and job creation. We start out our analysis by focussing only on the former argument. To do this we assume that there is no involuntary unemployment in the region. The wage level then reflects the shadow price of labor ($c = \gamma = 0$). In Case 2 we allow for a minimum wage $c > \gamma = 0$. In this case, the labor costs that firms face exceed the true labor costs for society. For this reason, there is too little employment in the economy, and hence a role for FDI as a means of job-creation.

⁸The observation that policy competition may lead to an increase in aggregate welfare has been made also by Barros and Cabral (2000) and Fumagalli (2003).

3 Case 1. Full employment

We start the discussion of the full employment case by first analysing the issue of location, then the degree of policy competition, and finally welfare.

3.1 Location

We see from (17) and (24) that for $\alpha > 1$ and $c = 0$, $t^* > t^{**}$. Figure 1 illustrates the location decision of the production firm with exogenous and endogenous policies. The vertical axis is bounded above by $t = 0.5$ to secure positive quantities in equilibrium.

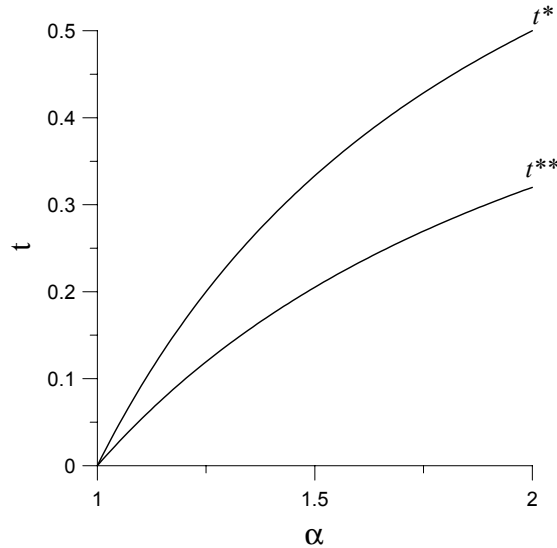


Figure 1: Location

Above the t^* -curve the location decision is B without policy intervention, and below the t^* -curve, the firm invests in A . Above the t^{**} -curve, the equilibrium location with endogenous policy is in B , and below the t^{**} -curve, in A . Hence:

Proposition 4 *Without unemployment, policy competition increases the attractiveness of country B as location for investment.*

Intuitively, the reason why policy competition makes B relatively more attractive, is that B has the higher willingness to pay for the investment; $w_B > w_A$. In addition to local consumer interests, the government of A also takes into consideration the profit-shifting effect of foreign entry away from the local firm. The profit loss of firm a reduces the gains from hosting the investment, and hence reduces the investment incentives that A would be willing to offer. Country B has no relevant local competitor to consider, a fact which raises its willingness to pay for the investment relative to that of country A . When the location advantage of A in the case with symmetric investment policy is positive but fairly weak, i.e. just below the t^* -curve, opening up for policy competition changes the equilibrium location choice of the investor from A to B .

3.2 Intensity of policy competition

We are interested not only in the location outcome but also in the intensity of policy competition. When will policy competition result in a net transfer of money from the host country government to the investor, i.e. a subsidy, and when will there be a transfer of money from the investor to the host country government, i.e. a tax? The direction of the money flow is an indication of the bargaining position of the host government relative to the investor. Define the critical level of t for which $s_B^{\min} = 0$ as:

$$t_2 = \frac{8\alpha - 4}{6 + 11\alpha}. \quad (25)$$

At $t = t_2$, $\frac{\partial s_B^{\min}}{\partial t} = \frac{2}{9}(1 - 2\alpha) < 0$. Thus, for $t > t_2$, $s_B^{\min} < 0$, and the investor has to pay an investment tax to country B if it chooses to invest there. For $t < t_2$, $s_B^{\min} > 0$, and the investor receives an investment subsidy if it chooses to invest in B . The critical level of t for which $s_A^{\min} = 0$ can be found as:

$$t_3 = \frac{8\alpha - 12}{8\alpha - 3}. \quad (26)$$

At $t = t_3$, $\frac{\partial s_A^{\min}}{\partial t} = \frac{4}{9}(\alpha - \frac{3}{2}) > 0$ for $\alpha > \frac{3}{2}$. Hence, for $t > t_3 > 0$, $s_A^{\min} > 0$, and the investor receives a subsidy if it invests in A . If $0 < t < t_3$, $s_A^{\min} < 0$, and the investor pays an investment tax if it chooses to locate in A . Figure 2 extends Figure 1 by adding the critical trade costs t_2 , and t_3 . For the welfare analysis, we also include two dashed lines, t_1 defined in

(18) and t_0 , to be defined later. The letters in the figure indicate the host country of the investment, with the subscripts indicating the equilibrium policy. For instance, A_S means that the foreign firm invests in country A , and that A offers an investment subsidy, whereas A_T implies that A charges an investment tax.

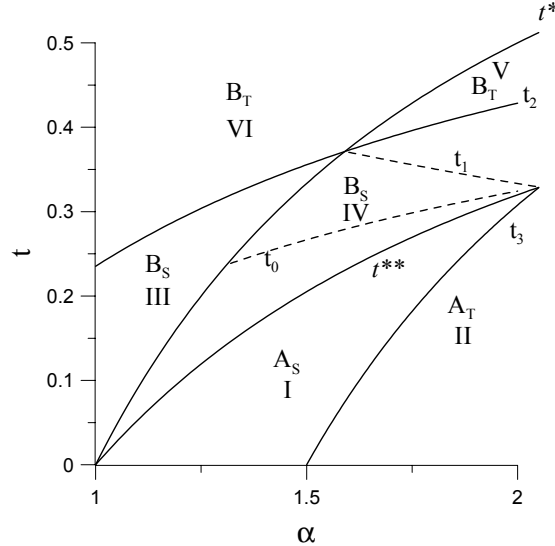


Figure 2: Policy

Area I in Figure 2 describes a situation where country A gets the investment with and without policy competition (since $t < t^{**} < t^*$). The equilibrium policy is given by a subsidy to the investor ($t > t_3$). Area II is similar to area I, except now A charges an investment tax. The bargaining position of A is now fairly strong, since the large market size in A provides a strong location advantage for this country. In Area III, the investment goes to country B with and without policy competition ($t > t^* > t^{**}$). Country B offers an investment subsidy ($t < t_2$). In Areas IV and V, characterized by $t^{**} < t < t^*$, policy competition changes the location decision of the investor from A to B . In IV, where $t^{**} < t < \min(t^*, t_2)$, country B pays a subsidy to attract the investor. In V ($t_2 < t < t^*$), its bargaining position is stronger since A is less eager to attract the investment, and B charges an investment tax. Finally, Area VI describes a situation where the foreign firm invests in B with and without endogenous policy ($t > t^{**}$) and B charges an investment

tax ($t > t_2$). To sum up:

Proposition 5 *Policy competition is more intense (in the sense that the equilibrium policy is characterized by an investment subsidy rather than an investment tax) when the countries offer relatively similar location advantages.*

Trade costs constitute a location argument in favor of B , since locating there reduces intra-regional competition. A large market size in A is a location argument in favor of locating in A . When these arguments are relatively “balanced”, the equilibrium policy will be a subsidy. In Figure 2, this is the case in areas I, III, and IV. When there are strong market based arguments in favor of investing in one country, competition for the investment will be less fierce. In this case, a country can tax the investment and still be the more attractive location for investment. This is true in Areas II, V, VI.⁹

3.3 Welfare

We have already seen that policy competition leads to a solution where aggregate welfare is maximized. We could thus conclude that policy competition for FDI is good. But policy competition for FDI creates winners and losers, and from a welfare perspective, we are interested not only in efficiency but also in distribution. Clearly, when there is subsidy competition and no effect on the location decision of the investor, policy competition has no impact on efficiency. The only impact is a transfer of funds from the host country to the investing firm. This is true in areas I and III in Figure 2.

More interesting is the case when policy competition in fact alters the location choice of the investor. We know that aggregate welfare in this case increases. We also know that the county that manages to attract the investment through fiscal incentives, namely country B , necessarily gains from policy competition. Country A , of course, loses. Since we know that aggregate welfare increases, if we allowed for side payments, firm f and country B could compensate country A such that all parties would gain from the relocation of the investment.

⁹The result that strong location advantages increase the bargaining power of potential host countries and may lead to taxation of FDI rather than subsidies, is also found in Haufler and Wooton (1999).

It is interesting to investigate the effect of policy competition on regional welfare. Is the gain to country B , net of the investment subsidy it pays to the investor, larger than the loss to country A ? If the region as a whole gains, then country B would be able to compensate country A and all parties would gain from the relocation, even in the absence of side-payments from firm f . We measure gains and losses relative to a situation with no investment subsidies or taxes. The net gain to country B from hosting the investment, net of the investment subsidy it pays to firm f , is given by $w_B - s_B^{\min}$. The loss to country A from not hosting the investment is given by w_A . Hence, for the region as a whole, the net gain is given by $w_B - s_B^{\min} - w_A$. The critical level of trade costs for which $w_B - s_B^{\min} - w_A = 0$ is given by:

$$t_0 = \frac{8\alpha - 4}{14\alpha + 9}. \quad (27)$$

At $t = t_0$, $\frac{\partial(w_B - s_B^{\min} - w_A)}{\partial t} = \frac{2}{9}(2\alpha - 1) > 0$. Thus, for $t < t_0$, i.e., in the lower half of area IV in Figure 2, $w_B - s_B^{\min} - w_A < 0$, and the region as a whole loses from policy competition relative to a situation with no investment taxes or subsidies even when aggregate welfare increases. This is an area where subsidy competition is intense, and hence the subsidy s_B^{\min} is substantial. At the same time trade costs between countries are low, so that the two markets are only weakly separated, and the gains from inducing the MNE to invest in market B are only small ($w_B - w_A$ is low). In this case, the region would be better off without policy competition even if this would lead to the “wrong” location decision from an aggregate welfare perspective. For $t_0 < t < t_2$ in area IV, however, the region gains even though the host country offers a subsidy to the investor. In this area, the two markets are strongly separated and a change in location has large impacts on welfare ($w_B - w_A$ is large), while the subsidy s_B^{\min} is smaller.¹⁰ Hence, we can conclude that:

Proposition 6 *Policy competition increases regional welfare given that it leads to a reallocation of the investment and that policy competition is not too intense.*

Finally, let us consider the welfare implications of policy competition for country A . Again, we are interested in the parameter space for which policy competition affects the location decision of the investor. With zero

¹⁰Note that s_B^{\min} approaches zero as t approaches t_2 .

investment subsidy and taxes as reference point, we can show that country A not necessarily loses from policy competition even though it loses the investment. Policy competition would then increase both countries' welfare. More precisely, we can demonstrate that:

Proposition 7 *Policy competition may increase both countries' welfare given that it leads to a reallocation of the investment and that both the trade cost and the difference in market size are sufficiently large.*

The reason why country A may gain from not hosting the investment is that when the market size of A is relatively large, the gain in local producer surplus dominates the loss in local consumer surplus. This is true for $t > t_1$, for which $w_A < 0$.

4 Case 2. Unemployment

Assume now that $c > \gamma = 0$, so that there is a discrepancy between the wage rate c and the shadow price of labor in the region, γ . The introduction of a positive minimum wage brings along two major changes. First of all, firms now have to pay a positive marginal production cost in addition to trade costs. And second, local governments care about employment in addition to consumer and producer surplus. The first change affects the MNE's location decision independent of investment policies. The second change affects the size of local subsidies offered.

We see from (17) that a higher minimum wage reduces t^* . Hence, the higher is the minimum wage, the stronger is the incentive for the investor to locate in B . Intuitively, higher marginal production costs reduces the relative importance of market size. Second, we see that t^{**} defined in (24) also falls in c . Hence, the higher is the minimum wage, the more likely is the foreign firm to invest in B also with policy competition.

Proposition 8 *A minimum wage increases the attractiveness of country B as location for the investment, both with and without policy competition.*

More interestingly, perhaps, we find that $\frac{\partial(t^*-t^{**})}{\partial c} < 0$ for all $\alpha > 1$. This means that while an increase in c makes B the preferred investment location for a broader range of trade costs and differences in country size, the parameter space for which policy competition leads to a relocation of

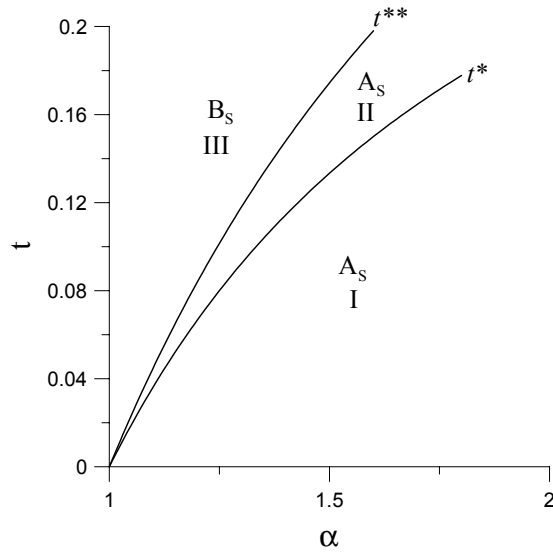


Figure 3: Unemployment: High minimum wage

investment from A to B diminishes. In fact, at $c = \frac{\alpha+1}{3\alpha+1} \in [\frac{1}{3}, \frac{1}{2}]$, $t^* = t^{**}$, and the introduction of fiscal incentives has no impact on the location of the investment for any t or α . If $c > \frac{\alpha+1}{3\alpha+1}$, then $t^* < t^{**}$, and policy competition actually leads to a switch from B to A in the range of $t \in (t^*, t^{**})$. We can summarize this discussion as follows:

Proposition 9 *If the minimum wage is sufficiently high, policy competition may lead to a relocation of investment from B to A .*

Intuitively, an increase in the minimum wage strengthens the job creation argument in favor of FDI. Since A is the larger country, the number of jobs created there and hence its willingness to pay for job creation is larger than that of the smaller country B .¹¹ Put differently, when c is high, the job creation effect dominates the profit shifting effect of FDI in country A , thus inducing A to subsidize FDI. Figure 3 illustrates the unemployment case with a relatively high minimum wage ($c = 0.6$). Trade costs are bounded above by $t = 0.2$, such that quantities in equilibrium are always positive.

¹¹It is straightforward to demonstrate that $l_A^A - (l_B^B + l_A^B) = \frac{tc}{3}(\alpha - 1)$, implying that the employment effect is greater when the investment takes place in the larger country A .

In area II, policy competition leads to a relocation of investment from country B to A . Following Proposition 3, we know that this relocation improves aggregate welfare. However, it is possible to show that for all parameter values covered in Figure 3, the region loses from the policy competition relative to a situation without subsidies. This is trivially true in areas I and III where the region offers a subsidy without affecting the equilibrium location decision. More interestingly, it also holds in area II, where the relocation creates potential welfare benefits: The gain to country A net of investment incentive to firm f is dominated by the loss to country B . In contrast to the case with full employment, it is never the case that the country that loses the policy competition for FDI, in the present scenario country B for $t^* < t < t^{**}$, will gain in terms of welfare. Hence, there is clearly a conflict between the two countries in area II on the issue of policy competition for FDI, country A being in favor and B opposing it.

5 Conclusion

We have analysed policy competition for FDI between two asymmetric countries in a region, one country being larger and than the other, and also housing a local firm. Policy competition is more fierce when the countries offer equally strong location advantages. The location advantage for the smaller country, B , is high trade costs and for country, A , a larger market size. Without unemployment, policy competition strengthens the relative profitability of investing in B over A , and may thus cause a switch in the investment decision from A to B . With unemployment, and for a high minimum wage, policy competition may have the reverse effect, causing a relocation of investment from B to A . In any case, a change in the investment decision due to policy competition improves aggregate welfare. We have also shown that in the absence of policy coordination between the two countries in the region, if policy competition is intense, regional welfare goes down even when policy competition leads to a reallocation of investment and hence an increase in aggregate welfare. Moreover, we have demonstrated that there may, or may not, be a conflict of interest between the two countries. In fact, since country A also has to take into account local producer interests, it may be in country A 's best interest to let the investment go to B .

References

- [1] Aitken, B. J., and A. E. Harrison (1999). Do domestic firms benefit from direct foreign investment? Evidence from Venezuela, *American Economic Review* 89 3, June 1999: 605-618
- [2] Barros, P. P. and Cabral, L. (2000). Competing for foreign direct investment, *Review of International Economics* 8 (2), 360-371.
- [3] Blomström, M., Kokko, A. (1998). Multinational Corporations and Spillovers, *Journal of Economic Surveys* 12 (3), 247-278.
- [4] Bucovetsky, S (1991). Asymmetric tax competition, *Journal of Urban Economics* 30: 167-181.
- [5] Charlton, A., 2003, Incentive bidding for mobile investment: Economic consequences and potential responses, Technical Papers No. 203, OECD Development Centre, January 2003.
- [6] Devereux, M. P. and R. Griffith (1998). Taxes and the location of production: Evidence from a panel of US multinationals, *Journal of Public Economics* 68: 335-367.
- [7] Fumagalli, C., 2003, On the welfare effects of competition for foreign direct investments, *European Economic Review* 47: 963-983
- [8] Girma, S. and H. Görg (2002). Foreign direct investment, spillovers and absorptive capacity: Evidence from quantile regressions, manuscript.
- [9] Haskel, J. E., S. C. Pereira, and M. J. Slaughter (2002). Does inward foreign direct investment boost the productivity of domestic firms?, CEPR Discussion Paper 2284.
- [10] Haaland, J. I. and I. Wooton (1999). International competition for multinational investment, *Scandinavian Journal of Economics* 101 4: 631-649.
- [11] Haufler, A. and I. Wooton (1999). Country size and tax competition for foreign direct investment, *Journal of Public Economics* 71: 121-139.
- [12] Kanbur, R. and M. Keen (1993). Jeux sans frontières: Tax competition and tax coordination when countries differ in size, *American Economic Review* 83: 877-892.

- [13] Nunnenkamp, P., Pant, M. (2003). Why the case for a multilateral agreement on investment is weak, Manuscript, Kiel Institute for World Economics, Kiel.
- [14] Oman, C. P. (2001). The perils of competition for foreign direct investment, In: OECD, Foreign direct investment versus other flows to Latin America. Development Centre Seminars, Paris: 63-84.
- [15] UNCTAD (1996). Incentives and Foreign Direct Investment.
- [16] Wilson, J. D. (1991). Tax competition with interregional differences in factor endowments, *Regional Science and Urban Economics* 21: 423-451.