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Eduardo Levy Yeyati
Universidad Torcuato Di Tella

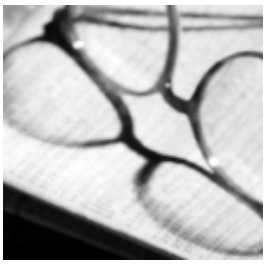
and

Ernesto Stein
BID

and

Christian Daude
UM






Inter-American Development Bank
Integration and Regional Programs Department
Research Department

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by
Eduardo Levy Yeyati
Ernesto Stein
Christian Daude ⊗

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Regional Integration and the Location of FDI

Over the last couple of decades, we have seen an increase in the number and depth of regional integration agreements (RIA) around the world. Indeed, the proliferation of trade agreements is quite widespread. The former European Economic Community has evolved into a single market (EU) and has recently adopted a common currency, while other non-EU European countries have formed free trade areas with the EU or are presently considering accession. Likewise, countries in Southeast Asia agreed to form the ASEAN Free Trade Area. The Americas have been no exception to this trend. A number of regional integration agreements have been either created (e.g., Mercosur, NAFTA) or strengthened (Comunidad Andina) in the 1990s. Some countries such as Mexico and Chile have been very active in forming bilateral trade agreements with countries both in the continent and in other regions. In addition, the Free Trade Area of the Americas, currently under negotiation, is supposed to create a free trade area from Alaska to Tierra del Fuego by the year 2005.

At the same time, the world has been experiencing a dramatic surge in the flows of Foreign Direct Investment, which has increased by a factor of 10 over the last two decades. By comparison, trade has expanded only by a factor of 2 during the same period. The surge in FDI involves flows toward both developed and developing countries. In fact, foreign direct investment has recently become the main source of foreign financing for emerging markets. In light of these developments, the role of regional integration agreements as a determinant of the location of FDI has become an increasingly relevant issue for emerging economies. This is the subject that we explore in this paper. In particular, we will look at the effects of regional integration on the stocks of bilateral FDI in the context of a gravity model, using data from the OECD *International Direct Investment Statistics*.

The potential effect of the FTAA on Latin American countries is a useful starting point to motivate the relevance of our work. What effect should we expect from the FTAA in terms of the evolution of FDI from the US and Canada to Latin American countries?

How will the creation of the FTAA affect FDI from the rest of the world to the region? What are the implications of FTAA for a country such as Mexico whose preferential access to the US may be diluted? Would the effect be similar across countries, or should we expect to see winners and losers? What determines whether a particular country wins or loses FDI flows as a result of the FTAA? These are some of the issues that we address in the paper. While the prospect of the FTAA is what motivates us to carry out this study, our focus is certainly broader, as we look at the effects of regional integration agreements in general, without concentrating in particular on the FTAA.

A difficulty in assessing the role of regional integration agreements on FDI is that there are many different channels through which RIAs could potentially have an impact on the location of FDI. Moreover, not all of them go in the same direction. The impact could depend, for example, on the reasons that bring about foreign investment in a particular country. For instance, a firm may invest abroad in order to exploit a highly protected domestic market, thus serving through sales of a foreign affiliate a market that it could serve through trade only at a high cost. Alternatively, it may invest abroad following a strategy of international vertical integration, exploiting differences in comparative advantage for different stages of production of a given good. As we will see, depending on the motive for foreign investment, the formation of trading blocs may have completely different implications for the location of FDI.

The impact of RIAs on bilateral FDI will also depend on whether the source country is a member of the RIA, or an outsider. For example, NAFTA could potentially affect flows of FDI to Mexico from both the US and Germany, although through different channels. The impact of RIAs will also depend on other characteristics of the host countries that make them relatively more or less attractive than their RIA partners as a potential location for foreign investment.

In what follows, we will discuss in detail a number of channels through which RIA could affect the location of FDI. For simplicity, we will focus on those channels that we think should be the most important ones, leaving aside others that we think should have only

second-order effects.[1] In addition to clarifying the main effects at play, this conceptual discussion should help lay down a roadmap for the empirical exercises that follow. Before doing this, however, it is useful to provide a brief stylized description of two different approaches to foreign investment that have been preeminent in the literature: the horizontal and vertical models of FDI.[2]

Varieties of Multinational Activity: The Vertical and Horizontal Models of FDI

The first models of vertical FDI were proposed by Helpman (1984) and Helpman and Krugman (1985). In these models, the prototypical firm has a corporate sector (which may produce management services and R&D) and a production facility, and these two activities can be separated geographically without incurring further costs. As the corporate sector is more capital intensive than the production sector, firms localize each "stage" of production to take advantage of the differences in factor prices. The model ignores trade costs, and the production facility produces for both the domestic market and the source country market. An implication of this model is that one would only expect to observe this type of (vertical) FDI taking place between countries with sufficiently different factor endowments, so as to ensure that factor prices do not equalize.[3] No FDI would be observed between countries with similar endowments, an implication that is obviously at odds with the international experience. While in its stylized version the vertical model incorporates just the firm's headquarters and a single plant, the concept can be extended to encompass all forms of multinational activity involving vertical integration across international borders.

While in the vertical model a multinational is a single plant firm with headquarters located in a different country, in the horizontal model multinationals are firms with multiple production facilities producing a homogeneous good, one of which is located

[1] For a more exhaustive discussion of the channels through which RIAs could affect FDI, see Blomstrom and Kokko (1997).
[2] This characterization and the discussion below follows Markusen and Maskus (2001).
[3] For this reason, Brainard (1993) characterizes vertical FDI as the factor-proportions approach to FDI.

together with the company's headquarters.[4] Each production facility supplies the domestic market. A key assumption in the horizontal model is the presence of economies of scale at the level of the firm (associated with the fact that they do not need multiple corporate sectors), which is the source of the advantage of multinational firms over domestic ones. Given that firm-level scale economies exist, multinational activity in the horizontal model depends on the interplay between trade costs and plant-level economies of scale.[5] In the absence of trade costs, there would be no reason for multinational production, since firms could concentrate their production in the home country, taking advantage of economies of scale and serving the foreign market through trade. As trade costs increase, multinational production arises as long as plant-level economies of scale are not too high. In this sense, one can think of horizontal multinational activity as a "tariff-jumping" strategy.

As expected, the horizontal model of multinational activity has different empirical implications. Contrary to the vertical model, multinational activity in this case will tend to arise among countries with similar factor proportions. The reason is that very different factor prices will make it too costly to produce in the high cost country. Furthermore, for a given level of trade costs, multinational activity will arise across countries of similar sizes.[6] Otherwise, a domestic firm in a large country will have an advantage in serving the smaller country through trade (since trade costs are incurred on a small trade volume), compared to a multinational which has to bear the fixed costs of producing in two locations.

The implications of both models discussed above seem to suggest that we should expect North-South FDI to be of the vertical variety, while North-North FDI should be largely of the horizontal type.[7] This is not as clear-cut as it may seem, however. First, countries in

[4] For models of the horizontal variety, see Markusen (1984), and Markusen and Venables (1998), among others.
[5] Due to this interplay between scale economies and trade costs, Brainard (1993) has labeled this type of model the "proximity-concentration" approach.
[6] By trade costs we mean both trade barriers and other transaction costs associated to trade, such as transportation costs.
[7] We concentrate on North-North and North-South FDI. Our database only includes developed countries as a source of FDI, which precludes us from analyzing the South-South case.

the North tend to have much lower trade barriers, at least in the manufacturing sector. As discussed above, trade barriers (both natural and policy-related) are a fundamental ingredient of horizontal FDI, so the existence of low trade barriers weakens the case for horizontal FDI among developed countries. If barriers to be jumped are small, then there is little case for horizontal FDI.

Second, horizontal FDI can arise between North and South countries, even when their factor endowments are very different, as long as trade barriers are high enough. The automobile industry in Latin American countries during the period of import substitution (or even today, within the protected environment of Mercosur) is a perfect example of horizontal FDI. Third, even with similar factor proportions, there may be other differences in locational advantage across countries in the North, which can explain the existence of internationally vertically integrated firms.

In fact, a large portion of FDI among countries in the North may not be placed squarely within either of the two categories discussed by Markusen and Maskus (2001), but instead belong to a different class, one in which firms have multiple plants, as in the horizontal model, but produce different varieties of a final good, rather than a homogeneous good.[8] In order to justify multinational activity of this sort, one would have to assume firm-level scale economies (otherwise there would only be domestic firms), and some locational advantage for the production of different varieties in different countries (otherwise, firms would produce different varieties in each country). This locational advantage could be related to differences in preferences across countries, coupled with trade or transportation costs. To provide an example, Honda produces its Odyssey minivans in North America, a market that seems to love this variety of automobiles, and not in Japan. A key difference between this and the horizontal model depicted above is that the production of each plant is not just for domestic consumption, but rather for both countries. Thus, this type of FDI does not substitute trade, as is the case with the homogeneous good horizontal model.

[8] Helpman (1985) has modeled multinationals that produce different varieties of a final good in different locations. Helpman called this FDI horizontal, a label criticized by Markusen and Maskus (2001).

Why Should Regional Integration Agreements Matter for FDI?

Having discussed the main stylized models of multinational activity, we are now ready to address the channels through which RIAs can affect FDI. Since the problem is a complex one with several relevant dimensions (vertical vs. horizontal FDI, insiders vs. outsiders in FTA, etc) it is convenient to choose one of these dimensions as a way to organize the discussion. Rather than starting from the vertical/horizontal distinction, we will organize the discussion starting from the insider/outsider nature of the source country in the host country's RIA. The reason is that the bilateral character of our data allows us to discriminate directly between these two cases. It is not as straightforward to identify the motives for investment with any precision, although some characteristics of the source and host countries can provide useful hints about the main motivation for FDI flows between each country pair. Throughout the discussion, we have to keep in mind a limitation of our FDI database: It only includes FDI from OECD countries to a variety of host countries (both OECD and developing). Therefore, we will not be able to look specifically at FDI between developing countries.

Effects on FDI from Members of the Same RIA

- *Tariff Jumping Effect:* The effects on FDI between member countries will clearly depend on the nature of FDI. Horizontal FDI is a substitute for international trade. High trade barriers increase the cost of serving these markets through trade, and thus increase the incentives to "jump the tariffs" by establishing foreign affiliates to serve these markets. To the extent that FDI is of the horizontal, "tariff-jumping" nature, the formation of RIAs that eliminate or reduce trade barriers in a preferential way should discourage FDI among members.

- *International Vertical Integration Effect:* When FDI is of the vertical variety, the implications are completely different. In its purest single-plant form, the firm produces the good in the labor-abundant country for both markets. This involves exporting back to the source country, so in this case FDI and trade are complements.

This also applies to broader definitions of vertical FDI, i.e., when the firm has a strategy of international vertical specialization, by which different stages of production are located in different countries, taking advantage of differences in factor prices. Barriers to trade discourage vertical FDI by increasing the transaction costs involved in a vertical integration strategy. Elimination or reduction of trade barriers will therefore encourage vertical FDI.[9] In the case of regional integration agreements, in which the reduction of trade barriers is preferential, we should expect the impact to be even larger, since transaction costs are reduced only for member countries, making them relatively more attractive as locations for investment. Similar effects can be expected for the case of FDI in which a firm produces different varieties of a single good in different countries.

- *Investment Provisions Effect:* Countries belonging to an FTA often make efforts to further reduce transaction costs by liberalizing capital flows, homogenizing legal norms, setting up institutions to handle cross-border disputes, etc. To the extent that RIAs include these explicit investment provisions, we should expect them to have a positive effect on FDI.

The first two effects discussed above go in opposite directions. The question of the effects on FDI of common membership in an FTA, then, is an empirical one. The answer should depend on the nature of the FDI involved. As we discussed above, we believe FDI among developed countries tends to be neither the pure vertical nor the pure horizontal, but instead the type in which multinational corporations produce different varieties in different countries. Therefore, we would expect North-North RIAs to increase FDI between member countries. In the case of FDI located in developing countries, we would expect the type of FDI that locates in the country to depend on the level of trade barriers. When trade barriers are high, we expect FDI to be primarily horizontal in nature, in which case it would fall as a result of the RIA. When trade barriers are low, we expect FDI to be primarily vertical, in which case RIAs will have a positive impact on FDI

[9] The effect would be similar if the foreign affiliate produces goods to export to the whole world, but imports intermediate inputs from headquarters, or from other foreign affiliates within the area.

among member countries. It should be clear that, regardless of the impact on total FDI, a regional integration agreement can have the effect of changing the composition of FDI from horizontal to vertical.[10]

Effects on FDI from Source Countries Outside the RIA

- *Extended Market Effect*: The increase in the size of the market can generate new investment in activities subject to economies of scale, which might not have been profitable before the RIA was formed. This effect is obviously relevant for the case of horizontal FDI. Mercosur, for example, may have become a more attractive market, making it more worthwhile to "jump" the common external tariff instead of supplying each of the individual countries through trade. The reason is exactly the same one we discussed above, when we argued that a large country would not engage in this type of investment in a small country unless trade barriers are very high, since it is cheaper to pay trade costs on a small volume than to pay the fixed cost of establishing a new plant. Naturally, the external tariff has to be high enough for this channel to be relevant. The formation of the RIA can also facilitate vertical integration within the region of production by multinational corporations based outside the region.[11] Thus, whatever the motive for FDI, the extended market effect should result in more FDI for the RIA as a whole.[12] But within the RIA, there may be winners and losers. We turn to this redistributive effect next.

- *Redistributive Effects*: While extending the market may bring more FDI to the region, new FDI will certainly not be evenly distributed. Moreover, existing FDI stocks in the region may be relocated. For instance, before the RIA is launched, a multinational

[10] This may be very important for the host countries, since the gains from FDI may be very different depending on the type of FDI involved. To use extreme examples, Intel's production of the Pentium 4 chip in Costa Rica can have a very different impact than Ford had by producing the Ford Falcon in Argentina up to the late 1980s.
[11] Note that this effect can also be present for the case of FDI from source countries within the same RIA.
[12] This effect may be different for different types of RIAs. In particular, when a country from the South forms a RIA with a country from the North, it may become particularly attractive, since it combines some "southern" locational advantages (for example, low wages) with access to a developed market. Production of some Volkswagen automobiles in Mexico is a case in point.

corporation might have horizontal FDI in all the countries in a given region. When barriers to trade within the region are eliminated, the firm may choose to concentrate production in a single plant and supply the rest of the countries through trade. At any rate, extending the market may bring about winners and losers, which may generate interesting political economy dynamics.

A key question, then, is what determines whether a country is a winner or a loser in this game. Even if tariffs are eliminated, as long as other trade costs (such as transportation costs) remain, the size of the individual economies may be an important variable in this regard, since plant-level economies may dictate that the firm locate its plant in the larger market (or the one most centrally located so as to minimize the cost of supplying the whole region).[13] The biggest losers could in fact be medium-sized countries, since very small countries would have been supplied by trade anyway, unless their trade barriers were extremely high.[14] Alternatively, a country may be particularly attractive as a destination of FDI due to the quality of its institutions (such as the rule of law, regulatory burden, corruption), the quality of its labor force, its tax treatment of multinationals, or its factor prices, all variables that are important even under the assumption of zero trade costs. These factors should dominate market size in the case of vertical FDI, in which the foreign affiliates produce for the world market.

Effects of RIA by a Source Country

- *Diversion/Dilution Effect:* FDI toward host countries can also be affected by RIA activity by a source country, whether or not the host is a partner of the source. If common membership in a regional integration agreement with the source country makes a host country relatively more attractive as a location for FDI (as it does in the vertical model), then such RIA will make non-members relatively less attractive. We call this effect *FDI diversion*, in analogy to Viner's (1950) classic trade diversion

[13] In addition, large countries may be relatively more attractive as the size of the domestic market works as an insurance against the possibility of a dismantling of the RIA.
[14] As an example, the auto industry in Uruguay was practically undeveloped, even during the years of import substitution industrialization.

concept: FDI from a source to non-partners may decline as the source enters a RIA.[15] [16]

Similar effects would be experienced by a member when the source country enlarges its RIA. Take, for instance, the potential effects on FDI flows from the US to Mexico once the FTAA is established. To the extent that the investment is there to exploit some locational advantages of Mexico, as the preferential access of Mexico to the US becomes *diluted* by the FTAA, part of the FDI may be relocated to other new members which may now offer an even better package. This is what we call *FDI dilution*, an effect closely associated with FDI diversion.

Empirical evaluation

Methodology

While there has been some empirical work on the link between integration and FDI, it has been mostly based on case studies, focusing on the European Union, on Mexico following NAFTA, or on Mercosur. As far as we know, there has been no systematic empirical evaluation of the effects of regional integration of FDI for a large sample of countries. The purpose of this section is to contribute to fill this void in the literature.

For this purpose, we use data on bilateral outward FDI stocks from the OECD *International Direct Investment Statistics.* The dataset covers FDI from 20 source countries, all of them from the OECD, to 60 host countries, from 1982 through 1998. One shortcoming of this data is that it does not cover FDI between developing countries. Yet,

[15] As in Viner's trade diversion (see box on the subject in chapter 1), the formation of a RIA may divert FDI from the most efficient location to a partner. For example, a US firm may locate in Mexico, following NAFTA, an the production of an intermediate input it may have otherwise located in Costa Rica, in the absence of the preferential access enjoyed by Mexico. In Mexico, this "trade diversion" effect will be combined with all other effects of common membership with the source country. What we call trade diversion in this paper is the loss suffered by Costa Rica, as well as other countries, as a result of the creation of NAFTA.

it is the most complete source available for bilateral FDI, which is a key ingredient to study the effects of integration on foreign investment.

Our empirical strategy is based on the gravity model, a standard specification in the empirical literature on the determinants of bilateral trade, which has also been recently used in the analysis of FDI location.[17] In its simplest formulation, it states that bilateral trade flows (in our case bilateral FDI stocks) depend positively on the product of the GDPs of both economies and negatively on the distance between them. Typical variables added to the simplest gravity specification in the trade literature include GDP per capita, as well as dummies indicating whether the two countries share a common border, a common language, past colonial links, etc.

In this paper, in line with our specific focus on the dynamic effect of the creation of RIAs, we will use a modified version of the standard gravity model that abstracts from most country and pair-specific aspects usually addressed in previous work. Thus time-invariant pair-specific variables such as distance, borders, common language, or colonial links will be subsumed in country pair fixed effects, in order to isolate the dynamic effects, and leave out the cross-sectional variation. We believe this is the cleanest possible way to address the impact of regional integration agreements on FDI.[18] In addition, we include source and host nominal GDP to control for size, and time fixed effects to control for the spectacular increase in FDI over time. Finally, we augment the traditional gravity equation with a number of variables associated with the effects of regional integration discussed above.

The first of regional integration variable in our baseline specification is *Same FTA*, a dummy that takes a value of 1 when the source and the host countries belong to the same Free Trade Area. In order to construct this variable, we used the description of existing

[16] Another example of investment diversion is found in the European Union: see Baldwin, Forslid, and Haaland (1999).
[17] See Eaton and Tamura (1994), Frankel and Wei (1997), Wei (1997, 2000), Blonigen and Davis (2000), Stein and Daude (2001a and 2001b) and Levy Yeyati, Panizza and Stein (2001).

regional trade agreements included in Frankel *et al*. (1997) (see Table 1A in Appendix).[19] This variable captures a combination of channels: tariff-jumping, international vertical integration, and the potential effect of investment provisions on FDI.[20]

A second integration variable we use is *Extended Market Host*, which captures the extended market effect discussed in the previous section. This variable is constructed as the log of the joint GDP of all the countries to which the host has tariff-free access due to common membership in a FTA (we include the host's own GDP as well). Following the previous discussion, we expect the coefficient of *Extended Market Host* to be positive, regardless of the motive for FDI. As an alternative to this variable, we also used a dummy that takes a value of 1 when the host country has FTA partners other than the source country.

A third integration variable is *Extended Market Source*. Similarly to *Extended Market Host*, it is measured as the log of the joint GDP of the source country plus all the countries that are FTA partners of the source country. This variable captures the FDI diversion/dilution effects, and we expect its coefficient to have a negative sign, suggesting that FDI to a host country diminishes when firms in the source country have other FTA partners in which to locate their investments. [21]

Hence, our basic specification is as follows:

$$Log\,(1+FDI_{ijt}) = a + b_1\, lGDP\, host_{ijt} + b_2\, lGDP\, source_{ijt} + g\, samefta_{ijt} + \\ + d_1\, EM\, host_{ijt} + d_2\, EM\, source_{ijt} + f D_{ij} + j Y_t + e_{ijt} \qquad (1)$$

[18] To a certain extent, the inclusion of the country pair dummies addresses potential endogeneity problems, which would arise if countries select their RIA partners on the basis of the multinational activity between them.

[19] We did not include as FTAs country pairs that have preferential trade agreements, in which trade barriers among members are reduced but not eliminated. Countries that are part of a customs union are coded as members of the same FTA.

[20] It would have been nice to include an index of depth of investment provisions within different FTAs in order to separate the effect of investment provisions on FDI. To our knowledge, however, such a measure does not exist. Since all our RIAs involving countries in the North contain some investment provisions, a simple dummy variable would not be helpful in identifying these effects.

[21] Similar results are obtained with a dummy that takes a value of 1 when the source country has FTA partners other than the host. A dummy like this one was used by Frankel *et al.* (1997) to study trade diversion.

where FDI_{ij} is the stock of foreign investment of country i in country j, *lGDP* is the log of GDP, *EM host* and *EM source* stand for Extended Market of the host and source countries, D_{ij} is country pair fixed effect, Y_t is the time fixed effect, and $?_{ij}$ is the error term.

A few methodological points are in order. We use a double log specification, which is standard, and has typically shown the best adjustment to the data in the empirical trade literature using the gravity model. There is, however, a problem in taking logs of our dependent variable. Our dataset includes a large number of observations where FDI stocks are zero (more than 60 percent of the sample), which would be dropped by taking logs. The problem of the zero variables is typical in gravity equations, and it has been dealt with in different ways.

Some authors (see for example Rose, 2000), simply exclude the observations in which the dependent variable takes a value of zero, for which the log does not exist. A problem with this approach is that those observations do convey important information for the problem at hand (it could be that zero observations tend to occur between countries that do not belong to the same FTA, for example). Given the importance of zero observations in our sample, this strategy could lead to a serious estimation bias.

Eichengreen and Irwin (1995, 1997) have proposed a simple transformation to deal with the zeros problem: work with log (1 + trade), instead of the log of trade. This has the advantage of simplicity, and the coefficients can be interpreted as elasticities, when the values of trade tend to be large, since in this case log (1 + trade) is approximately equal to log (trade). In turn, they scale up the coefficients obtained from the OLS by a factor equal to the ratio between the total number of observations and the number of non-zero observations.[22] A disadvantage of this approach is that it is somewhat ad hoc.[23] Another

[22] This procedure has been shown to approximate quite well a Tobit regression (Greene, 1980).
[23] Notice that any transformation of the type *LFDI* = log (*x* + *FDI*) with *x* > 0 would do the trick. But *x* = 1 is a natural choice because it yields a fixed point at zero, i.e., log (1+*x*) = *x* at *x* = 0. A different version of

approach has been to use Tobit instead of OLS, which can be justified either by assuming that zero values are due to the presence of fixed costs of investing abroad, or that stocks below a certain threshold value are incorrectly recorded as zeros. While in principle this approach is less ad hoc, its results can no longer be interpreted in terms of elasticities and estimation of the magnitude of the effect becomes less straightforward. One practical way to proceed in this case is to assess the sensitivity of the main results to alternative methodologies. Thus, while we chose as our benchmark a country-pair fixed effect model using the transformation proposed by Eichengreen and Irwin, for the sake of comparison we present below some results using alternative estimation procedures.

To the basic specification described in (1), we add controls for non-RIA related pair and host-specific factors that affect the impact of RIAs on FDI. Among the fist group, we include source-host difference in capital per worker, to proxy for relative factor endowment, and distance and bilateral trade, to control for the potential complementarities of FDI and trade.[24] Given the presumably positive effect of an RIA on bilateral trade, a natural question arises as to what extent the trade effect underlies the impact on FDI, whatever its sign. On the other hand, FDI-trade complementarity provides an additional robustness check to our results, as it would be consistent with a positive RIA-FDI link. Among the second group, we include the inflation rate, to proxy for the investment environment, an index of cumulative privatization, which may have induced large and concentrated capital inflows, and trade openness.

In addition, we add different measures of a *host attractiveness* that captures individual countries' propensity to attract FDI, which we use to test for redistributive effects within an RIA. This propensity is computed from our baseline regression replacing pair dummies by host and source dummies, and bilateral controls standard in extended gravity models (distance, common language, border, and common colonial background). The coefficients of each of the host dummies provide a measure of time-invariant country-

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this approach, used by Eaton and Tamura (1994) and Wei (2000), uses as dependent variable the log of (a + FDI), and estimates the value of a.

specific factors influencing FDI inflows. These coefficients, recovered from the OLS regression, are then used as our measure of absolute attractiveness. A measure of relative attractiveness is computed from them by comparing members of the same RIA.

Empirical Results

Before presenting the main empirical results regarding the effects of RIA on bilateral FDI stocks, we discuss briefly the effects of the presence of zero values of FDI in the sample and compare the estimated impact of RIAs (in particular our same FTA variable) using different methodologies. Next, we investigate the possible existence of FDI diversion and the extended market effect. Finally, we focus on other factors, such as differences in factor proportions, trade openness and FDI attractiveness, which may affect the impact of our integration variables on the bilateral stocks of FDI.

Nearly two-thirds of our observations have a zero value for the bilateral stock of FDI. Using our baseline specification, the regressions in Table 1 illustrate how different methodologies for dealing with this problem affect the results. In the first column of Table 1, we estimate equation (1) using as dependent variable the log of FDI. As a result, all zeros are discarded, reducing the sample to 6,768 observations. The estimated effect of a common FTA membership on the bilateral FDI stock is positive and significant. Column 2 reports a similar regression, this time using as dependent variable the transformation suggested the log of (1 + FDI). To make the results comparable with those of the first column, we restrict the sample to include only observations with strictly positive values for our dependent variable. The results are quite similar to those of the first regression. The point estimate for same FTA falls to 0.18 from 0.20. Hence, the transformation does not affect the results in any noticeable way.

Next, we rerun the same equation for the whole sample. As can be seen, the inclusion of

[24] Complementarities between FDI and trade have been found in the literature for the case of vertically integrated multinationals for which FDI is associated with larger trade flows of intermediate goods (Brainard and Riker, 1997, Head and Ries, 2001, and Blonigen 2001).

zero observations drives up the same FTA coefficient to 0.77, confirming our concern that ignoring these observations might bias the results considerably. Indeed, the exclusion of zero observations introduces an important downward bias in the estimation of the effect of our variable of interest: Since the overall effect of a FTA is positive, it is only natural that individual pairs are more likely to have had zero FDI during periods in which they did not share common membership in a FTA. Moreover, the inclusion of zeros inverts the sign of the effect of expansions in the source market, which are now negatively and significantly correlated with FDI, in line with our priors about the diverting effects of the source country's joining a RIA to which the host does not belong. As expected, the FTA effect changes significantly when we replace pair dummies by a set of source and host fixed effects and bilateral controls standard in gravity models for trade (column 4). Pair effects capture the correlation between RIAs and bilateral FDI for those pairs that share a FTA throughout the period, so that in column 3 the same FTA dummy only reflects the impact of joining a FTA. In contrast, in column 4, the same FTA dummy also captures the difference between those country pairs that share a FTA and those that do not. As it turns out, the impact of the same FTA variable is noticeably stronger when we isolate the dynamic effect of joining a FTA, as we do in column 3. Rerunning the regression with host and source country effects using a Tobit model (column 5) produces estimates of the FTA effect which are comparable to (albeit smaller than) those obtained in column 4. In the rest of the paper, we rely on the model of regression 3 as our baseline specification.[25]

Table 2 reports the basic tests of the hypothesis outlined in the previous section, reproducing in column 1 the results of our baseline regression for ease of comparison. They indicate that joining a FTA, on average, more than doubles the bilateral FDI between its members. [26] The positive effect suggests that any potential loss of FDI due to the tariff-jumping argument is more than offset by other effects that operate in the

[25] One note of caution is related to the fact that, if we scale up the coefficients in regressions 3 and 4 by a factor of 18,308/6,768, as suggested by Greene (1980), we obtain a same FTA coefficient of nearly 2, which appears to be unrealistically large and, from a simple comparison between OLS and Tobit estimates of the same specification, unwarranted. While the paper's main focus is on the qualitative results, the reader has to bear in mind that the quantitative effects mentioned for illustrative purposes should be taken as lower bound estimates.

[26] The implied effect of common FTA membership is calculated as exp (0.77) – 1 = 1.16, or 116%.

opposite direction.

This result is consistent with the signs we obtain for the extended market effect: A larger extended market of the source country diverts investment toward the members of that extended market. [27] More precisely, the doubling of the extended market of the source leads to a decline of nearly 27 percent in the average FDI stock originating in this country. Conversely, the size of the extended market of the host country has a positive effect on the bilateral FDI stock attracted from the source. In turn, a 100 percent increase in the extended market of the host is associated with a 6 percent increase in the domestic FDI stock.[28]

While the size of the estimated effects for the host extended market may seem small, it should be considered that changes in the extended market tend to be large rather than marginal. For example, when Mexico entered NAFTA its extended market increased by a factor of 18! This change would be associated with an increase in FDI from outside countries of nearly 100 percent.[29]

In Table 2 we explore some additional factors that may be important in explaining the expected effect of FTAs on FDI. We first add a measure of the cumulative value of privatized assets. As expected, privatizations are correlated with the stock of FDI, although their inclusion does not alter the results for our variables of interest. The same can be said of the inflation rate, which itself fails to be significant, in a result possibly due to the long-run nature of the investment plans underpinning the evolution of FDI.

Table 3 explores host and pair specific characteristics that may influence the intensity of the FTA effect, as well as shed some light on its nature (the baseline results are

[27] The reader should bear in mind that the average market size of host and source are already captured by the pair dummies, while the increase over time in FDI is captured by the time effects

[28] Alternatively, we tested a dummy that equals one if the source country is a member of an FTA to which the host country does not belong. As expected, we find that FDI from this source to non-FTA members declines, again indicating the existence of FDI diversion. Similarly, a dummy that equals one if the host country is a member of an FTA that does not include the source is associated with an increase in bilateral FDI: larger home markets increases the country's attractiveness as a location for FDI.

[29] 1700%*0.060 = 102%

reproduced for ease of comparison). In column 2 we introduce the openness of the host country, measured as the ratio of trade to GDP. If FDI tends to be of the vertical or "preference for variety" types, rather than the horizontal type, the impact of an FTA on FDI should be larger when the economy is more open, since in closed economies FDI tends to be of the horizontal, tariff-jumping type. The results appear to confirm these views. While the estimated effect of the same FTA is nearly the same as in the baseline estimation, the interaction with the same FTA dummy is positive and significant: More open economies attract proportionally more FDI when they join an FTA, contradicting the tariff-jumping hypothesis, and lending support to the vertical / preference for variety story.

While the previous result is in line with the evidence supporting FDI-trade complementarity, controlling for bilateral trade points in the same direction. Not only does FDI increase with bilateral trade but also the positive effect of an agreement on FDI is a positive function of the intensity of trade links. As shown in column 3, trade appears to be positively correlated with FDI, confirming our interpretation of the previous findings, and to increase the gains in terms of FDI associated with a RIA. The results are once again confirmed when we use bilateral distance as a proxy for trade in the interaction term, to reduce potential endogeneity problems (column 4).[30]

Next, we interact the same FTA dummy with the source-host difference in capital per worker as a proxy for relative factor endowments. Our priors here are not straightforward. According to the standard models of vertical and horizontal FDI, one should expect that the more diverse the level of relative factor endowments of a pair of countries, the more vertical the nature of FDI between the two should be. As vertical FDI increases—but horizontal FDI falls— with integration, standard theory would predict the positive effects of FDI to be larger for more dissimilar countries pairs (in which case the coefficient for the interaction term should be positive). However, as we argued at the beginning of the paper, FDI between developed countries is not purely horizontal. It also involves the production of different varieties in different countries, a form of FDI that is

[30] Bilateral distance alone is not included in the regression due to the presence of pair effects.

complementary with trade. Furthermore, in the case of North-South country pairs, FDI is not purely vertical. It more likely involves a mixture of horizontal FDI toward countries with high protection, and vertical FDI toward countries with low protection. This discussion suggests that the predicted sign of the interaction term is not as clear, and is in the end an empirical question. Column 5 shows that the coefficient for the interaction term is negative, suggesting that FTAs increase FDI among (similarly endowed) developed countries, but this increase becomes smaller as the disparity between the source and the host country increases, suggesting that North-South pairings may require a minimum degree of development (rather than a large supply of cheap unskilled labor) for the South host to profit from the partnership.[31]

Attractiveness: FDI as a beauty contest

The previous discussion highlighted the fact that while, on average, we should expect to see an increase in FDI as a consequence of a FTA, the impact might differ critically across the member countries. An alternative and relatively simple way to illustrate the possibility of winners and losers is to distinguish countries by their propensity to attract FDI. Intuitively, the most attractive countries within a FTA will receive the bulk of the increase in FDI. Moreover, given that a FTA allows firms to supply the extended market from a single location, FDI relocation may result in a net decline in FDI stocks in less FDI-friendly economies.

As mentioned in our previous discussion, redistributive effects within a regional bloc may depend on the characteristics that affect the relative attractiveness to foreign investors of the member countries. To measure a country's propensity to attract FDI, we estimate our baseline regression replacing pair dummies by source and host fixed effects plus a number of standard bilateral controls (Table 4). In this way, individual host effects should capture all those time-invariant factors (relative distance to sources, institutions,

[31] Other relative factor endowment proxies tested (relative land per worker, relative skilled labor) yielded similar results.

infrastructure, etc.) that make the country more attractive to FDI, or its *absolute attractiveness.*

Next, we re-estimated the baseline equation interacting the same FTA dummy with our measure of absolute attractiveness. As expected, the estimated effect is positive and significant (Table 4, column 2). Thus, countries that are more attractive to foreign investors may benefit more from entering an FTA than others. Indeed, there may be winners and losers in the integration process: Countries with very low attractiveness are more likely to experience a net decline in FDI stocks.[32] Interestingly, absolute attractiveness does not affect the impact of a market expansion, beyond what is captured by the same FTA interaction (column 3).

One could argue that being attractive is a relative concept: if an RIA increases the market readily accessible to their members, the key factor at the time of choosing a location should be the *relative attractiveness* within the region, or how a particular RIA member compares with the rest. Since there is no obvious way to measure this relative attractiveness, we test several alternative proxies. First, we construct a dummy that is one whenever a country displays the highest attractiveness index within a RIA.[33] In addition, for the particular case of the effect of the extended market, relative size may be crucial.[34] To address this point we include an additional dummy that takes a value of one if the country is the largest in its RIA.[35] Both the relative attractiveness and size interactions with the extended market at the host proved to be significant and positive, adding to the direct impact of a FTAs.

In sum, RIA and, in particular, the associated market enlargement hava a stronger positive effect on FDI in an FDI-friendly environment. More importantly, unattractive

[32] Note that a negative net effect is always possible whenever the negative impact of the increase in the source extended market dominates the combined positive impact through the FTA and host extended market effects.
[33] If the country belongs to two RIAs, it suffices to be the most attractive in one of them. Extensive robustness tests yielded comparable results using variations of these measures that included dropping no RIA countries, assigning a 1 to those that do not belong to an RIA and assigning a one only if the country is the most attractive in all of the RIA to which it belongs.
[34] See footnote 13 for an additional argument.

countries may lose FDI as a result of joining a RIA, due to stiffer competition from their more handsome partners.

Conclusions

In this paper we have shown that Regional Integration Agreements can have a very important effect on foreign direct investment. On average, common membership in an FTA with a source country nearly doubles the bilateral stocks of FDI. The increase in the size of the market associated with the formation of RIAs also implies important gains for the member countries. Our results show that FDI and trade are largely complementary. They also suggest that, for example, a move towards the Free Trade Area of the Americas would in principle bolster FDI flows to Latin America considerably.

However, the study study also indicates that FDI gains due to Regional Integration Agreements are unlikely to be distributed evenly. What determines whether a country wins or loses? Our results suggest that benefits will be smaller for countries that are closed to international trade, relatively less similar in their factor endowments (alternatively, in their production mix or their degree of development) and altogether unattractive to foreign investors. While not much can be done to change the country's relative endowments in the short run, the other two factors are certainly amenable to policy action.

Openness is important, since the formation of RIAs increases the incentives for multinational activity of the vertical variety (which takes advantage of differences in factor proportions), but reduces multinational activity of the horizontal variety, which is a substitute for trade. Not only will openness increase the impact of the RIA on FDI, but it can also more generally change the composition of FDI from horizontal to vertical. Since horizontal FDI sometimes occurs due to the existence of a distortion (high protection), and vertical FDI responds to comparative advantage, it could be argued that, regardless of

[35] Robustness checks as those described in footnote 31 did not change the results.

the impact of openness on total FDI, this shift will improve the benefits a country derives from multinational activity.[36]

It seems obvious that becoming more attractive to foreign investors (and improving the investment environment in general) can only be a positive development. What exactly can a country do to make itself more attractive to foreign investors is already the subject of some academic reaserch. The findings in this paper should make it a more urgent topic, as many of the benefits on which RIAs can easily turn up to be losses for countries insufficiently prepared to woo potential investors.

[36] Clearly, this is not the case for non-tradable goods where FDI can only occur in the horizontal form.

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Table 1

	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	OLS	OLS	TOBIT
	Ln(FDI)	Ln(FDI + 1) if FDI >0	Ln(FDI+1) All	Ln(FDI+1) All	Ln(FDI+1) All
GDP Host	0.6759	0.6636	0.8622	0.8499	-0.3208
	(11.360)**	(12.257)**	(14.676)**	(11.509)**	-1.617
GDP Source	0.9925	0.9199	-0.1362	-0.0905	0.6634
	(13.426)**	(13.676)**	(1.314)	(0.706)	(2.324)*
Extended Market Host	0.0688	0.0585	0.0601	0.0802	0.2281
	(4.121)**	(3.851)**	(2.668)**	(2.861)**	(3.765)**
Extended Market Source	0.0615	0.0239	-0.268	-0.2338	-0.1512
	(3.388)**	(1.445)	(11.756)**	(8.326)**	(2.314)*
Same FTA	0.2002	0.1775	0.7702	0.3204	0.2377
	(3.860)**	(3.761)**	(9.507)**	(4.898)**	(1.786)*
Distance				-0.7481	-1.7665
				(23.809)**	(27.239)**
Border				0.0552	-0.9969
				(0.550)	(5.248)**
Common Language				0.1389	1.4438
				(0.853)	(4.485)**
Colonial				0.6247	1.0356
				(8.519)**	(7.046)**
Constant	-42.3202	-38.6888	-9.218	-6.387	11.3974
	(17.196)**	(17.277)**	(2.900)**	(1.563)	(1.166)
Observations	6768	6768	18308	17957	17957
Number of pair	785	785	1140	-	-
Adjusted R-squared	0.4609	0.4595	0.1212	0.584	0.2699
test F Pair Effects	65.05**	69.69**	18.89**		-
test F Host and Source Effects				80.00**	52.89**
test F Time Effects	31.86**	32.76**	41.32**	26.38**	34.58**

Absolute values of t – statistics in parenthesis.
** significant at 1%, * significant at 5%.

Table 2

	(1)	(2)	(3)	(4)
GDP Host	0.8622	0.8796	0.8956	0.8969
	(14.676)**	(14.917)**	(12.931)**	(12.948)**
GDP Source	-0.1362	-0.1344	-0.2036	-0.2031
	(1.314)	(1.297)	(1.848)	(1.844)
Extended Market Host	0.0601	0.0502	0.0455	0.0428
	(2.668)**	(2.213)*	(1.900)	(1.774)
Extended Market Source	-0.268	-0.2705	-0.2642	-0.265
	(11.756)**	(11.860)**	(10.879)**	(10.906)**
Same FTA	0.7702	0.818	0.7695	0.7839
	(9.507)**	(9.945)**	(9.278)**	(9.305)**
Accumulated Priv +1		0.0208		0.0064
		(3.324)**		(0.977)
Inflation			0.0259	0.0245
			(1.546)	(1.460)
Constant	-9.218	-9.4488	-8.0073	-7.9763
	(2.900)**	(2.973)**	(2.312)*	(2.303)*
Observations	18308	18308	16739	16739
Number of pair	1140	1140	1100	1100
Adjusted R2	0.1212	0.121	0.0939	0.0937
test F Pair Effects	18.89**	18.91**	17.95**	17.92**
test F Time Effects	41.32**	36.45**	36.52**	33.94**

Absolute values of t – statistics in parenthesis.
** significant at 1%, * significant at 5%.

Table 3

	(1)	(2)	(3)	(4)	(5)
GDP Host	0.8622	0.8547	0.8665	0.8479	0.7667
	(14.676)**	(14.540)**	(12.409)**	(14.159)**	(8.744)**
GDP Source	-0.1362	-0.1379	-0.1682	-0.1794	-0.3632
	(1.314)	(1.331)	-1.53	(1.707)	(2.727)**
Extended Market Host	0.0601	0.0658	0.0447	0.0648	-0.0205
	(2.668)**	(2.913)**	-1.783	(2.832)**	(0.681)
Extended Market Source	-0.268	-0.2694	-0.2964	-0.2662	-0.2739
	(11.756)**	(11.817)**	(12.426)**	(11.519)**	(9.211)**
Same FTA	0.7702	0.1239	-2.0445	3.1689	1.1522
	(9.507)**	(0.563)	(7.150)**	(3.017)**	(9.021)**
Same FTA * Average Openness		0.0096			
		(3.161)**			
Trade			0.1194		
			(3.639)**		
Same FTA * Trade			0.4257		
			(10.535)**		
Same FTA * Distance				-0.3472	
				(2.285)*	
Same FTA * Average Difference in capital per worker					-0.78
					(4.186)**
Constant	-9.218	-9.0972	-7.8777	-7.8766	1.8284
	(2.900)**	(2.863)**	(2.265)*	(2.441)*	(0.428)
Effect of Same FTA (MIN)		0.319	-1.545	1.460	1.152
Effect of Same FTA (MEAN)		0.795	1.004	0.870	0.829
Effect of Same FTA (MAX)		1.447	3.072	0.442	-0.325
Observations	18308	18308	16341	17957	12343
Number of pair	1140	1140	1105	1104	740
Adjusted R2	0.1212	0.1221	0.1827	0.1027	0.0389
test F Pair Effects	18.89**	18.84**	16.23**	18.72**	18.04**
test F Time Effects	41.32**	18.04**	35.34**	40.97**	41.33**

Table 4

	Dependent variable : Stock of FDI				
Independent Variables	GDP Host	GDP Source	Ext Market Host	Ext Market Source	Same FTA
Coefficient	0.84979	-0.095	0.0803	-0.2334	0.3189
t statistic	(11.51**)	(-0.74)	(8.34)**	(2.86)**	(4.88)**
Independent Variable	Distance	Border	Colonial Links	Common Lang.	
Coefficient	-0.7468	0.0602	0.1463	0.6195	
t statistic	(23.78)**	(0.6)	(0.9)	(8.49)**	
	Host Effects		Source Country Effects		Year Effects
Test F	43.12**		195.75**		108.94**

	(1)	(2)	(3)	(4)	(5)
Ln(GDP Host)	0.8622	0.8552	0.8649	0.8421	0.8022
	(14.676)**	(14.543)**	(14.536)**	(14.316)**	(13.648)**
Ln(GDP Source)	-0.1362	-0.1314	-0.1311	-0.1335	-0.1328
	(1.314)	(1.268)	(1.265)	(1.289)	(1.286)
Extended Market Host	0.0601	0.0627	0.006	0.0266	0.0208
	(2.668)**	(2.784)**	(0.104)	(1.125)	(0.883)
Extended Market Source	-0.268	-0.2694	-0.2687	-0.2714	-0.2747
	(11.756)**	(11.814)**	(11.779)**	(11.909)**	(12.089)**
Same FTA	0.7702	2.0609	2.1351	1.9369	2.0558
	(9.507)**	(4.090)**	(4.197)**	(3.842)**	(4.089)**
Same FTA * Attractivennes		0.3411	0.3647	0.2954	0.3125
		(2.595)**	(2.736)**	(2.243)*	(2.380)*
Extended Market Host * Attractivenness			-0.0167		
			(1.068)		
Extended Market Host * Most Attractive				0.1749	0.2037
				(5.023)**	(5.848)**
Extended Market Host * Biggest					0.618
					(10.160)**
Constant	-9.218	-9.201	-9.498	-8.6671	-10.1947
	(2.900)**	(2.896)**	(2.978)**	(2.728)**	(3.215)**
Effect of Same FTA (MIN)		0.446	0.408	0.538	0.576
Effect of Same FTA (MEAN)		0.791	0.777	0.837	0.892
Effect of Same FTA (MAX)		1.407	1.436	1.370	1.457
Observations	18308	18308	18308	18308	18308
Number of pair	1140	1140	1140	1140	1140
Adjusted R2	0.1212	0.1245	0.0976	0.069	0.0418
test F Pair Effects	18.89**	18.73**	16.58**	18.51**	18.62**
test F Time Effects	41.32**	41.37**	41.43**	41.29**	38.8**

Absolute values of t – statistics in parenthesis. ** significant at 1%, * significant at 5%.

Table A.1 Free Trade Agreements

FTA	Creation	Members
European Union (EU)	1957	Austria (since 1995), Belgium, Denmark (since 1973), Finland (since 1995), France, Germany, Greece (since 1981), Ireland (since 1973), Italy, Luxembourg, Netherlands, Portugal (since 1986), Spain(since 1986), Sweden (since 1995), United Kingdom (since 1973)
European Free Trade Association (EFTA)	1960	Austria (until 1994), Denmark (until 1972), Finland (1986-1994), Iceland (since 1970), Liechtenstein (since 1991), Norway, Portugal (until 1985), Sweden (until 1994), Switzerland, United Kingdom (until 1972)
European Economic Area (EEA)	1994	All members of the European Union, Iceland, Liechtenstein, Norway
Central European Free Trade Area (CEFTA)	1992	Czech Republic, Hungary, Poland, Slovak Republic, Slovenia (since 1995)
North American Free Trade Agreement (NAFTA)	1989	Canada, USA, Mexico (since 1994)
Mercado Común del Sur (MERCOSUR)	1995	Argentina, Brazil, Paraguay, Uruguay
Andean Community (formerly Andean Pact)	1969	Bolivia, Colombia, Ecuador, Peru, Venezuela
Central American Common Market (CACM)	1959	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua
Group of Three	1994	Colombia, Mexico, Venezuela
Bolivia-Mexico FTA	1995	Bolivia, Mexico
Association of Southeast Asian Nations FTA (ASEAN)	1992	Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam (since 1995)
Australia-New Zealand Closer Economic Relations	1983	Australia, New Zealand
South African Custom Union	1910	Botswana, Lesotho, Namibia (since 1990), South Africa, Swaziland

Table A.2. Data Sources

Variable	Source
Privatizations	Chong, Alberto and Florencio López-de-Silanes (2002) "Privatization and Labor Force Restructuring Around the World." Manuscript Yale University (forthcoming NBER)
Inflation	International Monetary Fund. International Financial Statistics
FDI Stock	OECD. 2000. *International Direct Investment Statistics Yearbook*. Paris, France: Organisation for Economic Cooperation and Development.
Factor Endowments	Spilimbergo, Antonio, Juan Luis Londono, and Miguel Szekely (1999) "Income Distribution, Factor Endowments, and Trade Openness." Journal of Development Economics v59, n1 (June 1999): 77-101
Distance, Border, Common Language and Colonial Links	The Worldeconomic Factbook, CIA website www.cia.gov/cia/publications/factbook/index.html
GDP	World Development Indicators

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