

The Effects of Trading Blocs on U.S. Outward FDI Activity: The Role of Extended Market Size

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I use panel data of sales by the foreign subsidiaries of the U.S. MNCs to examine whether trading blocs create more or less FDI and the impacts on FDI of the extended market size created by forming blocs. By employing a region-fixed effects model, I find that countries forming trading blocs attract more FDI, particularly from non-member countries, but that FDI does not always increase with the market size of the blocs. As the market size increases, FDI increases only for large blocs. However, these findings are sensitive to model specifications. A policy implication is that a country considering forming or joining a trading bloc with a view to attract FDI may want to form a trading bloc with a country or countries with a large market size.

Keywords: Trading blocs, Multinational corporations, Proximity-concentration, Fixed effects model

JEL Classification: F15, F21, F23, C23

I. Introduction

Casual observation seems to indicate that trading blocs lead to more Foreign Direct Investment (FDI) into member countries. There is a natural logic behind this observation; a bigger market size via forming a trading bloc provides firms outside the bloc with more incentive to set up a plant inside for serving the local market rather than exporting. Hence, the purpose of this paper is to investigate whether or not the formation of trading blocs creates more FDI; and, more importantly, to assess the role of the extended market sizes of the trading blocs in attracting FDI, which has been the common reasoning behind

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the expectation of more FDI when forming a bloc.¹

A couple of theory models also support the positive role of the extended market size on FDI. Rowthorn (1992) shows in a two-country model that “the larger is the market, the more profitable is potential and the more likely is it that new plants will be established.” In addition, Motta and Norman (1996) argue using an oligopoly model that a decrease in the intra-regional tariffs of a trading bloc may induce firms outside the bloc to switch their regional market strategies from export to investment.

I use panel data of the outward activity of the U.S. Multinational Corporations (MNCs), collected by the Bureau of Economic Analysis (BEA), as a measure of FDI. As for empirical methodology, I employ a similar framework to what is used in Brainard (1997) for testing the “proximity-concentration” hypothesis. It states that firms not only desire to locate their plants close to markets in order to save trading costs such as transport costs and tariffs, but also want to locate their plants at one place to realize the economies of scale in production. This hypothesis still holds for firms facing the world where countries form a trading bloc. I use a fixed-effects model to control any unobservable factors that would affect not only FDI but also explanatory variables. Without addressing these unobservable effects, the estimation could result in biased effects of trading blocs.

I find that, although the results are sensitive to model specifications, countries forming trading blocs are likely to have more FDI, particularly from non-member countries, but that FDI does *not* always increase with the market sizes of the blocs. As the market sizes increase, FDI increases for large blocs, but not for small blocs. Hence, it can be inferred from this result that when a country is contemplating forming or joining a trading bloc to attract FDI, it may want to form a bloc with a country or countries with a large market size. Furthermore, this study finds that the U.S. MNCs tend to be more responsive to the official dates of entry into force of trading blocs than to the ending dates of transitional periods at which the trading blocs become fully effective.

In the following section, I review the related literature and point out the contribution of the paper. I describe the data in Section 3 and lay out the econometric model in Section 4. Then, Section 5 reports and discusses the estimation results. Concluding remarks are given in Section 6.

¹ *World Investment Report* (1998, p. 122) remarks that Increased market size - from national to regional or global - is in itself an efficiency-inducing determinant because it provides the demand dimension that gives rise to the possibility of exploiting economies of scale and scope in production and distribution.

II. Literature Review

This paper belongs to a body of literature on finding the determinants of FDI. Markusen and Maskus (2001) provide an overview of the empirical literature on the general-equilibrium approaches to MNCs, which are the primary sources of FDI. Brainard (1997) tests the proximity-concentration hypothesis and confirms that the hypothesis is supported in the data. However, these two studies do not discuss the effects of trading blocs on FDI.

There are a couple of case studies looking at the effects of specific trading blocs. Brenton *et al.* (1999) investigate the impact of the deepening integration between the European Community (EC) and Central and Eastern European Countries (CEECs)² on bilateral FDI inflow. They find that CEECs have, in general, succeeded in attracting FDI mainly from Europe. Waldkirch (2003) examines the effect of the North American Free Trade Agreement (NAFTA) on FDI in Mexico using time-series data. He finds that NAFTA has significantly induced FDI in Mexico mainly from her partners but a little from the rest of the world.

Yeyati *et al.* (2003) take a more general approach towards the issue covering a large sample of countries. They use the OECD *International Direct Investment Statistics*, which are aggregated by country and cover FDI from 20 OECD countries to 60 host countries from 1982 to 1998. Their main findings are that (i) a *common* FTA membership between the source and the host countries leads to an increase in the bilateral FDI stock; (ii) the extended market size of the *host* country via the FTA has a positive effect on the FDI from the *source* country; and (iii) the extended market size of the source country, when the source joining an FTA to which the host does not belong, has a negative effect on the FDI into the host country.

Related to the market size effects, Head and Mayer (2004) examine the effects of market potential on trade and investment. They develop a theoretical model of location choice based on Krugman (1992) and take the model to the data on Japanese investment in the European Union. They find that market potential partly explains firms' location choice but cannot explain away the entire empirical agglomeration effects in the economic geographic literature. However, their main interest does not lie in the formation of trading blocs.

This paper is distinguished from the literature in several aspects. First, instead of using data on FDI stocks, I measure FDI activity more directly by foreign

² Refer to Table 1 for the list of trading blocs and their member countries included in this study.

affiliates sales of the U.S. multinational firms.³ Second, it is an interesting finding that the total market size of trading blocs must reach some threshold levels for the relationship between the total market size of trading blocs and FDI to be positive. Third, by controlling region-fixed effects, this study addresses omitted variable bias, which is often prevailing in this avenue of the research, and it covers more trading blocs by including many bilateral FTAs between individual countries and between trading blocs and individual countries, which are excluded in Yeyati *et al.* (2003): see Table 1. Finally, this study distinguishes between the official dates of entry into force of the trade agreements and the effective dates of entry at which the transitional periods of the agreements end.

Table 1. The List of the Free Trade Agreements (FTAs)

Panel A: Regional Free Trade Agreements

FTAs	Member Countries	Entry Yr	Effective Yr
ASEAN Free Trade Area (AFTA)	Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand Vietnam	1992 1995	2002 2002
Andean Community	Bolivia, Colombia, Ecuador, Peru, Venezuela	1969	1993
Caribbean Community (CARICOM)	Antigua & Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Trinidad & Tobago, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Surinam	1973	1982
Central American Common Market (CACM)	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua	1961	1977
Closer Economic Relations (CER)	Australia, New Zealand	1983	1989
Common Market for Eastern and Southern Africa	Egypt, Angola, Burundi, Comoros, Congo, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Sudan, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe	1994	2005
North American FTA (NAFTA)	Canada, Mexico, the U.S.	1994	1998-2008*
Southern Cone Common Market (MERCOSUR)	Argentina, Brazil, Paraguay, Uruguay	1991	1995

Note: * Depending on products, the transitional periods vary for NAFTA. Refer to Panel C for the EC and the EFTA.

³ The sales data rather than FDI stock data are more relevant for multinational activity since the latter often suffer from measurement problems with evaluating changes in currency values and asset values occurring after initial investments.

Table 1. Continued

Panel B: Bilateral Free Trade Agreements

Country	Members in Bilateral FTAs	Entry Yr	Effective Yr
Canada	Israel	1997	
	Chile	1997	2014
Chile	Canada	1997	
	Mexico	1999	
Israel	EC	1975	1989
	The U.S.	1985	1995
	EFTA	1993	
	Canada	1997	
	Czech, Slovak	1997	1999
	Turkey	1997	2000
	Hungary, Poland, Slovenia	1998	2001
Mexico*	Chile	1999	
Turkey	EFTA	1991	1996
	EC (customs union)	1996	2002
	Israel	1997	2000
	Estonia	1998	
	Czech, Hungary, Lithuania, Slovak	1998	2001
	Romania	1998	2002
	Bulgaria	1999	2002

Note: * Mexico has other FTAs that have not been reported to the WTO, which are omitted in this study. The Group of Three was formed in 1994 among Colombia, Mexico, and Venezuela. Also, Mexico made a bilateral FTA with Bolivia in 1995.

Panel C: The Evolution of the EC and the EFTA

FTAs	Member Countries	Entry Yr	Effective Yr
European Community (EC)	Belgium, Netherlands, Luxembourg, France, Germany, Italy	1958	
	EC - Austria	1972	
	EC - Iceland, Norway, Sweden, Switzerland, Liechtenstein	1973	
	Denmark, Ireland, the U.K. (accession)	1973	
	EC - Finland	1974	
	EC - Israel	1975	1989
	Greece (accession)	1981	
	Spain, Portugal (accession)	1986	
	EC - Czech and Slovak Federal Republic, Hungary, Poland	1992	2002-3
	EC - Bulgaria, Romania	1993	2003-4
	Austria, Finland, Sweden (accession)	1995	
	EC - Estonia	1995	
	EC - Lithuania	1995	2002
	Customs unions with Turkey	1996	2002
EC - Slovenia	1997	2003	
European Free Trade Association (EFTA)*	Austria, Denmark, Norway, Portugal, Sweden, Switzerland, the U.K.	1960	
	Iceland (accession)	1970	
	Finland (accession)	1986	
	Liechtenstein (accession)	1991	1996
	EFTA - Turkey	1992	2003
	EFTA - Czech, Slovak	1992	
	EFTA - Israel	1993	2002-4
	EFTA - Bulgaria, Hungary, Poland, Romania	1993	
	EFTA - Slovenia	1995	2002
	EFTA - Estonia	1996	
EFTA - Lithuania	1996	2001	
European Economic Area (EEA)**	EC - EFTA	1994	

Note: * The following countries left the EFTA subsequently: Denmark, the U.K. in 1971; Portugal in 1985; Austria, Finland, Sweden in 1986. ** Since all member countries in the EEA are de facto connected by many earlier bilateral FTAs, the formation of the EEA does not really matter for my purpose.

III. Data

As a measure of FDI, I use sales by the foreign subsidiaries of the U.S. MNCs. For this, I use the BEA Benchmark surveys in 1982, 1989, 1994, and 1999. Although the BEA reports the MNC's activities annually, the data in the Benchmark surveys are the most comprehensive in terms of the coverage of the MNCs in survey. The BEA conducts the Benchmark surveys every five years. For the between years, the BEA surveys smaller number of firms than in the Benchmark surveys and extrapolates from the sample surveys. However, the annual reports are not disaggregated enough with regard to industry. Also, the classification of industry has changed from the Standard Industrial Classification (SIC) to the North American Industry Classification System (NAICS) since 1999, whence I end the sample in 1999.⁴ I use panel data of "Sales by Affiliates, Country by Industry." The data have six manufacturing industries, which are categorized by the two-digit SIC-based classification. Refer to Table 2 for the lists of countries and industries.⁵

While Brainard (1997) also uses the same data source, there are some differences. She uses a cross-section of 1989, whereas I have three additional years. Since she can access the confidential dataset of the BEA, her data are more disaggregated in industry codes; she has 63 industries and 27 host countries.

For the sample countries, I construct two dummy variables for FTAs based on the regional trade agreements notified to the WTO (WTO, 1995 and 2000): see Table 1 for the list of FTAs covered in this study. One is based on the official dates of entry into force of the agreements, while the other is based on the end of any transitional period for implementation of the agreements. For example, the bilateral FTA between Canada and Chile officially begins in 1997, but it is not fully effective until its transitional period ends, which is 2014. In short, I call the former the entry year, and the latter the effective year, and the dummy *FTA* corresponds to the entry year, and the dummy *effFTA* to the effective year.

In constructing the FTA dummies, I do not distinguish FTAs from customs unions.⁶ Under FTAs each member country maintains its own external tariffs

⁴ I thank Mataloni Raymond at the BEA for providing the SIC-based sales data for 1999.

⁵ Some sales data are zero. For a log transformation in the estimation, I replace them with one before taking logs. Further, for the privacy of individual firms in the survey the BEA suppresses some sales data. I dropped these cases from the sample.

⁶ FTAs are the most dominant form of trading blocs. According to the WTO (2002, p.40), FTAs

Table 2. The List of Industries and Countries

Industries	
Two-digit SIC Codes	Industries
20	Foods and kindred products
28	Chemicals and allied products
33, 34	Primary and fabricated metals
35	Machinery, except electrical
36	Electric and electronic equipment
37	Transportation equipment

Countries	
Regions	Countries
Canada	Canada
Europe	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the U.K.
South America	Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Venezuela
Central America	Costa Rica, Honduras, Mexico, Panama
Western Hemisphere	Barbados, Dominican Republic, Jamaica, Trinidad & Tobago
Africa	Egypt, Nigeria, South Africa
Middle East	Israel
Asia and Pacific	Australia, China, Hong Kong, India, Indonesia, Japan, Rep. of Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan, Thailand

Note: The categorizations of the industries and regions are based on the BEA table for “Sales by Affiliates, Country by Industry.”

against non-members, while under customs unions all member countries have common external tariffs. In principle, this difference should not matter for the decisions of the U.S. firms as long as the member countries have no internal tariffs. I include only FTAs that have reciprocity and exclude Preferential Trade Agreements, which entail weaker trade liberalization than FTAs.⁷

It is worthwhile to mention the evolution of the FTAs involving European

account for almost 90% of all trading blocs.

⁷ For example, the South Pacific Regional Trade and Economic Cooperation Agreement (SPARTECA) is composed of Australia, New Zealand, and many small South Pacific islands. Australia and New Zealand provide the small members with preferential concessions, which does not necessarily happen in the other direction.

countries. Most Western European countries were, *de facto*, under many bilateral free trade agreements by the mid 1970's: see Panel C in Table 1. Although they acceded to the EC later in 1996, Austria, Finland, and Sweden already made bilateral agreements with the EC over 1972-1974. Hence, the FTA dummies for the most European countries are one throughout the sample periods.⁸

I construct a variable for a market size of the FTAs (*MKT*). It is based on the entry years of the FTAs and is measured by the sum of the real GDPs (in millions) of all the member countries *net* of the GDP of the host country.⁹ The data on the real GDP are drawn from Penn World Table 5.1 (2002). For the data on the U.S. bilateral exports and transport costs, I use the Feenstra international database, U.S. Imports, Exports, and Tariff Data, 1989-2001. The transport costs are measured as the ratio of the U.S. import charges to the U.S. customs import value for foreign products.¹⁰ Since the dataset is available with the four-digit level of SIC-based industries, I aggregate to the two-digit level to be compatible with the sales data by a simple average.

The plant scale economies represent the costs of operating a plant, while the firm scale economies represent the costs of developing blueprints or R&D. The former indicates economies of scale at a plant level, but the latter implies MNC's firm-wide economies of scale. Following Brainard (1997), I use the ratio of the number of production workers to the number of plants in each industry as a proxy for plant scale economies. Similarly, I use the ratio of the number of non-production workers to the number of firms for each industry as a proxy for firm scale economies. I obtain these numbers from *Economic Census* (1992; 1997).

The summary statistics on each variable are provided in Table 3. Average sales by the foreign subsidiaries of the U.S. MNCs are \$2,087 million, while average U.S. exports are \$977 million. Average rate of transport costs is 5.9 percent with its maximum being 71 percent. Firm and plant scale economies are 32 and 53 on average, respectively. GDPs of the host countries are \$378 billion on average. Average market size of the FTAs is \$2,682 billion. Israel has the biggest market size of FTAs (\$19,868 billion), because it is the only

⁸ The FTA dummy stays at one even when a country changes a trading bloc from one to the other, e.g., Austria. However, I reflect this change of the trading blocs in terms of the market size of the blocs. Hence, as Austria changes from the EFTA to the EC, its extended market size changes accordingly.

⁹ Yeyati *et al.* (2003) consider the gross market size instead of the net market size.

¹⁰ This measure is also used in Brainard (1997) and Yeaple (2003).

country that has made agreements with both the EC and the U.S. as well as many other bilateral agreements. The smallest FTA is the Caribbean Community (CARICOM), whose market size in 1999 is \$36 billion. On average, 64 percent of the sample countries belongs to one or more FTAs. However, based upon the effective years of the FTAs, just about half belong to FTAs.

Table 3. The Summary Statistics

Variable	Mean	Std Deviation	Minimum	Maximum	Obs
Sales, \$million	2,087.05	4,972.86	1	71,546	1,108
Exports, \$mil	977.03	2,496.62	1.76	39,331.9	1,463
Sales Ratio	0.44	0.32	0	0.99	1,108
TRANS, %	5.90	4.66	0.02	70.52	1,456
FSCALE	32.35	16.54	8.98	65.17	1,254
PSCALE	53.10	27.10	21.79	117.12	1,254
HostGDP, \$mil	378,154.95	610,586.77	3,456.10	4,354,174.2	1,358
MKT, \$mil	2,681,571.13	3,757,047.91	1	19,868,120.9	1,358
FTA	0.64	0.48	0	1	1,442
effFTA	0.51	0.50	0	1	1,442

Note: See the text for the definitions for the variables. All values are before taking logs.

IV. Empirical Methodology

For empirical methodology, I modify Brainard’s (1997) framework which is used for testing firms plant-location decisions. The empirical model is given as follows:¹¹

$$\frac{SALES_{ijt}}{SALES_{ijt} + EXP_{ijt}} = Const + \beta_1 TRANS_{ijt} + \beta_2 FSCALE_{it} + \beta_3 PSCALE_{it} + \beta_4 HostGDP_{jt} + \beta_5 FTA_{jt} + \eta_j + \xi_t + v_{ijt}, \tag{1}$$

¹¹ This model is known as a fixed-effects model because the model treats η_j and ξ_t as a fixed but unknown constant differing across regions (countries) and times, respectively.

where β_s are unknown parameters, $SALES_{ijt}$ is the sales of the affiliates at country j of the U.S. MNCs in industry i at time t , EXP_{ijt} is the exports to country j of all the U.S. firms in industry i at time t , and $TRANS_{ijt}$ is the transport costs of products in industry i from the U.S. to country j at time t . $FSCALE_{it}$ and $PSCALE_{it}$ are the measure for the firm scale economies and the plant scale economies in industry i at time t , respectively. $HostGDP_{jt}$ is the GDP of the host country j at time t , FTA_{jt} is the dummy variable, which is one when country j belongs to any FTAs at time t but zero otherwise, η_j is a region- or country-fixed effect, ξ_t is a time-fixed effect, and v_{ijt} is an independently identically distributed random variable with mean zero and variance σ_v^2 . All independent variables are **in logs** except the dummy variable.

The dependent variable is **the log** of the ratio of foreign affiliates sales of the U.S. MNCs to total U.S. sales, which are composed of the MNCs' sales and total exports of the U.S. firms to country j in industry i at time t . I call the dependent variable the sales ratio hereafter. The sales ratio represents the decision of firms to undertake FDI as opposed to export as means of penetrating foreign markets. The motivation for using a ratio instead of a value of sales is to test the "proximity-concentration" hypothesis in the context of trading blocs. In other words, when countries form a trading bloc, a bigger market size leads firms outside the trading bloc to switch from exporting to undertaking FDI, as it allows them to recoup sunk costs in setting up plants inside the bloc and they can avoid paying tariffs and transport costs by undertaking FDI.¹²

I estimate equation (1) using Ordinary Least-Squares (OLS) with time-fixed effects and region-fixed effects or country-fixed effects. The "proximity-concentration" hypothesis suggests positive signs for $TRANS$ and $FSCALE$ but a negative sign for $PSCALE$. As the host market is close to the home country, a firm is less likely to serve the host market by investing. As the firm (plant) scale economies increase, a firm has more (less) incentive to set up a plant abroad to serve the local market. Because a market size is an important factor to consider when a firm decides to invest,¹³ I expect a positive sign for $HostGDP$.

Depending on whether FDI comes from a member or non-member country

¹² The "proximity-concentration" hypothesis is relevant for horizontal FDI rather than for vertical FDI.

¹³ The Economist (Feb. 17th 2001, p. 104) points out that a market size matters for the location of FDI, based on an annual survey by A.K. Kearney, a management-consulting firm.

and whether it is horizontal or vertical, the effects of trading blocs can differ.^{14,15} First, consider FDI from a non-member country. If FDI is horizontal, FDI is likely to increase because of market expansion. However, the effects of FTAs would be nil, if FDI is vertical. Therefore, FDI from FTA-outsider is expected to increase.¹⁶ Now consider FDI from a member-country. If FDI is horizontal, FDI would decrease because of less motivation of ‘tariff-jumping’ as FTAs lower trade costs. If FDI is vertical, FDI would increase as member countries enjoy no tariffs on imports of intermediate goods and re-exports of final goods between them. Hence, FDI from FTA-insider is predicted to be ambiguous. Finally, if combining FDI from FTA-insider *and* FDI from outsider all together, the effects of FTAs are expected to be ambiguous again.

Having noted this, I cannot predict a sign for the FTA dummy *a priori*, when I have a sample that consists of FDI from both member and non-member countries. However, in the case of FDI from non-members, a positive sign can be predicted for the FTA dummy.

I examine the role of the extended market size of trading blocs with several different specifications. For example,

$$\frac{SALES_{ijt}}{SALES_{ijt} + EXP_{ijt}} = Const + \beta_1 TRANS_{ijt} + \beta_2 FSCALE_{it} + \beta_3 PSCALE_{it} + \beta_4 HostGDP_{jt} + \beta_5 FTA_{jt} + \beta_6 MKT_{jt} + \beta_7 MKT_{jt}^2 + \eta_j + \xi_t + v_{ijt} \tag{2}$$

where MKT_{jt} is the market size of the FTAs if country j belongs to any FTAs at time t .

The equation (2) includes the market size of the FTA (MKT), which is the extended market size. MKT is introduced to directly measure the effects of market expansion on FDI due to FTAs. Thus, MKT implies that when a country forms a trading bloc, it expands its market place beyond its own market to include the markets of its member countries. In equation (2), I choose a quadratic

¹⁴ I appreciate a referee for pointing this out.

¹⁵ FDI that is aimed at serving foreign markets is called horizontal investment. On the other hand, vertical investment is aimed at producing the goods taking advantage of cheaper inputs in the host country and exporting the goods back to the source country or to a third country.

¹⁶ Note that the current study cannot distinguish horizontal and vertical FDI. Thus, I can only tell the effects of FTAs on FDI in terms of a status of FTA membership.

functional form for the market sizes of the FTAs in order to capture non-linear marginal effects on FDI, if any.¹⁷

V. Results and Discussion

1. Estimation on the Effects of Trading Blocs

Column (1) in Table 4 confirms the “proximity-concentration” hypothesis: the coefficients for transport costs and firm scale economies are positive but the coefficient of plant scale economies is negative. Consistent with past research, the market size of a host country is an important determinant for the sales of MNCs. The FTA dummy has a positive coefficient (0.9227). It implies that the formation of trading bloc, on average, is likely to lead to an increase

Table 4. The Effects of Trading Blocs on FDI: Basic Models

	(1)	(2)	(3)	(4)	(5)	(6)
<i>TRANS</i>	0.0820 (0.0605)**	0.1509 (0.0662)**	0.2532 (0.0767)***	0.3788 (0.0633)***	0.1037 (0.0609)*	0.1581 (0.0664)**
<i>FSCALE</i>	0.7077 (0.1533)***	0.7081 (0.1502)***	0.7109 (0.1571)***	0.8015 (0.1300)***	0.7148 (0.1543)***	0.7096 (0.1507)***
<i>PSCALE</i>	-1.0699 (0.1843)***	-1.0273 (0.1800)***	-1.0092 (0.1880)***	-1.0404 (0.1555)***	-1.0771 (0.1854)***	-1.0264 (0.0472)***
<i>HostGDP</i>	0.4712 (0.0366)***	0.2997 (0.0474)***	0.2235 (0.0536)***	1.6012 (0.3772)***	0.4630 (0.0367)***	0.2841 (0.0472)***
<i>FTA</i>	0.9227 (0.1206)***	0.5335 (0.1530)***	0.5750 (0.1590)***	-0.1706 (0.2004)		
<i>effFTA</i>					0.7596 (0.1103)***	0.3934 (0.1605)***
Fixed Effects	No	Region	Region	Country	No	Region
Obs. Number	907	907	845	907	907	907
R ²	0.2085	0.2558	0.2568	0.4766	0.1992	0.2507

Note: The FTA dummies in column (1) to (4) are based on the entry years of the FTAs, while the FTA dummies in columns (5) and (6) on the effective years. Column (3) excludes Canada, Mexico, and Israel, which are the member countries of the U.S. All values are in logs except the FTA dummies. The standard errors are in parentheses. ***, **, and * indicate that the estimates are significant at the 1%, 5%, and 10% level, respectively. All models include time-fixed effects.

¹⁷ By comparison, Yeyati *et al.* (2003) do not allow for the non-linearity in the market size of the FTA.

of the sales ratio by 152%.¹⁸ Although not directly comparable, Yeyati *et al.* (2003) find that joining the *same* FTA as the source country is likely to increase FDI stock from the source by 116%.

The major concern in estimating equation (1) is that some unobservable characteristics other than the control variables may well affect *both* the sales and the FTA dummies, which is omitted variable bias in nature. Unobservable heterogeneity includes, *inter alia*, cultural or institutional similarity between the source and the host country. Given with this problem, I cannot be sure that the estimate on the FTA dummy in column (1) in Table 4 is the true effects of the FTA on the sales ratio. It is quite possible that, without controlling these unobservable effects, the binary variable of the FTA may simply pick up any residual effects on the sales that are not measured by the included control variables. In other words, the estimation would assign the effects of the unobservable factors to the observed FTA dummy and thus could overestimate or underestimate the true effects of the FTA.

In the following analyses, I address this issue using region-fixed or country-fixed effects, which control for unobservable heterogeneity.¹⁹ However, using region-fixed or country-fixed effects requires an assumption that unobservable factors are time invariant. Although our sample spans for a long period from 1982 to 1999, this assumption should not be a problem because factors that are specific to a region or a country are less likely to change even for a long period of time.

First, I account for the region-fixed effects that are specific or common to the region to which countries belong,²⁰ but stay constant over time and industry. For instance, European countries may have unobservable characteristics which have led to more FDI from the U.S. than elsewhere. However, these characteristics, such as cultural similarity or historical relationship, are specific to the European region but more or less invariant over time and industry. Another justification for controlling for region-fixed effects is that the formation of many trading blocs is often regionally oriented. The regionalism is well evident in

¹⁸ Since only the dependant variable is in log, the effects can be calculated as $\exp(0.9227)-1=1.52$ or 152%.

¹⁹ Another solution is to use an Instrument Variable (IV) for the FTA dummy. However, it is not easy to find a good IV which is closely correlated with the formation of trading blocs. One may argue that political-military alliances can be an IV. However, since most political-military alliances already concluded right after World War II, they are rather time-invariant unlike the formation of trading blocs.

²⁰ Refer to Table 2 to see which region each country belongs to.

the sample, as shown in Table 1. Column (2) in Table 4 reports the estimates of the region-fixed effects model. All variables have significant and expected signs, including the “proximity-concentration” variables. After removing the region-specific heterogeneity, I get a smaller estimate for the FTA dummy, 0.5335.²¹ This estimate implies that a trading bloc, on average, leads to an increase in the sales ratio by 70%, which is less than half for the case without the region-fixed effects.²²

In the previous estimation, I have treated all FTAs in the same way. However, as argued in Section 4, the effects of FTAs are predicted to be unambiguously positive for non-member countries of FTAs. Hence, I eliminate the member countries of the U.S. from the sample, which are Canada, Mexico, and Israel, and re-estimate the model.²³ The results confirm the prediction and are intuitive, as shown in Column (3) in Table 4. The coefficient of the FTA dummy (0.5750) is slightly larger than before.

Next, I consider the country-fixed effects model in order to control for any unobservable characteristics that are specific to each country but do not vary over industry and time. Column (4) in Table 4 reports the results controlling for the country-fixed effects. The most distinctive result is that the estimate of the FTA dummy has a *negative* sign (-0.1706), suggesting that the formation of the FTA decreases the sales ratio by 16%. However, this estimate is statistically *insignificant*.²⁴

A possible explanation for the insignificant estimate in the country-fixed effects model can be given as follows. Since the country-fixed effects wipe out any time-invariant characteristics, the estimates come from the time series variation in the variables within a country, not from the variation across countries. Having said that, the data used in the current study may not be sufficient to allow for much variation in the time series dimension and to identify the dynamic effects of FTAs; in the sample, I have four discontinuous years from the periods of 1982 to 1999. Hence, I suspect that the use of the

²¹ Given that the significance of the estimates of the FTA dummy decreases in the region-fixed effects model, it is possible that there exists multicollinearity in the estimation. I thank a referee for raising this issue.

²² To be precise, this estimate only captures the effects of the FTAs that are established during the sample period, 1982 to 1999.

²³ I thank a referee for this suggestion.

²⁴ To compare the two fixed effects models, I test the null hypothesis that the region- and country-fixed effects models are identical. I find that the F statistic is 7.54. Since this is well above the 1% critical value, 1.52, I reject the null that the two models are identical.

country-fixed effects with this sample is likely to yield the insignificant estimate of the FTA dummy variable. Given that the estimate for the FTA dummy is insignificant in the country-fixed effects, I focus on the results of the region-fixed effects model in the remainder of the paper, while omitting reporting the discussion of the country-fixed effects model.²⁵

Column (5) and (6) in Table 4 report the results when I use the FTA dummies based on the effective years, *effFTA*. Observe that the estimates of the *effFTA* dummy are smaller than those for the FTA dummy in columns (1) and (2). Both estimates are statistically significant at the 1% level as well. The implication of this finding is that the official dates of entry into force matter more for firms' investment decisions than the ending dates of transitional implementation of the agreements. In other words, the U.S. MNCs tend to respond more to the official dates of entry than to the effective dates of entry in which the transitional period ends. This is probably because firms are quick to take advantage of any preferential treatments that FTAs can offer and try to promote their businesses in local markets as early as possible, even before FTAs become fully effective.

To summarize the key points so far: first, the effects of trading blocs on FDI are great; second, controlling for the region-fixed effects is important in the estimation as it reduces the effects by more than half; third, the country-fixed effects model yields an insignificant estimate for the effects, due to less variation in the formation of trading blocs in the sample; and finally, the U.S. MNCs tend to be more responsive to the official dates of entry into force of the trade agreements than to the effective dates.

2. *The Role of the Extended Market Size*

I now examine the effects on FDI of the extended market size of a host country when it forms a trading bloc. For this, I include the variable *MKT* into equation (1) while dropping the FTA dummy. This variable measures the joint GDPs of all member countries *net* of the host country's GDP, if the country belongs to any FTAs. Column (1) in Table 5 shows that the results are consistent with the "proximity-concentration" hypothesis and, after controlling for the region-fixed effects, the coefficient of the market size of the host country is 0.30, while that of the extended market is 0.04.

²⁵ The results are available upon request to the author.

Table 5. The Region-Fixed Effects Model with the Full Sample

	(1)	(2)	(3)	(4)
<i>TRANS</i>	0.1582 (0.0659)**	0.1592 (0.0674)**	0.1604 (0.0672)**	0.1576 (0.0671)**
<i>FSCALE</i>	0.7095 (0.1501)***	0.7134 (0.1503)***	0.7100 (0.1502)***	0.7076 (0.1500)***
<i>PSCALE</i>	-1.0268 (0.1799)***	-1.0300 (0.1801)***	-1.0267 (0.1800)***	-1.0233 (0.1798)***
<i>HostGDP</i>	0.2967 (0.0471)***	-0.2477 (0.6105)	0.2955 (0.0477)***	0.2948 (0.0476)***
<i>HostGDP</i> ²		0.0220 (0.0247)		
<i>MKT</i>	0.0421 (0.0118)***	-0.0018 (0.0674)	0.0531 (0.0658)	-1.2990 (0.7223)*
<i>MKT</i> ²		0.0033 (0.0050)		0.0510 (0.0271)*
<i>FTA</i>			-0.1451 (0.8543)	8.6743 (4.7685)*
Fixed Effects	Region	Region	Region	Region
Obs. Number	907	907	907	907
R ²	0.2563	0.2572	0.2563	0.2592

Note: All values are in logs except the FTA dummies. The standard errors are in parentheses. ***, **, and * indicate that the estimates are significant at the 1%, 5%, and 10% level, respectively. All models include time-fixed effects.

Two interpretations are possible for the estimate on the coefficient of the extended market. One interpretation is that when a country, which previously did not have any FTAs, signs its first FTA, there will be an increase in the sales ratio, on average, by the amount of 0.04 times the extended market. The other interpretation is that when a country, which has already had an FTA, doubles the market size of the FTA by adding new members, this addition, on average, could increase the sales ratio by 4%.

I also examine a quadratic specification for both a country's own market size and the extended market size. The results are given in column (2) of Table 5, but the estimates for all market variables are *insignificant*. In the next specification, I add the FTA dummy, but drop the squared own market size and extended market size. Its estimation is provided in column (3) of Table

5. The estimate for the FTA dummy is negative, while that for the expanded market is positive. However, both estimates are *insignificant*.

Next, in column (4) of Table 5, I add the squared extended market size; note that this is the estimation of equation (2) accounting for the region-fixed effects.²⁶ The FTA dummy has a positive sign, the extended market size has a negative sign, and the squared market has a positive sign. However, their estimates are now *significant* with their p-values being about 7%. Then, the effects of FTAs on the sales ratio can be given by the following expression, in which the effects depend on the extended market size.

$$\begin{aligned} FTA \widehat{Effect} &= \widehat{\beta}_5 + \widehat{\beta}_6 MKT + \widehat{\beta}_7 MKT^2 \\ &= 8.67 - 1.30 MKT + 0.05 MKT^2 \end{aligned}$$

Note that the quadratic curve, which represents the FTA effects, does not touch the X-axis of the market size of the FTAs, and its minimum reaches the market size of \$250 billion.

Two interpretations can be provided for this result. First, given that the curve is located above the X-axis, a country that starts with no FTA expects an increase in the sales ratio when forming an FTA, with the level of the increase depending on the market size of the FTA. Second, the sales ratio does not always increase with the market size of the FTA: as the market size increases, the sales ratio increases for larger blocs but not for smaller blocs. In other words, a country that has already joined a bloc and wants to expand the market size by adding new member countries to the existing bloc can experience an increase in the sales ratio of MNCs *only when* the total market size of the bloc is above the critical market size, \$250 billion.

According to the data in 1999, most trading blocs have a market size above the threshold. In particular, they are the EC, the European Free Trade Association (EFTA), MERCOSUR, the Andean Community, the Closer Economic Relations (CER), NAFTA, the Common Market for Eastern and Southern Africa (COMESA), the ASEAN Free Trade Area (AFTA), and the bilateral FTAs that Israel, Turkey, and Chile have signed, respectively. A country that already

²⁶ To some extent, both the FTA dummy variable and the extended market size variable measure the effect of a bigger market size due to FTAs, in which case estimating with both variables together suffers a multicollinearity problem. However, it is also possible that the FTA dummy measures some other effects of FTAs than the market size effect itself such as the provisions of investment facilitation or liberalization often included in FTAs.

belongs to one of these blocs may observe an increase in FDI by adding new members. Or, equivalently, a potential member country can expect more FDI if it signs an FTA with one of these large blocs. On the other hand, the blocs whose market size is below the critical market size are the Central American Common Market (CACM) and the Caribbean Community (CARICOM). The member countries of these two blocs would expect little increase in FDI when they invite new members and their total extended market size with the new members is still less than the critical market size.

The argument of the extended market effects of trading blocs is more relevant for FDI from non-member countries as opposed to FDI from member countries. Table 6 exhibits the results when I re-estimate previous models with only FTA-outsider countries eliminating three member countries of the U.S. Basically, while the level of significance for estimates is somewhat increased, the results

Table 6. The Region-Fixed Effects Model with FTA-Outsider Countries

	(1)	(2)	(3)	(4)
<i>TRANS</i>	0.2608 (0.0765)***	0.2759 (0.0776)***	0.2602 (0.0778)***	0.2636 (0.0776)***
<i>FSCALE</i>	0.7140 (0.1571)***	0.7299 (0.1568)***	0.7138 (0.1573)***	0.7169 (0.1569)***
<i>PSCALE</i>	-1.0114 (0.1880)***	-1.0230 (0.1875)***	-1.0112 (0.1881)***	-1.0127 (0.1876)***
<i>HostGDP</i>	0.2271 (0.0538)***	-1.5644 (0.6825)**	0.2270 (0.0540)***	0.2353 (0.0539)***
<i>HostGDP</i> ²		0.0719 (0.0273)***		
<i>MKT</i>	0.0460 (0.0126)***	-0.0017 (0.0789)	0.0427 (0.0813)	-1.7740 (0.7697)**
<i>MKT</i> ²		0.0037 (0.0060)		0.0698 (0.0294)**
<i>FTA</i>			0.0427 (1.0273)	11.7037 (5.0187)**
Fixed Effects	Region	Region	Region	Region
Obs. Number	845	845	845	845
R ²	0.2570	0.2634	0.2570	0.2620

Note: In the above estimations, I exclude Canada, Mexico, and Israel, which are the member countries of the U.S. All values are in logs except the FTA dummies. The standard errors are in parentheses. ***, **, and * indicate that the estimates are significant at the 1%, 5%, and 10% level, respectively. All models include time-fixed effects.

are quite similar to the previous results when I have all countries. This is probably because the number of the U.S. member countries is small in the sample, that is, just three out of 51 countries.

In a nutshell, I find that countries forming trading blocs are likely to have more FDI; but the relationship between FDI and the market sizes of the blocs is non-monotonic such that, as the market sizes of the blocs increase, FDI increases for large blocs, but not for small blocs.²⁷

VI. Concluding Remarks

The conventional wisdom is that trading blocs lead to more FDI into member countries. This paper investigates whether trading blocs cause more or less FDI and looks for empirical evidence for the role of the extended market size of trading blocs, which has been the common reasoning for why we would expect more FDI into trading blocs.

I use panel data of sales by the foreign subsidiaries of the U.S. MNCs and employ a fixed effects model. I find that countries forming blocs attract more FDI, particularly from non-member countries, and that FDI does *not* always increase with the market sizes of the blocs; as the market size expands, FDI increases only for large blocs. However, it is found that these findings are sensitive to model specifications. A policy implication from the non-linear relationship is that when a country is considering forming or joining a trading bloc to attract FDI, it may want to form a bloc with a country or countries with a large market size. Unless the market size of a bloc is large enough, forming a bloc would not necessarily raise FDI.

For future research, it would be worthwhile to distinguish not only FDI origin (FDI from a member versus a non-member country), but also the characteristics of FDI (horizontal versus vertical). As argued earlier, the impacts of trading blocs can differ depending on where it is originated from *and* the types of FDI. One may distinguish foreign affiliate activity between production for local sales and exports, with the former being a proxy for horizontal FDI and the latter for vertical FDI.

²⁷ However, when using the country-fixed effects model, the estimates for the FTA dummy and the market size variables of FTAs are all insignificant, suggesting that the results in the text are sensitive to model specifications.

References

- Balasubramanyam, V. N. and D. Greenaway. 1992. "Economic Integration and Foreign Direct Investment: Japanese Investment in the EC." *Journal of Common Market Studies*, vol. 30, issue. 2 pp. 175-194.
- Brainard, S. L. 1993. "A Simple Theory of Multinational Corporations and Trade with a Trade-off Between Proximity and Concentration." NBER working paper, no. 4269, NBER.
- _____. 1997. "An Empirical Assessment of the Proximity-Concentration Trade-off between Multinational Sales and Trade." *American Economic Review*, vol. 87, no. 4 (September), pp. 520-44.
- Brenton, P. F. D. Mauro, and M. Lucke, 1999, "Economic Integration and FDI: An Empirical Analysis of Foreign Investment in the EU and in Central and Eastern Europe." *Empirica*, vol. 26, issue 2, pp. 95-121.
- Feenstra R. C., J. Romalis, and P. K. Schott. 2002. U.S. Imports, Exports and Tariff Data, 1989-2001, mimeo, the University of California at Davis, Available online at www.internationaldata.org.
- Head, K. and T. Mayer, 2004, "Market Potential and the Location of Japanese Investment in the European Union." *Review of Economics and Statistics*, vol. 86, no. 4, (November) pp. 959-72.
- Krugman, P. "A Dynamic Spatial Model." NBER working paper, no. 4219, NBER.
- Markusen, J. R. and K. E. Maskus, 2001, "General-Equilibrium Approaches to the Multinational Firm: A Review of Theory and Evidence." *NBER working paper*, no. 8334, NBER.
- Motta, M. and G. Norman. 1996. "Does Economic Integration Cause Foreign Direct Investment?" *International Economic Review*, vol. 37, no. 4, (November) pp. 757-83.
- Nicitas, A. and M. Olarreaga. 2001. Trade and Production, 1976-1999, mimeo, the World Bank.
- Rowthorn, R. E. 1992. "Intra-Industry Trade and Investment under Oligopoly: the Role of Market Size." *The Economic Journal*, vol. 102, issue 411, pp. 402-414.
- Summers, R. and A. Heston. 1991. "The Penn World Table (Mark 5): an Expanded Set of International Comparisons, 1950-1988." *Quarterly Journal of Economics*, vol. 106, issue 2, pp. 327-368.
- _____. 2002. "Data Appendix for a Space-Time System of National Account: Penn World Table 5.1." mimeo, The Center for International Comparisons at the University of Pennsylvania.
- The Economist, 17 February 2001. "Foreign Investment." p. 104.
- UNCTAD. 1998. *World Investment Report: Trends and Determinants 1998*. United Nations, New York and Geneva.
- U.S. Bureau of Economic Analysis. 1982, 1989, 1994, and 1999. *U.S. Direct Investment Abroad: Benchmark Survey*. Washington, D.C.: U.S. Bureau of Economic Analysis.
- U.S. Bureau of the Census. 1999. *Annual Survey of Manufactures: Statistics for Industry*

- Groups and Industries*. Washington D.C.: U.S. Bureau of the Census.
- _____. 1992 and 1997. *Economic Census*. Washington D.C.: U.S. Bureau of the Census.
- Waldkirch, A. 2003. "The 'New Regionalism' and Foreign Direct Investment: The Case of Mexico." *Journal of International Trade and Economic Development*, vol. 12, no. 2, pp. 151-184.
- World Trade Organization. 1995. *Regionalism and the World Trading System*, April, Geneva.
- _____. 2000. *Basic Information on Regional Trade Agreements*, WT/REG/W/39, Geneva.
- _____. 2002. *Annual Report*, Geneva.
- Yeaple, S. R. 2003. "The Role of Skill Endowments in the Structure of U.S. Outward Foreign Direct Investment." *Review of Economics and Statistics*, vol. 85, no. 3, pp. 726-734.
- Yeyati, E. L., E. Stein, and C. Daude. 2003. "Regional Integration and the Location of FDI." Working Paper no. 492, Inter-American Development Bank.
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