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Rabin Hattari and Ramkishan S. Rajan

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How Different are FDI and FPI Flows?: Does Distance Alter the Composition of Capital Flows?

Rabin Hattari*

Asian Development Bank

and

Ramkishan S. Rajan**

George Mason University

Institute of Southeast Asian Studies

Hong Kong Institute for Monetary Research

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Abstract

The availability of bilateral capital flows between countries has given rise to a number of papers attempting to understand trends and determinants of capital flows between country pairs. Almost without exception, the papers find that the gravity model fits the data quite well. Specifically, while economic sizes of the host and source (measured by GDP, population etc) appear to positively impact bilateral flows in most cases, distance -- broadly proxying some sort of transactions and / or information frictions -- stands out as consistently hindering all types of capital flows. But does greater distance hinder both foreign portfolio investment (FPI) and foreign direct investment (FDI) flows equally? In other words, does distance change the composition of capital flows? This is the specific question that this paper focuses on, differentiating between total FDI, FDI via mergers and acquisitions (M&As) and FPI.

Keywords: Distance, Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Gravity, Mergers and Acquisitions (M&As)

JEL Classification: F21, F23

* Asian Development Bank (ADB). E-mail: rhattari@adb.org.

** George Mason University, VA and Institute of Southeast Asian Studies (ISEAS), Singapore. E-mail: rrajan1@gmu.edu . Corresponding author.

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1. Introduction

Openness to cross-border capital flows is a double-edged sword. On the one hand, greater capital inflows facilitate growth by supplementing domestic resources and bringing in new technological know-how. On the other hand, capital inflow surges and sudden stops and reversals are the proximate causes of many of the financial crises that have plagued many emerging economies since the 1990s. Given its importance there has understandably been a burgeoning literature dealing with the determinants of cross-border capital flows. While the early literature, which was limited to using aggregate country data, focused on “push” and “pull” factors (for instance, see Calvo, Leiderman and Reinhart, 1996 and Dasgupta and Ratha, 2000), the availability of bilateral capital flows between countries has motivated a voluminous literature attempting to understand trends and determinants of capital flows between country pairs. Drawing on the more established trade literature (see Coe *et al.*, 2007, Deardorff, 1996, Evenett and Keller, 2002, Feenstra *et al.*, 2002, Helpman *et al.*, 2008 and Grossman, 1996), most of the papers apply some version of the gravity model to various types of international capital flows.

For instance, in the case of foreign direct investment (FDI), Stein and Daude (2007) investigate the effects of time zone differences on bilateral stocks of FDI for 17 OECD source countries and 58 host countries over the period 1997-1999, estimating a gravity model using both OLS and Tobit specifications. Hattari and Rajan (2008) estimate a gravity model to investigate the determinants of bilateral FDI flows to developing Asia from sources within and outside the region using a panel comprising 24 source countries and 12 host countries for the period 1990-2005. Hattari and Rajan (2009a) examine the determinants of intra-Asian bilateral FDI flows for selected 14 developing countries in Asia over the period 1990-2005. Rajan and Hattari (2009) use the same database to examine the role of information asymmetries measured by telephone traffic on intra-Asian FDI flows. All these papers use the two-stage Tobit procedure. Talamo (2007) explores the determinants of FDI flows from industrialized OECD countries to 61 host countries (comprising both OECD and non-OECD countries) by estimating a fixed effects OLS gravity model on a panel over the period 1980-2001. Wei (2000) is a cross-country study that examines the impact of corruption on FDI using bilateral investment data from 12 source countries and 45 host countries for 1993 by estimating a gravity model using quasi-fixed effect and Tobit procedures. Tong (2005) is a cross-country study that analyzes the role of ethnic Chinese networks/diasporas in facilitating bilateral FDI transactions by applying an OLS and threshold Tobit gravity estimation to a panel of bilateral FDI stocks among 71 economies for the period 1989-1991.

In the case of cross-border Mergers and Acquisitions (M&As), Di Giovanni (2005) investigates their economic and financial determinants across 193 countries for the period 1990-1999. Hattari and Rajan (2009b) examine the financial drivers of cross-border M&As using a panel comprising 53 source countries and 60 host countries for the period 2000 to 2007. Wong (2008) is a cross-country study that investigates the goodness of fit of a gravity model on M&A flows in comparison to trade and telephone traffic flows for

a sample of 193 countries for 1999. All these studies estimate their specifications using a two-stage Tobit procedure. Coeurdacier *et al.* (2009) apply a gravity model using a Poisson MLE estimation technique to examine the impact of joining the EU and Euro-zone on M&As on the members at the sectoral level (in manufacturing and services) over the period 1985-2004.

In the case of foreign portfolio transactions, the pioneering study is by Portes and Rey (2005) who apply a gravity model to a panel of bilateral gross cross-border portfolio equity flows between 14 countries for the time period 1989-1996. Lane and Ferretti (2008) is a cross-country study that investigates the determinants of bilateral portfolio equity holdings in 67 source countries and nearly 218 destination countries applying an OLS fixed effects and a Tobit type gravity model using data for the end of 2001. Lee (2008) examines the determinants of financial integration in East Asia by estimating a random effects gravity model for a panel of cross-border holdings of various financial assets (equity portfolio, long-term and short-term debt securities, and bank claims) between 2001 and 2003.¹ Garcia-Herrero *et al.* (2009) analyze empirically the determinants of the composition of cross-border portfolio holdings (bond and equity flows) of 42 countries for the period 2001 to 2005 by estimating a gravity model using OLS random effects. Portes *et al.* (2001) estimate a pooled OLS gravity model for bilateral cross-border portfolio flows (covering different types of securities including corporate equities, corporate bonds and government bonds) between the US and a set of 50 advanced and emerging economies for the period 1988-1998.

Apart from equity and bond flows, others have applied the gravity model to sovereign debt flows (Rose and Spiegel, 2004), international bank lending and payments flows (Buch, 2005 and Papaioannou, 2009) and equity trading and market correlations (Flavin *et al.*, 2002).² Almost all the papers arrive at the conclusion that the gravity model fits the data quite well. Specifically, while economic sizes of the host and source (measured by GDP, population, market capitalization, etc) appear to positively impact bilateral flows in most cases, distance stands out as consistently hindering all types of capital flows. The persistence of the distance puzzle is fairly robust across different types of cross-border activities.

The distance elasticities (in absolute terms) vary depending on the types of capital flows, set of countries, time period, regression methodology, use of stocks versus flows, and types of controls used to augment the gravity model, with a mean and median elasticity of around 0.8 (Table 1). Given the finding of the importance of distance in hindering different types of capital flows,³ some studies have gone on to examine to what extent this distance variable is measuring informational gaps and asymmetries (for instance, see Loungani *et al.*, 2002, Portes and Rey, 2005, Rajan and Hattari, 2009, Di Giovanni, 2005,

¹ While the bilateral international portfolio asset holdings used by Lee (2008) cover 223 destination countries, the international bank claims are gathered for 25 destination countries.

² The review, while fairly comprehensive, does not claim to be exhaustive. Other studies have examined more specific questions such as whether China has diverted FDI from other Asian countries (for instance, see Eichengreen and Tong, 2007 and Liu, Chow and Li, 2006).

³ See Buch *et al.* (2004) for a discussion of interpretation of the distance coefficients in the gravity model.

Daude and Fratzscher, 2008, etc).⁴ Stein and Daude (2007) and Hattari and Rajan (2008) have suggested that differences in time zones may explain the persistence of distance elasticity.

An interesting question that arises is to what extent the gravity variables impact different types of capital flows differentially. This issue has not been examined systematically. In particular, does greater distance hinder all types of bilateral flows equally or are some types of flows more impacted than others? In other words, does distance affect the composition of cross-border equity flows? This is the question that is of focus here. Due to data availability, and consistent with the theory/hypotheses to be laid out, we focus on equity flows only, limiting our attention to foreign portfolio (equity) flows (henceforth FPI) and FDI, and also differentiate between total FDI and FDI in the form of M&As (the other type of FDI being of the Greenfield variety).

The remainder of the paper is organized as follows. Section 2 briefly discusses the existing literature that deals with the composition of capital flows. Section 3 outlines the broad hypotheses to be tested. Section 4 introduces the data and empirical model. Section 5 discusses the results. Section 6 concludes the paper.

2. Literature Review: FDI versus FPI

The literature on composition of capital flows in general is quite limited. According to conventional wisdom, FDI and FPI flows are entirely different beasts. The former are considered to be relatively stable, driven by long-term fundamentals such as country size, financial market development, degree of openness, and the like. In contrast, the latter are viewed as being more volatile, highly reversible, and driven by cyclical factors, including interest rate differentials, business cycle conditions, market sentiments and herd behavior. Chuhan *et al.* (1996), Levchenko and Mauro (2006), Sarno and Taylor (1999), Sula and Willett (2006) and the World Bank (1999) are among a number of studies that find FDI flows to be relatively more stable than FPI.⁵ In addition, empirical analysis suggests that emerging economies most prone to currency crashes tend to have a relatively smaller share of FDI in total capital inflows. For instance, using a probit analysis, Frankel and Rose (1996) model the probability of a currency crisis as a function of the stock of FDI and non-FDI liabilities. Based on a set of over 100 emerging economies for the period 1971-

⁴ While not attempting to specifically tackle the distance puzzle, Javorcik *et al.*, (2010) and Tong (2005) stress the role of diasporic networks in mitigating informational, cultural and other barriers to bilateral FDI. These networks could also serve as contract enforcement mechanisms.

⁵ Hausmann and Fernandez-Arias (2000) opine that countries with less developed financial markets and institutions – which are presumably more volatile – tend to attract inflows in the form of FDI rather than FPI. In other words, foreign investors are more likely to enter the country directly via FDI compared to other forms of capital flows when there underdeveloped or inefficient markets and it may therefore be an indicator of some fundamental weaknesses of the host economy. Also see Daude and Fratzscher (2008).

1992 they find that a low ratio of FDI to debt is linked to a greater likelihood of a currency crisis.⁶ Tong and Wei (2009) argue that adverse liquidity shocks are more severe for countries that have been exposed to higher levels of FPI (and foreign loans) than FDI pre-crisis.

Thus, the popular belief is that FDI is a relatively safe form of external finance as it is “bolted down”, while FPI is viewed as unstable, “hot money” and more prone to destabilizing the economy. This conventional wisdom has given rise to strong policy pronouncements such as a country should selectively liberalize capital account controls on FDI transactions while still maintaining or even tightening controls of FPI (and short-term debt) flows.⁷ In some sense, however, this conventional wisdom is rather curious. After all, a careful examination of the definition of FDI reveals it consists of three components, viz. new foreign equity flows, intra-company debt transactions and reinvested earnings. As a matter of convention, equity need involve only a 10 percent threshold value of ownership to be considered as FDI. This component in turn could take the form of either M&As of existing local enterprises or Greenfield investments (i.e. establishment of new production facilities).

If FDI takes the form of Greenfield investments, one could reasonably argue that it is quite different from FPI flows. However, according to UNCTAD (2008), FDI has been rising in recent years, driven largely by M&A flows. The share of M&As to FDI rose from around 0.1 in 1992 to a high of almost 0.7 in 2000 before averaging around 0.4 thereafter (Figure 1).⁸ This is an important point. If a foreign entity undertakes a cross-border acquisition of less than 10 percent it is regarded as FPI flows. As an example, the Chinese sovereign wealth fund (SWF) originally purchased a 9.9 percent stake in the largest US private equity firm, Blackstone Group. Therefore, this investment enters the balance of payments as FPI flows from China to the US. If the Chinese had purchased a stake of above 10 percent, the transaction would have been categorized as FDI.⁹

Do small differences in equity ownership represent substantially different investment horizons? The IMF

⁶ Hausmann and Fernandez-Arias (2000) confirm the Frankel-Rose result, but show that it is not robust when extended to industrial countries. The authors note that these results may be because industrial countries have a much larger stock of non-FDI liabilities than do developing countries and have a lower frequency of crisis. Other empirical studies that have attempted to link the composition of capital flows to crises include Bussiere and Mulder (1999) and Nithanprapas and Willett (2000). In neither case is the result clear-cut. Theoretically, Goldstein *et al.* (2007) argue there may be reverse causality, i.e. when firms expect there to be greater volatility (or, more specifically, expect to be hit by negative liquidity shocks), they may prefer to undertake FPI rather than FDI as the former is considered easier to liquidate.

⁷ Acharya *et al.* (2008) argue that negative correlations between FDI and FPI may occur if there is a fire-sale of assets during a crisis and foreign investors who have bought controlling equity stake then turn around and sell part of their stake following asset price revaluations once the crisis abates. Also see Aguiar and Gopinath (2005).

⁸ However, as will be discussed later, the comparison of FDI and M&A is not straightforward.

⁹ This and other investments by foreign SWFs in the US have tended in recent times to be less than 10 percent so that they are not categorized as FDI and therefore do not need to undergo the evaluation by the Committee on Foreign Investment in the United States (CFIUS). See <http://www.treas.gov/offices/international-affairs/exon-florio/>. Martin (2008) has also emphasized that there was a strategic reason behind China's decision to purchase something less than 10 percent of Blackstone's shares: an arbitrary one. As he notes, according to Blackstone's CEO and Chairman Stephen A. Schwarzman, “The deal is ‘purely commercial’ and do [sic] not need the U.S. government approval as the stake is less than 10 percent” (p.8). The Chinese investment was later increased to a 12.5 percent stake.

(1998) has similarly drawn attention to the fact that the distinction between FPI and FDI flows in the balance of payments can be arbitrary. Using annual data for selected emerging economies for 1991-1998 Carlson and Hernández (2002) conclude that “portfolio equity flows respond to policies in a manner similar to that of FDI and in a manner opposite to that of short-term debt. It may be that portfolio equity is not of a short-term nature after all” (p.23). A potential danger is that policy measures designed to encourage FDI may involve not only a distortionary cost but also little gain in terms of enhanced financial stability. Given the growing interconnections between FDI and FPI there is clearly a need for more analysis of this issue at all levels. The remainder of the paper focuses on the specific issue of the role of distance and information on total FDI, FDI via M&As and FPI (equity).

3. FDI and FPI and the Role of Distance

To our knowledge, the only other paper that systematically compares the determinants of capital flows using bilateral data is Daude and Fratzscher (2008). However, they do not look at ratios (as we do). Instead they estimate a gravity model using seemingly unrelated regression methodology to understand the determinants of cross-border investments, covering FDI, portfolio equity securities and debt securities, for 77 countries over the period 1999-2003 (around 1160 observations). They do not focus on the type of FDI, i.e. M&A versus Greenfield and they use stocks as opposed to flows as done in this paper (for the period 2000-2007).

Goldstein and Razin (2006) is one of the few papers that examines the determinants of FDI versus FPI in a theoretical framework. In their information-based model, there is a fundamental tradeoff between sunk costs and liquidity. On the one hand, FDI ought to offer greater returns as it allows for more ownership and control and presumably is managed more efficiently than FPI in which management is delegated to outside parties. The problem with FDI, on the other hand, is that it involves significant upfront costs and much higher transactions costs unlike FPI which is a “weightless asset” and therefore is more liquid. A priori, insofar as greater distance is associated with informational asymmetries and unfamiliarity (thus raising the risk of adverse negative shock) it ought to hinder FDI relatively more than FPI. However, there are two important caveats to this conclusion.

First, it is important to distinguish between horizontal and vertical FDI. Horizontal FDI usually occurs when the multinational undertakes the same production and related activities in multiple countries. A firm can service a foreign market either by exporting or by establishing a presence overseas (i.e. FDI). Insofar as greater distance implies higher transport costs which increases the cost of servicing the market via exports, this could motivate greater FDI if these trade costs exceed the sunk costs of establishing presence overseas (Markusen, 1984). Vertical FDI, on the other hand, occurs when the multinational undertakes different parts of the production process in different countries. This in turn suggests that greater distance may discourage such FDI as it raises transaction costs. FPI equity, on the other hand, is

a largely uniform type of investment. Thus, if FDI is largely of the horizontal variety it may not necessarily be hindered more than FPI by greater distance. Second, even if FDI were more of the vertical variety, the foregoing logic probably only holds for Greenfield investments. M&As and FPI are essentially similar types of investments (keeping in mind the 10 percent threshold), and should therefore be impacted more or less equally.

While we do not have data that allows us to distinguish between horizontal and vertical FDI, we do have data on total FDI, FDI in the form of M&A and FPI. Thus the hypotheses we set out are as follows. *In general, FDI ought to be relatively more hindered by greater distance than FPI (Hypothesis 1). Other things equal, FDI in the form of M&As should be less impacted by distance than total FDI as it is primarily a financial transaction (Hypothesis 2). Since M&A and FPI are broadly similar types of investments, distance ought not to have any discernible difference between the two (Hypothesis 3).* Of course, one could argue that large differences in ownership stakes (e.g. over 50 percent and less than 5 percent for instance) do make a difference and greater distance could negatively impact the extent of ownership stake (home bias). As against this, based on the Goldstein and Razin (2006) argument, without sunk costs, investors would prefer more M&A if it implies greater control (which includes Greenfield investments). Unfortunately we do not have data on the size of FPI and M&A ownership stakes.

4. Model and Data Sources

4.1 Gravity Model

We follow the basic gravity model which has become the workhorse model for capital flows. Head and Ries (2008) offer a theoretical basis for a gravity model of cross-border M&As, while Courdacier and Martin (2006) and Okawa and van Wincoop (2010) do so for financial assets. The baseline specifications to be estimated are outlined below:

$$\ln(FDI / FPI)_{ijt} = \alpha_0 + \alpha_1 \ln(POP_{jt}) + \alpha_2 \ln(POP_{it}) + \alpha_3 \ln(GDPPC_{jt}) + \alpha_4 \ln(GDPPC_{it}) + \alpha_5 \ln(DIST_{ij}) + \alpha_6 \ln(X_{ijt}) + u_t + v_{ijt} \quad (1a)$$

$$\ln(MA / FDI)_{ijt} = \beta_0 + \beta_1 \ln(POP_{jt}) + \beta_2 \ln(POP_{it}) + \beta_3 \ln(GDPPC_{jt}) + \beta_4 \ln(GDPPC_{it}) + \beta_5 \ln(DIST_{ij}) + \beta_6 \ln(X_{ijt}) + u_t + v_{ijt} \quad (1b)$$

$$\ln(MA / FPI)_{ijt} = \gamma_0 + \gamma_1 \ln(POP_{jt}) + \gamma_2 \ln(POP_{it}) + \gamma_3 \ln(GDPPC_{jt}) + \gamma_4 \ln(GDPPC_{it}) + \gamma_5 \ln(DIST_{ij}) + \gamma_6 \ln(X_{ijt}) + u_t + v_{ijt} \quad (1c)$$

where: FDI_{ijt} , FPI_{ijt} and MA_{ijt} are the total (dollar) values of FDI, FPI and M&A deals, respectively from source country (i) to host country (j) at time (t); GDP_{it} and GDP_{jt} are nominal GDPs in US dollars for the

source country (i) and the host country (j) at time (t); $DIST_{ij}$ is the geographical distance between host and source countries; and X_{ijt} is a set of controls. The basic controls we use are contiguity and two measures of ethnolinguistic ties, viz. common language, and common colonial links. We then augment the model with a set of other controls, viz. real exchange rate source per host (a rise implies depreciation of the host country currency), market capitalization as a share of GDP in the source and host, capital account openness in the source and host and risk premium in the host and source. λ_t denotes the unobservable time effects (we use year dummies); and v_{ijt} is a nuisance term. We take logs of the ratios to reduce the impact of extreme values.

The focus of our attention is the distance elasticity. Based on the hypotheses outlined previously, we expect $\alpha_5 < 0$, i.e. the FDI-to-FPI ratio should decline with greater distance. However, the caveats noted above really make this an empirical question. We expect $\beta_5 > 0$ as the greater the distance the more likely that any FDI will take the form of M&A rather than the establishment of a Greenfield entity (given the general uncertainties and sunk costs). As such the MA-to-FDI ratio should rise with distance. Insofar as M&A and FPI (equity) are broadly similar types of transactions we expect $\gamma_5 \approx 0$ (suggesting marginal differences in ownership thresholds or that ownership thresholds do not matter).

4.2 Data Sources

While the hypotheses are easily laid out, there are practical problems with the data. The FDI data are based on UNCTAD FDI/TNC via the *Economic Intelligence Unit's World Investment Service (EIU-WIS)* database. While the FDI data are from national sources, they are not divided into M&A versus Greenfield investments.¹⁰ In fact no database we know of collects Greenfield investments across countries. However, a few commercial entities keep track of domestic and cross-border M&A activities such as Bloomberg, Thomson Financial Securities Data, ISI Emerging Market, and Bureau Van Dijk. For our study we use the Bureau Van Dijk M&A database, also called "Zephyr". Zephyr is a fairly new M&A database and has extensive global coverage. The practical benefit of using this data is that it is available via the *EIU-WIS*.¹¹ The data collected by Zephyr involves any M&A with over 2 percent equity.¹² However, the Zephyr data available via the *EIU-WIS* conform to the 10 percent threshold to be considered FDI (rather than portfolio flows) and is therefore preferable to other sources.¹³

¹⁰ See UNCTAD (2006, pp.15-21) for a discussion of Greenfield versus M&As.

¹¹ See <https://zephyr.bvdep.com/Zephyr/>.

¹² According to Zephyr, "(w)hen the bidder is an investment trust or pension fund, then the threshold is raised to 5 per cent." The various private sector companies that collect M&A data do not appear to use standardized methodologies or definitions making it tricky to compare across databases.

¹³ Others such as Di Giovanni (2005), Coeurdacier *et al.* (2009) and Wong (2008) use the Thomson Financial database. None of these papers seem to heed the 10 percent ownership threshold.

While we have bilateral M&A data, the two (M&A and Greenfield investments) are not always directly comparable and thus we cannot subtract it from the FDI data to come up with Greenfield investments. This is so for at least three reasons. One, M&A data, unlike the FDI data, do not include reinvested earnings and other components (such as intracompany lending) or divestment (also see Zhan, 2006). Two, the FDI data are based on actual ownership of companies as opposed to the flow of funds. This is an important point. Since the FDI data are based on actual flows of funds, while offshore financial centers (OFCs) and other tax havens show up as important sources and destinations of funds in this data, they do not show up as major players in the M&A data which only deals with ownership.¹⁴ Unfortunately there is nothing we can do about these differences. However, as long as there is not any systematic change in behavior over time, since we are taking ratios of the two assets, the results should not be affected too much. Three, while FDI data are captured when the capital flows actually take place, the M&A data is based on when the deal is actually done.¹⁵ On average, the ratio of MA-to-FDI is around 0.3 which is broadly consistent with the UNCTAD data (Figure 1) of 0.4. However, for reasons noted above, in many instances we could have a ratio greater than 1.

With regard to FPI equity investments, the data are sourced from the IMF's Coordinated Portfolio Investment Survey (CPIS).¹⁶ This data geographically breaks down securities holdings in equities (less than 10 percent) and bonds by residence of issuers. The data are gathered in a manner consistent with the BoP definition and based on flows of funds. We focus here on portfolio equity. Since 2001, the CPIS has been undertaken on an annual basis involving 74 participating economies (China as a source is a notable omission). IMF-CPIS equity data refers to end of year numbers (i.e. *stocks*) or positions rather than *flows*, while the FDI and M&A data are based on flows. We therefore modified the data from stocks to flows by taking the difference of time t with $t-1$. We understand the approach of converting stocks to flows is not without problems because it does not take into account the valuation effect and exchange rate differences on the day of the transactions.

In the original data there are 2688 country pairs from 2001 to 2007 (48 sources and 57 hosts). Figures 2a-c show that most of the bilateral equity flows have been concentrated between high-income economies and from high-income to middle-income economies. Since our interest is in directly comparing the flows of different types across country pairs we need to ensure that we have similar sets of non-zero bilateral pairs across the same time period.¹⁷ We are left with an unbalanced panel of just under 3300

¹⁴ A significant portion of FDI to the region is from OFCs such as the British Virgin islands, Bermuda, Cayman islands, Mauritius, and Western Samoa (see Hattari and Rajan, 2008, 2009a and Lane and Milesi-Ferretti, 2010). Apart from transshipping, there is also the problem of roundtripping (e.g. Hong Kong-China). Also see Gopalan and Rajan (2010) for a discussion of this issue in the context of inflows to and outflows of FDI from India. In relation to this, many commercial enterprises include M&A deals between foreign affiliates and firms based in the same host economy. These are not part of balance of payments statistics.

¹⁵ Some studies use M&A data when deals are announced as opposed to when they are done.

¹⁶ See <http://www.imf.org/external/np/sta/pi/datarstl.htm>.

¹⁷ Since we are taking the natural log of ratios, in theory we also have to include dependent variables with a ratio of exactly 1. However, there were no cases of this in our sample.

observations for Regression 1 (FDI/FPI) and about 2500 for Regressions 2 and 3 (mainly because of more limited M&A observations).¹⁸ While we have lost a number of observations through this matching process (due to missing observations, empty cells, zeros), the remaining number of observations is still fairly large compared to others such as Daude and Fratzscher (2008) which had 1100 observations in their comparison of FPI and FDI flows.

Data on the independent variables are more straightforward. The source for population and real GDP per capita are from the World Bank's *World Development Indicators* database. Data for distance, common language, colonial history and contiguity are taken from CEPII.¹⁹ Data on nominal bilateral exchange rates and consumer price indices (to compute real exchange rate volatility) are from the IMF's *International Financial Statistics* (IFS). The stock market capitalization data are taken from Standard & Poor's. For capital account openness (kaopen), we used the well-known index developed by Chinn and Ito (2002). The index is based on the four binary dummy variables, viz. whether the country has multiple exchange rates, current account restrictions, capital account restrictions, and requirements of the surrender of export proceeds (as reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)*). Risk premium is defined as the prime lending rate minus Treasury bill rate (%) and the data are from Datastream. Table 2 provides the summary statistics of the variables used in the three regressions, while Table 3 outlines the countries in the sample.

5. Empirical Results

As noted, while it is common knowledge that all types of cross-border capital flows are negatively related to distance, Figures 3a-c are scatter plots of the three ratios we are interested in against distance.

We have three sets of results. First we start with the baseline Fixed effects OLS estimation. Second, we re-estimate the data using three-year averages to take into account possible lumpiness in the annualized data. Third, we augment the model with additional controls.

¹⁸ There are two types of missing observations for FDI and FPI data – empty cells or completely excluded country pairs for some (all) years. In the case of M&A data there are no empty cells so it is unclear whether these have been entirely excluded or assumed to be zero. It is also unclear what the difference between empty cells, excluded observations and zeros observations imply.

¹⁹ For more information, see http://www.cepii.fr/distance/noticedist_en.pdf

5.1 Baseline Results: Fixed Effects OLS

Before undertaking the estimation on the ratios it might be useful to estimate with dependent variables of $\ln(\text{FDI})$, $\ln(\text{FPI})$ and $\ln(\text{MA})$. The results are shown in Table 4.²⁰ The results indicate that the distance elasticity is negative, similar to the existing literature on capital flows using the gravity equation.

Table 5 summarizes the regression results on the ratios (Regressions a-c) using host and source Fixed effects OLS. Recall that the coefficient of interest is the distance elasticities. Focusing on column 2, α_5 is negative (-0.35) and statistically significant. Thus, as distance rises, the FDI-to-FPI ratio declines, implying that FDI is deterred more than FPI. This is also consistent with the finding by Daude and Fratzscher (2008). We know that, in general, economic masses (proxied here by population and per capita GDP) tend to increase all types of capital flows between countries, but do they do so proportionately? We find that the richer the host and source countries the greater the ratio, implying that FDI increases relatively more than FPI, though the economic significance of these are rather small. In addition, the more populous the source country the greater is the ratio and the more populous the host, the lower the ratio. Common language appears to attract relatively more FDI than FPI, while a common border appears to attract relatively more FPI compared to FDI. While the finding of common language is clear-cut (i.e. common language lowers costs of doing business), the finding of common border appears counter-intuitive at first glance. However, if relatively more of the FDI flows between neighbors is of the horizontal variety then it is possible that firms choose to service the neighboring market via exports rather than FDI, implying that a common border reduces FDI compared to FPI.²¹

Referring to column 3 of Table 5, β_5 is positive (0.21), implying that the greater the distance the more likely that any FDI will be in the form of M&A rather than by establishing a Greenfield entity. This is consistent with our prior. All the other variables are statistically insignificant with the exception of per capita GDP in the source country which enters with a negative sign. This could imply that the richer the source country the more likely that FDI takes the form of Greenfield rather M&A.

Referring to column 4 of Table 5, γ_5 is close to zero and statistically insignificant, suggesting we cannot reject the null that the distance elasticity is statistically different from 0. This is consistent with our prior that the M&A and FPI are essentially similar types of transactions and ought to react the same way to distance. The lack of statistical significance of either of the two ethnolinguistic ratios further fortifies this conclusion. The only other strongly statistically significant terms across both estimations are populations

²⁰ We thank an anonymous referee for recommending to include estimation with dependent variables of $\ln(\text{FDI})$, $\ln(\text{FPI})$ and $\ln(\text{MA})$ before examining the ratios to allow for comparison with the existent literature.

²¹ Daude and Fratzscher (2008) also find that FDI is more sensitive (positively) to common language than is FPI equity stock though they do not test for common border.

in the host country and GDP per capita in the source country – the larger the host and the richer the source the greater the extent of FPI flows vis-à-vis M&A flows.

5.2 Baseline Model: Three-Year Average Fixed Effect OLS

Given the lumpiness in the annual flows data we re-estimate the regressions using three-year averages (Table 6). Comparison of Tables 5 and 6 reveals that the results are highly robust. We focus first on the FDI-to-FPI ratio. The distance elasticity for the three-year average estimation is -0.34 compared to -0.35 using annual data. Both are statistically significant. All other results remain more or less unaffected. In the case of the MA-to-FDI ratio, the elasticities for the annual and three-year averages are also close to each other (0.21 for annual and 0.25 for three year averages), and both are statistically significant. Similarly, in the case of the MA-to-FPI ratio, the corresponding distance elasticity between the annual and three-year averages are very close (0.069 as compared 0.075) and neither are statistically significant, suggesting that M&A and FPI are similar types of assets.

5.3 Augmented Model

We go on to augment the model with a further set of economic and financial controls, both to check the robustness of the results and to ascertain to what extent other factors may impact the composition of equity flows. Results are summarized in Table 7 (Regression a-c).

We focus first on the FDI-to-FPI ratio. Comparing Columns 2 of Tables 5 and 6 we see that the basic variables remain unchanged. As before, distance and contiguity continue to lead to a shift of investments from FDI to FPI, while common language leads to relatively greater FDI. The only exceptions are the per capita GDPs in the host and source countries which now become statistically insignificant. This is reasonable as we do not have strong priors as to why they should impact the choice of undertaking investments in the form of FDI or FPI. With regard to the additional controls, there are two noteworthy findings. Capital account openness in the source tends to lead to greater outflows from that country in the form of FPI compared to FDI, while capital account openness in the host has no impact on the composition of flows. What about the case of risk premia? A priori one would expect that a higher risk premium (and/or costlier credit conditions) in the host would tend to lead to greater inflows to that country in the form of FPI rather than FDI. This finding may be related to the issue of uncertainty aversion due to sunk costs. On the other hand, a higher risk premium in the source country ought to lead to greater outflows in the form of FDI for the same reason, i.e. the relative risk of incurring sunk costs overseas is lower vis-à-vis the home or source country. The results are consistent with the priors, i.e. the source country risk premium is positively associated with the FDI-to-FPI ratio and the host country risk premium is negatively related to it. The real exchange rate does not appear to alter the composition of equity flows.

We consider next the MA-to-FDI ratio. Comparing Columns 3 in Tables 5 and 7, the baseline variables remain almost unchanged with the estimated distance elasticity still at around 0.2. With regard to the augmented variables, only market capitalization in the host is strongly statistically significant and enters with a negative sign, though it is economically insignificant.

Lastly, we consider the MA-to-FPI ratio. Comparing Columns 4 in Tables 4 and 7, once again the baseline results hold. There does not appear to be any difference in M&A and FPI at least with regard to distance or the proxies for ethnolinguistic ties. There is some, albeit rather weak, statistical evidence that real currency depreciation in the source country leads to greater FPI compared to M&A. This makes intuitive sense in that the more expensive assets are in the host country, the lower the volume of investment, i.e. smaller percentage share (recall the basic difference between M&A and FPI is the 10 percent threshold). Greater capital account openness in the source appears to favor FPI inflows into the country rather than M&A, though the economic significance of this variable is rather weak. More importantly, a larger risk premium in the source leads to greater outflows in the form of M&A rather than FPI. Combining this with the previous results, it appears that greater risk in the source leads to more M&A type FDI than FPI outflows and more Greenfield FDI than M&A type FDI. In other words, with greater risk levels in the source, there is greater willingness to undertake sunk costs overseas, consistent with Goldstein and Razin (2006). Lastly, capital account openness in the source appears to shift investments towards FPI away from M&A. This is also consistent with the regression a in Table 7, where we found that higher capital account openness in the source led to a decline in the FDI-to-FPI ratio.

6. Concluding Remarks

Previous studies have documented the importance of distance as a hindrance to different types of cross-border capital flows. However, almost no attention has been paid to examining whether distance impacts various types of capital flows differently, a gap that this paper has attempted to fill. Given data constraints and in order to maintain focus, the paper is limited to equity flows – FPI, FDI and M&As where the hypotheses are also clearer (compared to debt flows). We use a fairly large panel over the period 2000-2007. We find that the data fit our three priors quite well. Broadly, distance affects FDI relatively more than FPI.²² Consistent with the fact that FDI in the form of M&A does not involve as much sunk costs compared to Greenfield and is also much easier to liquidate, we find that distance seems to hinder Greenfield investment relatively more than M&A. Finally, we find that distance has an almost equal inhibiting impact on FDI in the form of M&A and FPI, consistent with the fact that they are broadly similar financial transactions with different ownership thresholds.

²² Daude and Fratzscher (2008) find that FDI is more sensitive than FPI to information frictions (proxied by telephone traffic and bilateral trade in newspapers and periodicals) as well as familiarity (proxied by the stock of immigrants from the source country in the host).

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Table 1. Estimated Distance Elasticities

Authors	Type of Capital	Data	Methodology	Distance Elasticity (Baseline Models)
Coeurdacier <i>et al.</i> (2009)	Mergers and Acquisitions (Flows)	21 source countries; 31 host countries (1985-2004)	Poisson MLE Estimation	-0.064 (manufacturing) -0.075 (services)
Daude and Fratzscher (2008)	Foreign direct investment (Stocks), Portfolio Equity and Debt (Stocks)	77 countries; (1999-2003)	Fixed effects and Seemingly Unrelated Regression (SUR) estimators	-1.180 (FDI) -0.676 (EPI Equity) -0.808 (FPI Debt)
Di Giovanni (2005)	Mergers and Acquisitions (Flows)	193 countries (1990-1999)	Two-stage Tobit	-0.767
Garcia-Herrero <i>et al.</i> (2009)	Bond and Equity (Stocks)	42 source countries (2001-2005)	Random Effects OLS	-0.671 (Equities) -0.893 (Bonds)
Hattari and Rajan (2008)	Foreign Direct Investment (Flows)	24 source countries; 12 host countries (1990-2005)	Two-stage Tobit	-0.376
Hattari and Rajan (2009)	Mergers and Acquisitions (Flows)	53 source countries; 60 host countries (2000-2007)	Two-stage Tobit	-1.571
Lane and Ferreti (2008)	Portfolio Equity Investment (Stocks)	67 source countries; 218 destination countries (2001)	OLS Fixed Effects Tobit	-0.61 -0.75
Lee (2008)	Portfolio Equity, Securities, Bank claims (Stocks)	223 destination countries (portfolio holdings); 25 destination countries (bank claims) (2001-2003)	Random Effects OLS	-0.156
Portes and Rey (2005)	Portfolio Equity (Flows)	14 countries (1989-1996)	OLS	-0.881

Authors	Type of Capital	Data	Methodology	Distance Elasticity (Baseline Models)
Portes <i>et al.</i> (2001)	Portfolio Equity and Debt (Flows)	40 countries (1988-1998)	OLS	-0.601 (Treasury bonds) -0.826 (Corporate equities) -0.795 (Foreign bonds)
Rajan and Hattari (2009a)	Foreign Direct Investment (Flows)	14 countries (1990-2005)	Two-stage Tobit	-0.83
Rajan and Hattari (2009b)	Foreign Direct Investment (Flows)	14 countries (1990-2005)	Two-stage Tobit	-0.809
Stein and Daude (2007)	Foreign Direct Investment (Stocks)	17 source countries; 58 host countries (1997-1999)	OLS Tobit	-0.957 -1.551
Talamo (2007)	Foreign Direct Investment (Flows)	61 host countries (1980-2001)	Fixed Effects OLS	-0.603
Tong (2001)	Foreign Direct Investment (Stocks)	71 countries (1989; 1990; 1991)	OLS Threshold Tobit	-0.840 (Inflows) -1.341 (Outflows) -0.820 (Inflows) -1.206 (Outflows)
Wei (2000)	Foreign Direct Investment (Stocks)	12 source countries; 45 host countries (1993)	OLS Fixed Effects; Modified Tobit	-0.60 -0.29
Wong (2007)	Trade(Flows), Telephone (Flows), Mergers and Acquisitions (Flows)	193 countries (1999)	Two stage Tobit	-1.21 (Trade) -1.04 (Tel traffic) -0.48 (M&A)

Source: Compiled by authors with the assistance of Sasidaran Gopalan.

Table 2. Summary Statistics

Regression 1

Variable	Mean	Std. Dev.	Min	Max
MA (in millions of USD)	293.43	3179.13	0	187112.6
FDI (in millions of USD)	619.53	7837.91	-305502.2	394332.1
FPI (in millions of USD)	7510.94	38694.22	-3.545052	1142380
FDI-to-FPI (both in millions of USD)	77.94115	1862.967	0.00000564	98138.57
Distance (miles)	5867.356	4842.354	59.61723	19586.18
Contiguous (Dummy) 1= Yes; 0 = No	0.088012	0.2833556	0	1
Common Language (Dummy) 1=Yes; 0 = No	0.129287	0.335568	0	1
Common Colony (Dummy) 1= Yes; 0 = No	0.060395	0.2382525	0	1
GDP Per capita in USD in i	960583.3	3277396	1118.199	19700000
GDP Per capita in USD in j	835190.2	2885204	1118.199	19700000
Population in i (billions)	58.94416	105.0394	3.917	1164.95
Population in j (billions)	128.8293	288.8624	3.917	1321.29
Real exchange rate of i w.r.t. j (deflated by CPI)	467.2422	2899.105	0.0000829	33727.56
Market capitalization of listed companies in i (% of GDP)	104.5639	77.00996	0	561.439
Market capitalization of listed companies in j (% of GDP)	78.60439	66.33939	0	561.439
Financial openness in i (Index) 100 = Max 0 = Min	2.012267	0.9244169	-1.13058	2.531836
Financial openness in j (Index) 100 = Max 0 = Min	1.393313	1.340928	-1.13058	2.531836
Risk premium on lending in i (prime rate minus treasury bill rate, %)	2.035979	4.770575	-0.03417	44.97834
Risk premium on lending in j (prime rate minus treasury bill rate, %)	3.018163	7.629541	-0.03417	44.97834

Source: Authors.

Table 3. Source and Host Countries

Source Countries			
Argentina	Greece	Pakistan	United Kingdom
Australia	Hong Kong	Philippines	United States
Austria	Hungary	Poland	Venezuela
Belgium	India	Portugal	
Brazil	Indonesia	Romania	
Bulgaria	Ireland	Russia	
Canada	Israel	Singapore	
Chile	Italy	Slovakia	
Colombia	Japan	South Africa	
Czech Republic	Korea	Spain	
Denmark	Malaysia	Sweden	
Egypt	Mexico	Switzerland	
Finland	Netherlands	Thailand	
France	New Zealand	Turkey	
Germany	Norway	Ukraine	
Host Countries			
Argentina	France	Mexico	South Africa
Australia	Germany	Netherlands	Spain
Austria	Greece	New Zealand	Sri Lanka
Belgium	Hong Kong	Nigeria	Sweden
Brazil	Hungary	Norway	Switzerland
Bulgaria	India	Pakistan	Thailand
Canada	Indonesia	Peru	Turkey
Chile	Iran	Philippines	Ukraine
China	Ireland	Poland	United Kingdom
Colombia	Israel	Portugal	United States
Czech Republic	Italy	Romania	Venezuela
Denmark	Japan	Russia	Vietnam
Ecuador	Kazakhstan	Saudi Arabia	
Egypt	Korea	Singapore	
Finland	Malaysia	Slovakia	

Source: Authors.

Table 4. Baseline Gravity Model

Dependent Variable	Fixed Effects OLS Regression (a) FDI	Fixed Effects OLS Regression (b) FPI	Fixed Effects OLS Regression (c) MA
Constant	0.909** (0.418)	-1.881*** (0.385)	0.916 (0.643)
ln (Population i)	0.692*** (0.025)	0.714*** (0.022)	0.531*** (0.029)
ln (Population j)	0.621*** (0.022)	0.747*** (0.020)	0.457*** (0.029)
ln (GDP per capita i)	-0.027* (0.016)	-0.054*** (0.014)	-0.082*** (0.025)
ln (GDP per capita j)	0.050*** (0.015)	-0.065*** (0.012)	-0.033* (0.020)
ln distance	-0.773*** (0.034)	-0.491*** (0.026)	-0.330*** (0.042)
Contiguity	0.205* (0.118)	0.734*** (0.110)	0.635*** (0.139)
Common language	1.315*** (0.101)	1.410*** (0.075)	0.536*** (0.102)
Colony	0.568*** (0.126)	0.327*** (0.119)	0.613*** (0.134)
Observations	5,974	12,026	3,877
R Squared	0.412	0.488	0.192

Table 5. Annual Baseline Gravity Model

Dependent Variable	Fixed Effects OLS Regression (a) FDI/FPI	Fixed Effects OLS Regression (b) MA/FDI	Fixed Effects OLS Regression (c) MA/FPI
Constant	4.725*** (0.643)	-1.175 (0.848)	2.546** (1.136)
ln (Population i)	0.152*** (0.033)	-0.030 (0.038)	-0.018 (0.042)
ln (Population j)	-0.147*** (0.035)	0.011 (0.036)	-0.161*** (0.040)
ln (GDP per capita i)	0.057** (0.024)	-0.134*** (0.029)	-0.098*** (0.036)
ln (GDP per capita j)	0.037* (0.022)	-0.035 (0.026)	-0.016 (0.028)
ln distance	-0.348*** (0.046)	0.210*** (0.057)	0.069 (0.059)
Contiguity	-0.444*** (0.159)	0.181 (0.169)	0.378* (0.195)
Common language	0.330** (0.133)	0.103 (0.139)	-0.107 (0.141)
Colony	0.213 (0.165)	0.061 (0.160)	0.270 (0.193)
Observations	3,295	2,449	2,519
R Squared	0.136	0.044	0.142

Notes: Robust standard error in parentheses; i is the source country and j is the host country.

***Significant at the 1 percent level; **Significant at the 5 percent level; *Significant at the 10 percent level.

Table 6. 3-Years Average Baseline Gravity Model

Dependent Variable	Fixed Effects OLS Regression (a) FDI/FPI	Fixed Effects OLS Regression (b) MA/FDI	Fixed Effects OLS Regression (c) MA/FPI
Constant	4.006*** (0.733)	-0.322 (0.999)	2.694** (1.295)
ln (Population i)	0.166*** (0.039)	-0.077* (0.047)	-0.009 (0.051)
ln (Population j)	-0.126*** (0.043)	-0.026 (0.044)	-0.218*** (0.047)
ln (GDP per capita i)	0.046 (0.029)	-0.132*** (0.035)	-0.115*** (0.041)
ln (GDP per capita j)	0.047* (0.027)	-0.062** (0.031)	-0.016 (0.032)
ln distance	-0.344*** (0.055)	0.248*** (0.068)	0.075 (0.071)
Contiguity	-0.346* (0.184)	0.221 (0.207)	0.396* (0.230)
Common language	0.319 (0.212)	0.248 (0.166)	0.068 (0.165)
Colony	0.373 (0.288)	-0.020 (0.192)	0.447* (0.233)
Observations	1,876	1,430	1,657
R Squared	0.144	0.072	0.145

Notes: Robust standard error in parentheses; i is the source country and j is the host country.

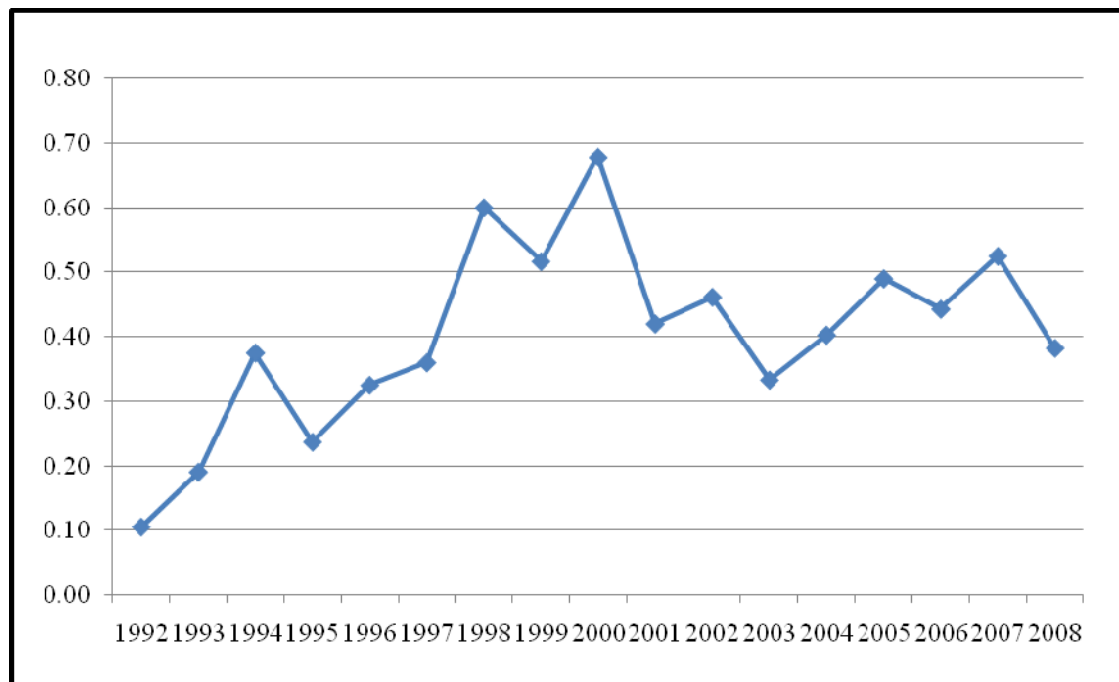
***Significant at the 1 percent level; **Significant at the 5 percent level; *Significant at the 10 percent level.

Table 7. Augmented Gravity Model

Dependent Variable	Fixed Effects OLS Regression (a) FDI/FPI	Fixed Effects OLS Regression (b) MA/FDI	Fixed Effects OLS Regression (c) MA/FPI
Constant	5.292*** (0.663)	-1.677* (0.867)	3.001*** (1.160)
ln (Population i)	0.111*** (0.034)	-0.029 (0.038)	-0.056 (0.042)
ln (Population j)	-0.118*** (0.034)	0.003 (0.037)	-0.170*** (0.042)
ln (GDP per capita i)	-0.110** (0.050)	-0.102** (0.050)	-0.209*** (0.071)
ln (GDP per capita j)	-0.011 (0.046)	-0.053 (0.046)	0.089 (0.065)
ln distance	-0.360*** (0.047)	0.229*** (0.059)	0.072 (0.060)
Contiguity	-0.440** (0.160)	0.141 (0.169)	0.262 (0.192)
Common language	0.331** (0.136)	0.220 (0.144)	-0.004 (0.146)
Colony	0.189 (0.168)	0.041 (0.160)	0.270 (0.189)
ln (rer_h_s)	-0.001 (0.043)	0.029 (0.043)	-0.112* (0.064)
markcap_GDP_i	0.000 (0.001)	0.001 (0.001)	-0.001 (0.001)
markcap_GDP_j	0.001 (0.001)	-0.003*** (0.001)	-0.002** (0.001)
kaopen_i	-0.334*** (0.072)	-0.166* (0.095)	-0.466*** (0.108)
kaopen_j	0.071 (0.055)	0.029 (0.060)	-0.016 (0.073)
riskprem_i	0.045*** (0.010)	0.012 (0.014)	0.065*** (0.017)
riskprem_j	-0.028*** (0.006)	0.000 (0.006)	-0.014 (0.009)
Observations	3,282	2,444	2,517
R Squared	0.154	0.054	0.158

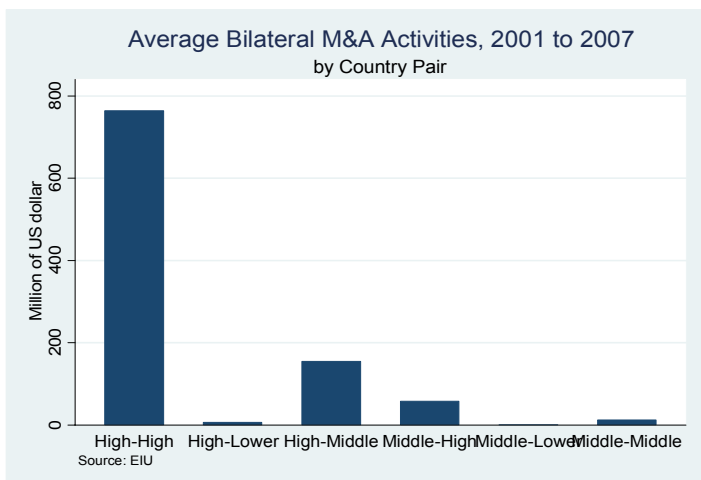
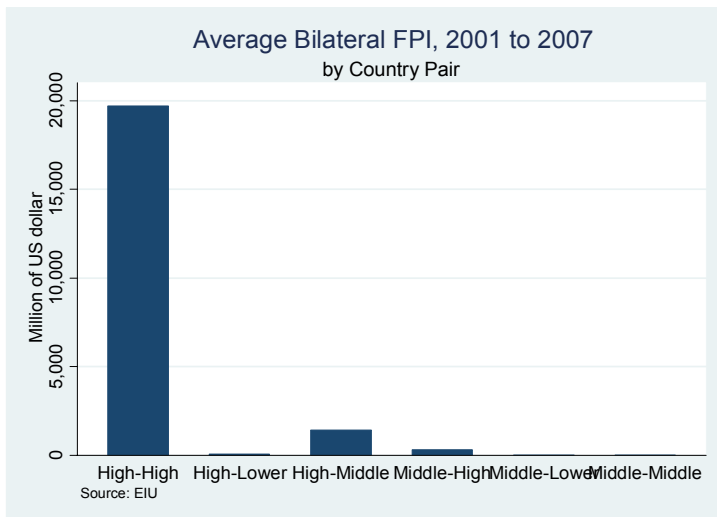
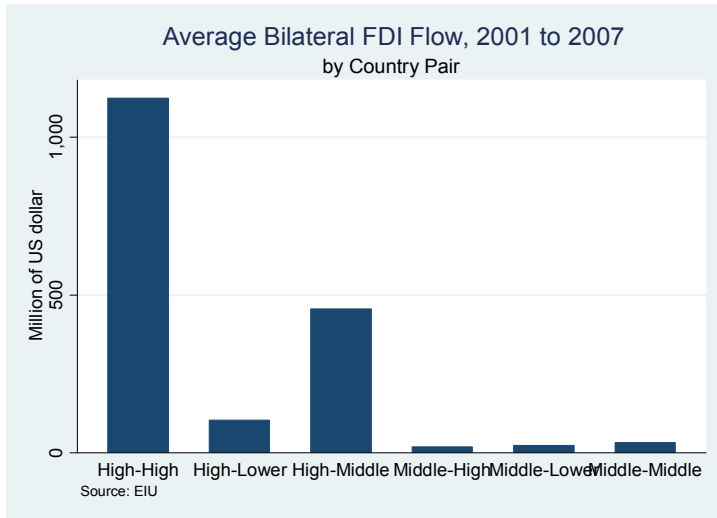
Notes: Robust standard error in parentheses; i is the source country and j is the host country.

***Significant at the 1 percent level; **Significant at the 5 percent level; *Significant at the 10 percent level.

Figure 1. Ratio of Global M&A-to-FDI, 1992-2008

Source: UNCTAD (2008).

Figures 2a-c. Cross-Border Equity Flows by Country Pairs



Figures 3a-c. Scatter Plots of Capital Flows (Ratios) and Distance

