Financial Crises and Bilateral Foreign Direct Investment Flows

Abdelaal Mahmoud, Ashraf
George Washington University, university of Rome "Tor Vergata"

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Ashraf Abdelaal Mahmoud
University of Rome "Tor Vergata"

Abstract.

Despite impressive studies on financial crises consequences and foreign capital flows, by large the research done has examined these economic phenomenons separately without addressing their nexus. This paper aims at bridging this gap by examining the impact of financial crises on bilateral foreign direct investment (BFDI). Financial turmoil reshapes the perception and magnitude of BFDI flows in both host and home countries; host countries governments see in FDI a mean for overcoming the sluggish economic situation and hence become eager to stimulate FDI inflows, while for the same reasons home countries governments, and investors become more cautious about their decisions to invest abroad. This paper addresses in particular the impact of financial crises on FDI in both host and home countries. To that end the paper uses a panel data covering the period 1985-2008 on home countries, as presented by the six largest FDI outflow, and 42 host countries. Empirical analysis applies the system GMM estimator to a gravity model of BFDI flows. The key findings in this paper are that financial crises exerts a negative impact on BFDI, a generalized fact that applies to all financial disturbances that took place during the last 23 years. Second the magnitude of the negative shock of financial crises on FDI differs by type and origins causing the financial crises.

Keywords: Foreign direct investment; financial crisis; Bilateral Foreign direct investment; dynamic panel data; spatial dependence.

JEL classification *F2; C3; E2; G01.*

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The author alone is responsible for the views expressed in the paper and for any errors that may remain.
Author Details: Ashraf Abdelaal Mahmoud, PhD candidate in Money and Finance, visiting researcher at School of Business, George Washington University, Address.40 Via Rodolfo Crespi, 00133 Rome Italy, cell +393208487543 E-mail: abd.el.aal@economia.uniroma2.it, ashrafabdelaal@gafinet.org, abdelaal@gwu.edu

1. Introduction.

In the history, of Emerging and developing countries from the early 1960s, FDI did not figure prominently in their development paradigm, as the wisdom of the policy makers during that period was that FDI was a form of exploitation of cheap land, labor and raw materials by global Multinational Corporation from industrialized countries. Various FDI host countries started to show resistance to the industrialized countries ownership, and control of local industry which led to slowdown of FDI outflows from industrialized countries.

The 1980s witnessed for two main changes in FDI patterns. First, USA as one of the main OECD countries became a net debtor and a central reception of FDI and this because of the low-saving rate in the US economy which led to inability to finance the budget deficit by resorting to the domestic capital market, and giving priority to the need of FDI, which came primarily from Japan and Germany. Another reason was the restrictive trade policy adapted by US government in that period and the depreciation of the US dollar in the second half of 1980s.

The second main change in 1980s was the emergency of Japan as a significant FDI exporter motivated by the desire to reduce labor cost. Japanese FDI expanded all over the world (USA, Europe and south East Asia).

The past two decades brought considerable improvement in the investment climate, triggered in part by the recognition of the benefits of FDI which has spread rapidly through the world economy. More regions and more sectors have become part of the international FDI mesh, and the high level and different patterns of FDI represent a fundamental leverage generating greater global economic integration.

The Financial Economic turmoil, such as Japanese Asset price crisis 1990, black Wednesday in Europe 1992-1993, the Asian financial crisis of 1997–1998 and the current global financial crisis, have large and unpredictable effects on the behavior of bilateral FDI and other forms of capital flow. The decline in the importance of Japan in 1990 as a source of FDI was one of the most significant consequence of Japanese Asset price crisis.

The financial crisis has brought severe consequences in terms of rising unemployment, growth slowdown, sluggish export growth, and a significant reduction in international, bilateral capital flows.

The effectiveness of the government policies responses – at both the national and international levels in dealing with the financial crisis and its economic consequences – is crucial for creating favorable conditions for a relatively quick recovery in both FDI flows and economic growth.

So far there are few studies attempted to analyze empirically the unpredictable behavior of bilateral FDI flow after financial crises, Lipsey (2001) shows that FDI was relatively stable during the crises affecting Latin America in 1982, Mexico in 1994, and East Asia in 1997.

FDI inflows may increase even while there has been the short-term capital flight. The explanation is that the two flows driven by different determinants—the latter is in response to a perceived increase in short-term risk profiles while the former, which pursues a longer-term motive, attracted by the asset-cheapening effects of a crisis (through lower prices in domestic currency terms and a depreciating exchange rate) as well as, a frequent by-product of a crisis, a more liberal FDI regime. This response documented at the time of the Asian financial crisis in 1997–1998, except in countries that experienced both deep economic and political crisis, such as Indonesia Hal Hill et al (2009).

Global FDI flows have been severely affected worldwide by the economic and financial crisis. Inflows falling from $1.7 trillion to below $1.2 trillion in 2009, with a slow recovery in 2010 (to a level up to $1.4 trillion), and gaining momentum in 2011 (approaching $1.8 trillion) (UNCTAD, 2009).

The crisis changed the FDI landscape: investments to developing and transition economies surged increasing their share in world FDI flows to 43% in 2008. This was partly due to a concurrent large decline in FDI flows to developed countries (29%). In Africa, inflows rose to a record level, with the fastest increase in West Africa (a 63% rise over 2007); inflows to South, East and South-East Asia witnessed a 17% expansion to hit a new high; FDI to West Asia continued to rise for the sixth consecutive year; inflows to Latin America and the Caribbean rose by 13%; and the expansion of FDI inflows to South-East Europe and the CIS rose for the eighth year running. However, in 2009 FDI flows to all regions will suffer from a decline (UNCTAD, 2009).

Scholars devote a lot of attention to studying on inflows of FDI specially the link between trade openness and FDI inflows and the impact of FDI on growth (see Balasubramanyam et al (1996); Kawai (1994); Dees (1998) and De Mello (1996)). Bilateral FDI has been less studied, and researchers totally ignore the relevance of financial crisis.

Financial crisis can generate positive and negative impacts on BFDI flow in some region in comparison to other, in the globe, for example, currency collapses crisis have a positive impact on BFDI flow between Thailand and Japan. Thailand received capital inflows from Japan in the form of FDI and exports, as a result of Yen appreciation see Siamwalla et al (1999) and Tiwari et al (2003). In the same time, the government response to the financial crisis can generate positive and negative impacts on FDI inflow. The revisions to FDI laws as part of the crisis management package in crisis affected countries can open up new opportunities for cross-border mergers and acquisitions la Krugman (2001). However, there is singularly little work on how the financial crisis influences bilateral investment flows. I fill that gap in this article.

I consider how financial crises influence investment flows. Theoretically, any financial turmoil causes changes to both sides; the host country in which government policies become keener to encourage foreign businesses and to the investors (home country) and their expectations of financial crisis. Hence I expect financial crisis reduce investment flows.

I test my hypotheses in a dyads sample among 48 countries from 1985 to 2008. Using a system generalized method of moments (GMM) estimator to a gravity model of bilateral investment flows for 282 dyads for dynamic panel data. I believe that tracing the effects of financial crises on bilateral FDI flows is necessary. It facilitates a better understanding of how financial shock influences the allocation of FDI. At the same time, identifying the impact of financial turmoil on FDI is essential for understanding the possible reverse effect of FDI on government's response to the crisis.

2. Literature Review

The first part of this section offer a background related to the Gravity Model. The second part discuses the literature review for the theoretical foundations of the gravity models in bilateral FDI.

2.1 Gravity Model Background.

The Gravity Model based on Newton's Law of Gravitation and used to predict the movement of information, investment and commodities between different places related to the distance between them see Erlander (1980). The model is also based on the interactions of different potential sources across border. The so-called "gravity equation" has been widely used in the social science since William J. Reilly set up the Reilly's Law of Retail Gravitation in 1931. Recently, scholars have

transferred the gravity equation to the empirical analysis of both bilateral trade and FDI. Ultimately there are some studies have attempted to improve the performance of gravity models by including the incorporation of spatial effects aspects to the gravity model for the estimation of its parameters. Therefore, the Gravity Model is a static formulation which is capable of explaining how multinationals around the world responded to the crisis.

2.2 literature review for the theoretical foundations of the gravity models in bilateral FDI

Recently, the Gravity Model has become a workhorse model for empirical research not only bilateral trade but also FDI Flows. Martinez zarzoro et al (2004) used the Gravity Model as an empirical framework for explaining investment flows, while Bevan and Estrin (2004) used panel data and the Gravity Model to address trade flow and FDI in Europe; also, Brenton et al (1999) used Gravity Model to model the regional pattern of FDI, Stone and Jeon (1999) showed how the Gravity Model specification can be used to estimate the bilateral flows of FDI. Egger et all (2004) examined the effects of distance over bilateral FDI using the gravity model.

Gopinath et al (2004) studied the relationship between FDI and trade in a bilateral context using a Gravity Model approach.

Scholar's studies bilateral FDI flows using the Gravity Model based on the proposition that transactions between countries determined by their national incomes, geographical distance and market size while, in the following study, I added the new variable financial crisis as a significant variable into the empirical model to investigate the effect of different financial turmoil on bilateral FDI.

As explained earlier the Gravity Model is flexible and further developed to answer the scholar's, questions on bilateral trade and FDI studies.

3. Theory and Hypotheses Development

The collapse of FDI flow after global financial crisis in certain regions rather than others in the world has led to a substantial interest to investigate its causes and consequences, both empirically and theoretically. Before Japanese Asset price crisis in 1990, the Asian financial crisis of 1997–1998, dot-com bubble burst crisis in 2000-2001 and the current global financial crisis, the strong economic

growth and attractive stock returns in many regions all over the world have been attracting foreign investors to relocate their funds to the financial and capital markets in those regions.

[Table 1 goes about here]

In 1991 FDI inflows across the world fell 26 percent to $53 billion as a result of Japanese Asset price crisis, In comparison to other regions, Europe and Eastern and South-Eastern Asia (excluding China) has been most severely affected by Japanese crisis. FDI flows to Europe region plummeted in 1991 from $97 billion in 1990 to $80 billion. In the other hand, the Middle East and North Africa (MENA) region recorded the sharpest rise among all regions for net FDI inflows in 1991; FDI inflows rose 119 percent from $ 1.05 billion in 1990 to $2.3 billion. The Sub-Saharan Africa region (excluding South Africa) also saw flows in 1991 as FDI flows were up from the previous year by 37 percent to $ 0.6 billion finally The Latin America and the Caribbean region recorded an increase in FDI flows in 1991 from the previous year by 31 percent to $2.7 billion. See table 1.

The Asian Financial Crisis 1997 has already had a significant impact on FDI flows. As a result, of the Asian economic crisis FDI flows dipped in the late 1998 and 1999 in certain regions like Eastern and South-Eastern Asia (excluding China) and MENA region comparing to other regions. Also, FDI had plunged from its peak in 2000 until 2003 after the dot-com bubble burst crisis in 2000-2001 followed by 9 eleven terrorist attack ; it resulted in a dramatic decline, in global FDI, in 2001 FDI inflows across the world fell 41 percent to $576 billion. In comparison to other regions the Sub-Saharan Africa region (excluding South Africa) received the highest FDI inflows of any region in 2001; net FDI flows rose 40 percent to $2.4 billion. In the other hand, Europe and Eastern and South-Eastern Asia (excluding China) recorded the sharpest decrease among all regions in 2001. See table 1.

FDI declined by 15.6 percent in 2008, as a result of the ultimate global financial crisis. The impact of the crisis on FDI flow differs, depending on the region. Europe has so far been the most affected, with a significant decline in FDI inflows in 2008, in the other hand MENA, Sub-Saharan Africa (excluding South Africa) and Latin America and the Caribbean saw net FDI flows increase in 2008. FDI rose about 18 percent in each region. See table 1.

How do global financial crisis influence bilateral investments? I argue that the financial crisis in origin countries of FDI outflow is positive determinants of BFDI flows between dyads countries. Direct

investments flowing from a home country to a host country can generate benefits for both sides. The standard theory of FDI explaining that; firms investing abroad possess a range of advantages, and that they prefer to harness these advantages in the form of FDI rather than the alternatives of exporting from their home base or some non-equity arrangements such as licensing, franchise, or royalty agreement Caves (1996). Analytically there are three different motives of FDI outflow, commonly termed efficiency-seeking, market-seeking and resource-seeking.

In the first case, efficiency-seeking investments refer to those that locate in economy owing to its effectiveness as compared to other locations. Here, what matters are factors such as; the broader macroeconomic environment, and trade policy that investment is by necessity more likely to be highly export-oriented. This form of FDI expected to grow slowly as results of global financial crisis, especially this form of FDI concentrated in the electronics, automotive, and machinery goods industries Kimura (2006).

By contrast, market-seeking, foreign investors are primarily attracted to the domestic market of the host country. Therefore, tariff protection and investment incentives are significant determinants, along with a broader set of factors such as market size and growth. This form of Investment expected to grow rapidly even while there is a financial crisis. The explanation is that this form of investments mainly in services which by definition are generally non-tradable.

Resource-seeking, historically, the natural resources were the main form of FDI in developing countries, this form of investment expected not to be affected by the global financial crisis.

As discussed earlier, during all the episodes of the global financial turmoil Europe and Eastern and South-Eastern Asia (excluding China) has been most severely affected by the crisis. By contrast, MENA and Sub-Saharan Africa (excluding South Africa) received the highest FDI inflows since most of those countries are developing countries and characterizing by natural resources.

I argue that financial turmoil causes changes to both sides; the host country in which government policies become keener to encourage foreign businesses and the home country and their expectations of the financial crises. Forward-looking investors constantly evaluate the crisis, and as a result, investors often have to adjust their investments or reallocate it in another region of the globe.

3.1 Hypotheses and Conjecture

Based on the theoretical discussions above, I identify the following hypotheses.

Hypothesis 1: Financial crisis is positive determinants of BFDI flows between dyads.

Hypothesis 2: FDI flows have different responses to the global financial crises. This depends upon the crisis.

One caution as discussed earlier FDI could come for different motives (efficiency-seeking, market-seeking and resource-seeking), My hypotheses do not distinguish them. I show above my conjecture about the effects of financial crisis on different FDI types. Efficiency-seeking form is likely to be more sensitive to crisis, but testing these differentials is difficult, because of real problems in obtaining and classifying FDI data Navaretti &Venables, (2004).

4. Methods and Data

4.1Sample Description and Dependent Variable

Giving that the main source of FDI flows to emerging and development countries are the industrial countries, I concentrate on the six largest industrial countries (USA, Germany, Japan, UK, Italy and France) as the countries of FDI outflows. I study the effects of financial crisis on bilateral FDI using a sample of 282 dyads between the Biggest 6 (henceforth, B6) countries and 42 countries from 1985 to 2008. Including 25 non-OECD countries, 17 OECD member countries, 8 from Latin America, 16 from Europe, 6 from East Asia & Pacific, 7 from MENA countries, 2 from South Asia, in addition to Canada, South Africa and Australia. These countries classified also into three groups according to the World Bank's World Development Indicators. The first sub-group consists of 9 lower, middle-income countries; the second consists of 12 upper middle-income countries, and the third consists of 27 high-income countries. Detailed descriptions of the study sample countries presented in the Appendix.

[Figure 1 goes about here]

[Table 2 goes about here]

Summary statistics and correlation matrix of all variables are in Tables 2. The dependent variable is the bilateral FDI flow (henceforth, BFDI); BFDI flow within a dyad refer to transfers of investment from origin to destination country, either from B6 countries in FDI outflows to any of the other 42 countries, or from 42 countries to any country of the B6 countries. For example, when U.S. MNEs

contribute money to investment projects in Egypt, a positive inflow within the U.S. – Egypt dyad registered in the data, and vice-versa. The data cover the FDI flows between B6 countries and Latin America, Europe, East Asia & Pacific and MENA Countries but, do not cover the flows between each other (see figure 2 in the Appendix). The variable BFDI flow measure in millions of constant US dollar, and expressed in logarithm which include the proliferative effect of time series, I log-transform BFDI variable (dependent Variable) for two motives; First, to correct its skewed distribution as its value could be positive or negative (reverse investment or disinvestment larger than Investment), or even zero (no investment between two countries or reverse investment eliminating investment) Second, to be compatible with the gravity model specification. Data collected from the OECD International Direct Investment Statistics Year- Book.

4.2 Exogenous and Endogenous Variables in the Model (Independent Variables)

Exogenous variables in the model are the geographic distance between origin country i and the destination country j, and populations of country i and country j in year t.

Endogenous variables in the model are the spatial term, bilateral trade between i and j in year t, per capita incomes of i and j in year t, inflation rate of country i and country j in year t and dummy variable representing the financial crisis in year t.

4.3 Empirical Model

I carry my main analysis on the relationship between financial crisis and BFDI in the years of the financial crisis to test the hypotheses in a pooled design. I consider the following dynamic panel data model:

$$y_{ijt+1} = \alpha y_{ijt} + \gamma[W_t y_{it}]_{ijt} + \beta_1 \mathrm{A}_{i,j,ij,t} + \beta_2 \mathrm{B}_{i,j,ij,t} + \eta_{ij} + \varepsilon_{ijt}, \qquad (1)$$

$$ij = 1,..,N, \;\; t = 1,..,T$$

Where y_{ijt+1} denotes BFDI flows between the Origin country i and the destination country j at year $t+1$; y_{ijt} indicates BFDI flows between country i and country j in year t which can be utilized to model temporal dependence in BFDI; $[W_t y_{it}]_{ijt}$ represent spatial dependence in FDI inflow from home country i to destination country j; $\mathrm{A}_{i,j,ij,t}$, $\mathrm{B}_{i,j,ij,t}$ indicates exogenous and endogenous

variables respectively as discussed earlier.; $\alpha, \gamma, \beta_1, \beta_2$ represent vectors of parameters to be estimated; η_{ij} indicates dyad-level fixed effects that may correlate with the covariates; and ε_{ijt} is the error term, assumed to be *i.i.d* $(0, \sigma_\varepsilon^2)$.

The spatial linkages of the observations are measured by defining a spatial connectivity or weighting matrix, denoted by W_t for any year t as following

$$W_t = \begin{pmatrix} 0 & w_t(d_{k,j}) & \cdots & w_t(d_{k,l}) \\ w_t(d_{j,k}) & 0 & \cdots & w_t(d_{j,l}) \\ \vdots & \vdots & \ddots & \vdots \\ w_t(d_{l,k}) & w_t(d_{l,j}) & \cdots & 0 \end{pmatrix}$$

Where $w_t(d_{j,k})$ defines the functional form of the weights between any two pair of country k and j. The diagonal elements of the square weigh matrix W_t are set to zero; therefore, no observation of bilateral FDI predicts itself.

As the determination, of the proper specification of W_t is one of the most complex and debatable methodological issues in spatial data analysis therefore, it is necessary to calculate different weight matrices in order to find the most proper one in my case this done by dividing the distance between locations i and j by the minimum[2] distance within the sample space as following:

$$w_t(d_{j,k}) = \exp\left(\frac{-d_{j,k}}{Min\ d_{j,k}}\right) \qquad if \quad j \neq k$$

The spatial autoregressive term = $[W_t y_{it}]_{ijt} = \sum_{k \neq j} w_t(d_{j,k}) \, . \, y_{ikt}$

Panel data generate better predictions and provide micro-foundations for aggregate data analysis and has a lot of advantages. A panel data set offers advantages over cross-section or time series data sets. The benefits of using panel data analysis in this paper as follows: (1) I used a large number of observation which gives more reliable parameter estimates than the cross-section or time series data set. (2) Panel data set minimize the multicollinearity problem. (3) As FDI inflow tend to correlate over time, dynamic panel data model able to capture temporal dependence with the lagged dependent variable. (4) Dynamic Panel data taking into account the so-called "third-country" effect problem as FDI flow usually correlate across space especially in a multi-country setting as in my model. For example, Home country of FDI can allocate FDI in a host country, but can also engage in FDI, in a

[2] The minimum distance within the sample is 231.3 mile s which the distance between Netherlands and Germany

third country, this means that FDI decisions across various host countries are not spatially independent, implying negative spatial correlation**. I** use the spatial autoregressive term $[Wy_{it}]_{ijt}$ to capture the time-varying spatial dependence in FDI, where $[\mathrm{Wy_{it}}]_{\mathrm{ijt}}$ represents the spatially weighted average of FDI flow from home country i to the neighborhood countries of country j, there are many studies highlight the importance of spatial interdependence. Coughlin and Segev (2000) show that FDI into one location within China is positively associated with FDI into other locations close to China. Hisarciklilar, Kayam and Kayalica (2006) examine the role of market potential in MENA region by estimating a modified gravity model allowing for spatial autocorrelation in the disturbances with both spatial and time fixed effects. They show that FDI to MENA region is market oriented and aimed at the domestic market in the host economy. Recently, Baltagi, Egger and Pfaffermayr (2007) study the third-country effects associated with US outflow FDI for seven manufacturing industries across both developed and less-developed destinations. Their GMM results find substantial evidence of spatial interactions, Blonigen, Davies, Waddell, and Naughton (2005) focus on US inbound FDI from OECD countries during 1980-2000, and they find robust results for third country FDI effects. (5) In order to identify factors affecting the BFDI flow as the financial crisis it is necessary to define the Gravity Model According to Evenett and Keller (2002). The gravity model support both assumptions of increasing returns to scale, and homogenous goods production. This can explain why this approach has been widely used in the empirical studies of FDI, (see, Bevan and Estrin (2004), Benassy-Quere et al. (2007), Brenton et al (1999) and Stein and Daude (2007). **(6)** Applying GMM system developed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998) to a spatial gravity model provide a remedy to simultaneity, endogeneity bias and spatial characteristics of the data see Madariaga and Poncet (2007). **(7)** Independent variables lagged one period behind the dependent variable, in order to control for possible reverse causality. **(8)** A problem that arises when using a log-transformer specification is how to deal with observations with negative and zero values (this case for BFDI inflows as discussed earlier). In order to handle the presence of zero/negative BFDI flows; I transformed the variable by adding a constant factor to each observation on the dependent variable: $y = \ln(z + \sqrt[2]{z^2 + 1})$ see McDonald (2008) and Osborne (2002). Using this

transformation allow me to keep all the observations without losing any observation, plus the sign of z is unchanged, and the values of z pass from a linear scale at small absolute values to a logarithm scale at large values. **(9)** The error term ε_{ijt} assumed to be i.i.d, and $(0, \sigma_{\varepsilon}^2)$ with first differencing; therefore, in order for the moment conditions to be valid. I should get the errors to be serially correlated at order one, not in any higher order, so I test this assumption using AR(1) test (All AR(1) test statistics should be statistically significant, and All AR(2) test statistics should be statistically insignificant). **(10)** FDI flows often correlate across space which means that bilateral FDI between a pair of countries may not be independent of FDI inflow into alternative host countries. I test the spatial dependence in FDI using the most popular spatial indicators: Moran I and Geary's C. The null hypothesis of no spatial correlation should be rejected by both tests for all years.

5. Source and Measurements of Independent Variables

This section discuses the data source, and the measurement of the independent variables. According to the dynamic panel data model (equation 1) bilateral FDI flow functions of GDP Per Capita, distance, population, bilateral trade, inflation rate, financial shock and regional location.

In literature, GDP per capita defined as a proxy for the country K/L ratio. Bergstrand (1989) argue that GDP per capita is adequate with the Gravity Model see also Dascal et al. (2002). Therefore, in this model GDP per capita can be characterized as a proxy of FDI Form-led. In the sense, that GDP per capita may be negative or positive depending on the strategic factors of FDI outflow. For example if FDI outflow seeking domestic service market (market-seeking FDI form), so GDP per capita should be positive since it would signal a higher purchasing power see Buch et al. (2003) and Limao and Venables (2001). On the other hand, if FDI motivated to produce and to export to other countries (efficiency-seeking FDI form). In this case, GDP per capita in the host country should have a negative sign since it implies relatively low labour cost. The expected sign of GDP per capita coefficient can be positive or negative depending on the FDI flows form. Data on GDP per capita is from the World Development Indicators (World Bank, 2009).

In the Gravity Model distance widely used as an explanatory variable see Portes and Rey, (2005); Stone and Jeon, (1999) and Egger and Pfaffermayr, (2004a, 2004b). Distance defined as a proxy for transportation cost, and information cost. Obviously distance could have direct, or indirect effects on

FDI flows see Bougheas et al. (1999); Brenton et al (1999), and Guerin (2006). I use distances between capital cities (measured in miles), which drawn from distancefromto (website).

The distance coefficient expected to be negative. It implies that any increases in the investment cost or information cost will have a negative impact on FDI flows.

Bilateral trade; the effect of trade on FDI flow is indistinct see Brainard (1997), and Grosse and Trevino (1996). Bilateral trade variable use to capture whether trade complements FDI activity (in this case the coefficient of Trade will be significantly positive) or trade substitute FDI activity (significantly negative coefficient), trade coefficient in equations (1) expected to be positive. Data on Bilateral trade is from the IMF DOT database.

Inflation rate defined as a proxy for the country macroeconomic stability and measurement of the efficiency of the government policy since literature argued that The government‘s ability to control inflation expected to reduce investment risks and consequently, to increase FDI inflow. The inflation coefficient (host country) expected to be negative. The expected sign for Inflation rate of the FDI source countries will be positive which implies an increase of the average price level and the purchasing power in investing country’s economies, which led to increase FDI outflow, and FDI inflow as consequence. Data on inflation is from the World Development Indicators database (2009).

Financial crisis or financial turmoil is typically easily observed, because it is a global. In order to test Hypothesis 1, I construct a financial crisis variable. The variable measures the presence or absence of the crisis in time t, it is a dummy variable, and it equals 1 if I have a global financial crisis in a year t and 0 otherwise.

6. Results

The results of spatial dependence tests of "Moran’s I and Geary’s C "which reported in Table 3 suggest that Bilateral FDI seem to be affected by any shock or crisis irrespective of the investment climate in the host country.

[Table 4 goes about here]

Moreover, Table 4 shows the statistical results from the Arellano–Bover/Blundell–Bond system GMM estimator for directed dyadic data of bilateral FDI between the Biggest 6 countries in FDI outflows and 42 countries based on equation (1). I estimate six models: one without the financial crisis dummy,

and others with financial crises dummies. Across all models, the result for the serial correlation test is as expected. The null hypothesis of no serial correlation at order one rejected and fails to be rejected at order two, which collectively demonstrate that the moment conditions are valid.

The results for interstate financial crisis dummy variables largely support my hypotheses and exhibit interest variations across different crises. The effect of financial crises for all models has the expected negative sign and statistically significant.

[Table 4 goes about here]

Table 4 shows the coefficient for the different crises dummies displays considerable variation. Interestingly, the Current global financial crisis has the highest coefficients for all models. The occurrence of the current financial crisis (The US subprime mortgage crisis) causes the flow from source to a host country to drop by 52%. The results are consistent with UNCTAD report 2009, which state that; global inflows of FDI fell by 39% from US$1.7 trillion in 2008 to a little over US$1.0 trillion in 2009, based on UNCTAD estimates. Hypothesis 1and 2 receives support for all models.

The control variables in Table 4 also report interest results. The lagged-FDI variable has significant and positive effects in all models. A 1% increase in bilateral FDI in the current year t generates almost 6 % increase of FDI flow in the next year t+1. This is support temporal dependence of FDI flow.

The spatially weighted FDI associated with significant, positive effects for all models. These results show strong, positive spatial contagion among bordering host countries as well as bordering home countries.

Table 4 report the bilateral trade has positive impacts on bilateral FDI and appears to have a complementary relationship with bilateral FDI flows. The result supported the findings of Brenton et al. (1999) that the relationship between FDI and trade are complementary.

The populations of both origin and destination countries in Table 4 all have statistically positive significant, effects for all models this indicates that market size is a positive determinant of bilateral FDI inflows. The populations of both home and host countries encourage bilateral investment.

GDP per capita of the destination country has mixed sign negative but not statistically significant and positive statistically significant. The results demonstrate support for my conjecture that GDP per

capita in the destination country could use as a proxy of FDI Form-led. In the sense, that GDP per capita may be negative or positive depending on the strategic factors of FDI outflow.

The inflation rate of both origin and destination country show interest results. The coefficients for Inflation Rate of origin country are positive and statistically significant; indicating that high- inflation rate in FDI source countries increases the bilateral FDI. This also shows that an increase of the price index in origin countries leads to increase the demand for substitute expensive products, for consumers in the economy of origin countries; this implies that investors may increase investment overseas with lower inflation rates in order to keep competitiveness in both the international and domestic market. Interestingly, the coefficients for Inflation rate of the destination country are negative but not statistically significant which provide indirect support for, my conjecture about inflation. It can be argued that the inflation rate indicates the macroeconomic stability of the origin country also captures uncertainties in destination countries.

Finally, distance reduces bilateral investment flows for all models. The results of these typical gravity model variables are consistent with those in previous studies..

7. Conclusion

This paper investigates the impact of financial turmoil on bilateral FDI using the gravity model on 282 dyads sample among 48 countries from 1985 to 2008. I examine patterns of global economic crises, and I study how bilateral FDI responded to different global crises.

The bottom line of this paper is that financial shocks reduce bilateral FDI; this negative impact affected according to my model- positively by preexisting bilateral trade between host and home countries, and positively by inflation prevailing in the home country. The latter two factors manifested on the ground by how crisis influence both government policies toward international business and investor expectations of crisis risk.

In addition, the findings provide support for the following hypothesis; GDP per Capita is likely to exert stronger effect on FDI depending on the latter type; particularly if FDI outflow is seeking domestic service market (market-seeking FDI form), so GDP per capita should be positive since it would signal a higher purchasing power. This is the case of all the examined financial shocks in the paper except for the ultimate global financial crisis. My interpretation is that; for the current financial

crisis, there are many of the stimulus packages introduced in OECD, emerging economies, and development countries too include components to support innovation, entrepreneurship, infrastructure, human capital, and green investments, in order to, foster more efficient and sustainable economic growth. See Policy Responses to the Economic Crisis: Investing in Innovation for Long-Term Growth (OECD, 2009). These findings have serious implications for International business. It facilitates a better understanding of how financial shock influences the allocation of FDI. At the same time, identifying the impact of financial turmoil on FDI is crucial for understanding the possible reverse effect of FDI on government's response to the crisis.

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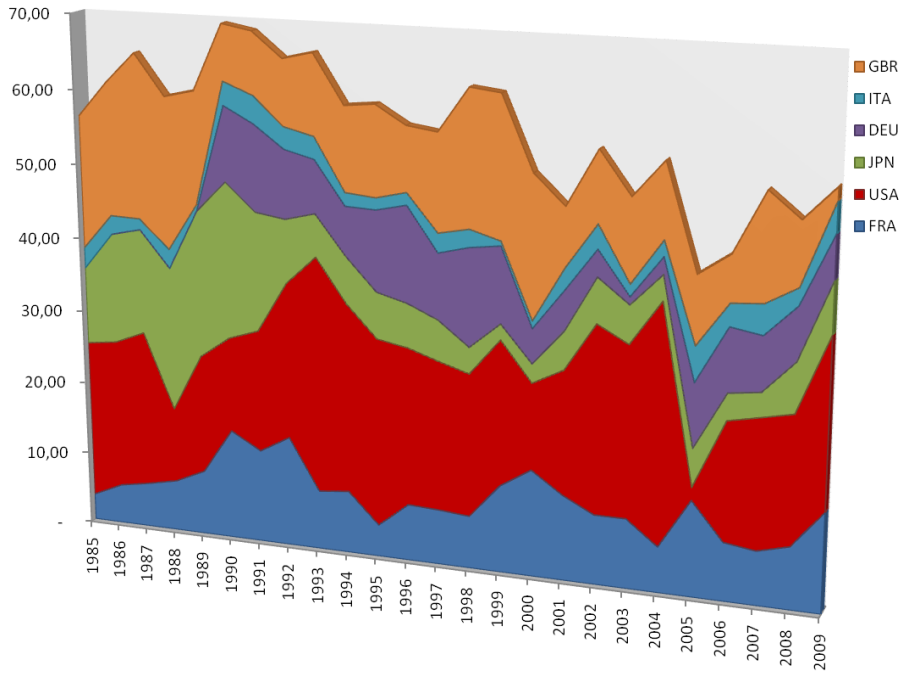
Table 1 FDI inflow in $ Million to different regions before and after global crises

	Japanese Asset price crisis			The Asian Financial Crisis			dot-com bubble burst crisis		Global financial crisis	
	1989	**1990**	**1991**	**1997**	**1998**	**1999**	**2000**	**2001**	**2007**	**2008**
MENA	1504	1050	2301	8462	7802	7614	13301	12547	91739	109083
Sub-Saharan Africa excluding South Africa	3254	1737	2372	4564	6429	7499	5926	8324	35049	41675
European Union (EU)	80695	97309	79761	144109	283356	504487	698224	383962	923810	536917
Latin America and the Caribbean	8592	8700	11382	66514	72219	89193	80206	73181	111903	132313
Eastern and South-Eastern Asia excluding China	12726	18125	17220	50950	42395	66205	99582	52429	141442	124475

Source UNCTAD 2009

Figure 1 FDI outflow from Biggest six countries in FDI outflow, 1985–2007



Source UNCTAD 2009

Table 2 Descriptive statistics and correlation matrix

	Mean	**S.d.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1. Real FDI flow at T+1 (log)	3.99	4.38										
2. Lagged real FDI flows (log)	4.03	4.34	0.36									
3. Spatially weighted FDI (log)	0.05	0.30	0.16	0.18								
4. Population of origin (log)	11.4	0.56	0.10	0.10	-0.11							
5. Population of destination (log)	9.98	1.57	0.20	0.20	0.00	-0.01						
6. GDP per capita of origin (log)	10.2	0.17	0.09	0.15	-0.07	0.73	0.03					
7. GDP per capita of destination (log)	9.52	0.76	0.19	0.24	0.16	0.01	-0.49	0.13				
8. Inflation of origin (log)	0.02	0.02	-0.08	-0.11	0.03	-0.27	-0.02	-0.36	-0.06			
9. Inflation of destination (log)	0.13	0.37	-0.04	-0.07	-0.06	-0.01	0.11	-0.10	-0.22	0.09		
10. Bilateral trade (log)	8.31	1.66	0.43	0.49	0.26	0.20	0.37	0.32	0.40	-0.13	-0.16	
11. Distance (log)	8.02	0.94	-0.11	-0.12	-0.37	0.39	0.18	0.24	-0.22	-0.13	0.08	-0.29

Table 3 Results of Spatial autocorrelation Test (Moran I and Geary's C)

Year	Test	France	USA	Japan	Germany	Italy	UK
1985	Moran I	0.43 (9.96)***	0.260 (6.135)***	0.45 (10.2)***	0.43 (9.97)***	0.40 (9.12)***	0.463 (10.4)***
	Geary C	3.56 (4.34)***	3.759(4.375)***	3.48 (4.36)***	3.79 (4.16)***	3.44 (4.48)***	3.47 (4.32)***
1986	Moran I	0.42 (9.76)***	0.237(5.565)***	0.44 (10.0)***	0.43 (9.99)***	0.34 (8.10)***	0.45 (10.4)***
	Geary C	9.76 (4.38)***	3.280 (4.385)***	3.53 (4.36)***	3.65(4.26)***	3.97 (4.17)***	3.56 (4.27)***
1987	Moran I	0.37 (8.50)***	0.340 (7.802)***	0.42 (9.75)***	0.42 (9.75)***	0.39 (9.103)***	0.45 (10.3)***
	Geary C	3.58 (4.51)***	3.315 (4.328)***	3.54 (4.39)***	3.76 (4.23)***	4.04 (3.98)***	3.56 (4.27)***
1988	Moran I	0.36 (8.38)***	0.239 (5.680)***	0.42 (9.74)***	0.41 (9.64)***	0.38 (8.88)***	0.46 (10.57)***
	Geary C	3.59 (4.49)***	3.731 (4.315)***	3.57 (4.38)***	3.81 (4.19)***	3.968 (4.05)***	3.66 (4.18)***
1989	Moran I	0.39 (8.97)***	0.223 (5.295)***	0.43 (9.87)***	0.36 (8.45)***	0.44 (10.0)***	0.45 (10.4)***
	Geary C	3.54 (4.48)***	3.451 (4.234)***	3.56 (4.36)***	3.81 (4.29)***	3.61 (4.25)***	3.66 (4.20)***
1990	Moran I	0.35 (8.11)***	0.463 (10.45)***	0.41 (9.51)***	0.36 (0.36)***	0.37 (8.76)***	0.44 (10.22)***
	Geary C	3.55 (4.55)***	3.182 (4.252)***	3.61 (4.37)***	0.36 (4.32)***	3.98 (4.06)***	3.56 (4.12)***
1991	Moran I	0.35 (8.11)***	0.324 (7.502)***	0.43 (9.82)***	0.39 (9.17)***	0.27 (0.27)***	0.45 (10.30)***
	Geary C	3.55 (4.55)***	3.521 (4.345)***	3.56 (4.37)***	3.90 (4.08)***	3.54 (4.56)***	3.56 (4.28)***
1992	Moran I	0.38 (8.70)***	0.314 (7.297)***	0.43 (9.83)***	0.37 (8.69)***	4.56 (9.99)***	0.45 (10.3)***
	Geary C	3.31 (4.61)***	3.693 (4.289)***	3.50 (4.41)***	3.89 (4.17)***	3.84 (4.05)***	3.42 (3.42)***
1993	Moran I	0.39 (8.94)***	0.170 (4.157)***	0.43 (9.97)***	0.39 (9.12)***	4.05 (4.05)***	0.46 (10.50)***
	Geary C	3.47 (4.54)***	3.401 (4.031)***	3.50 (4.39)***	3.77(4.20)***	4.10 (4.17)***	3.44 (4.34)***
1994	Moran I	0.44 (10.1)***	0.309 (7.143)***	0.45 (10.2)***	0.35 (8.14)***	0.38 (8.94)***	0.44 (10.13)***
	Geary C	3.42 (4.41)***	3.351 (4.419)***	3.43 (4.39)***	3.88 (4.22)***	3.81 (4.19)***	3.38 (4.44)***
1995	Moran I	0.41 (9.41)***	0.295 (6.843)***	0.44 (10.1)***	0.34 (8.04)***	0.399 (9.16)***	0.46 (10.52)***
	Geary C	3.45 (4.48)***	3.448 (4.362)***	3.53 (4.34)***	3.81 (4.32)***	3.71 (4.21)***	3.57 (4.26)***
1996	Moran I	0.42 (9.54)***	0.259 (6.06)***	0.44 (10.0)***	0.34 (7.92)***	0.38 (8.84)***	0.44 (10.17)***
	Geary C	3.43 (4.47)***	3.453 (4.303)***	3.48 (4.39)***	3.84 (4.31)***	3.41 (4.52)***	3.46 (4.24)***
1997	Moran I	0.35 (8.06)***	0.216 (5.128)***	0.44 (10.0)***	0.42 (9.72)***	0.34 (7.99)***	0.44 (10.21)***
	Geary C	3.57 (4.51)***	3.304 (4.180)***	3.49 (4.38)***	3.79 (4.19)***	3.56 (4.48)***	3.53 (4.29)***
1998	Moran I	0.380 (8.70)***	0.272 (6.344)***	0.32 (7.48)***	0.44 (10.2)***	0.31 (7.23)***	0.44 (10.07)***
	Geary C	3.55 (4.48)***	3.433 (4.426)***	3.54 (4.53)***	3.79(4.14)***	3.73 (4.326)***	3.55 (4.30)***
1999	Moran I	0.40 (9.23)***	0.227 (5.384)***	0.37(8.64)***	0.27 (6.35)***	0.25 (6.04)***	0.45 (10.24)***
	Geary C	3.32 (4.56)***	3.37 (4.280)***	3.51 (4.54)***	3.77 (4.47)***	4.08(4.108)***	3.58 (4.26)***
2000	Moran I	0.25 (6.07)***	0.258 (6.053)***	0.25 (5.96)***	0.46 (10.6)***	4.108 (4.108)***	0.35 (8.10)***
	Geary C	3.52 (4.48)***	3.403 (4.341)***	3.61 (4.52)***	3.86 (4.15)***	4.01 (4.12)***	2.71 (4.61)***
2001	Moran I	0.34 (8.00)***	0.300 (6.882)***	0.38 (8.66)***	0.44 (10.0)***	0.30 (7.02)***	0.48 (10.9)***
	Geary C	3.62 (4.49)***	2.652 (4.040)***	3.34 (4.63)***	3.61 (4.25)***	3.70 (4.39)***	3.64 (4.12)***
2002	Moran I	0.41 (9.43)***	0.343 (7.851)***	0.39 (9.08)***	0.10 (2.81)***	0.35 (8.19)***	0.43 (9.84)***
	Geary C	3.46 (4.48)***	3.312 (4.516)***	3.73 (4.27)***	4.35 (4.31)***	3.57 (4.438)***	3.15 (4.46)***
2003	Moran I	0.32 (7.53)***	0.284 (6.599)***	0.44 (10.0)***	4.31 (4.84)***	0.41 (9.33)***	0.45 (10.3)***
	Geary C	3.43 (4.57)***	3.355 (4.384)***	3.41 (4.42)***	3.94 (4.53)***	3.34 (4.44)***	3.82 (4.09)****
2004	Moran I	0.30 (6.96)***	0.283 (6.580)***	0.39 (8.91)***	0.27 (6.41)***	0.35(8.22)***	0.42 (9.56)***
	Geary C	3.43 (4.56)***	3.375 (4.441)***	3.01 (4.92)***	3.35 (3.45)***	3.42 (4.48)***	3.22 (4.56)***
2005	Moran I	0.37 (8.53)***	0.372 (8.410)***	0.42 (9.60)***	0.27 (6.42)***	0.42 (9.736)***	0.44 (10.05)***
	Geary C	3.49 (4.58)***	2.736 (4.543)***	3.23 (4.68)***	3.54 (4.54)***	3.36 (4.36)***	3.47 (4.41)***
2006	Moran I	0.40 (9.14)***	0.311 (7.181)***	0.37 (8.42)***	0.36 (8.33)***	0.43 (9.83)***	0.38 (8.79)***
	Geary C	3.50 (4.45)***	3.350 (4.497)***	3.29 (4.71)***	3.69 (4.42)***	3.23 (4.51)***	3.18 (4.65)***
2007	Moran I	0.40 (9.20)***	0.372 (8.438)***	0.43 (9.71)***	0.38 (8.65)***	0.37 (8.77)***	0.45 (10.19)***
	Geary C	3.34 (4.51)***	3.098 (4.698)***	3.14 (4.72)***	3.34 (4.58)***	3.95 (4.15)***	3.36 (4.44)***
2008	Moran I	0.48 (10.9)***	0.365 (8.312)***	0.44 (10.0)***	0.37 (8.54)***	0.41 (9.442)***	0.43 (9.89)***
	Geary C	3.06 (4.45)***	3.190 (4.621)***	3.38 (4.49)***	3.51 (4.59)***	3.247 (4.590)***	3.70 (4.29)***

All tests statistics statistically significant at 1% level

Table 4 Effect of financial crisis on bilateral FDI inflows, 1985–2007

	All sample (B6 countries / 42 countries)				
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Lagged real FDI flows (log)	0.056** 0.021	0.059*** 0.022	0.056*** 0.021	0.057*** 0.021	0.065*** 0.021
Spatially weighted FDI (log)	0.493*** 0.189	0.471** 0.188	0.491** 0.189	0.478** 0.189	0.263 0.225
Population of origin (log)	1.524*** 0.324	1.126*** 0.319	1.501*** 0.321	1.470*** 0.328	0.489 0.330
Population of destination (log)	0.617*** 0.193	0.544*** 0.194	0.613*** 0.192	0.645*** 0.192	0.211 0.323
GDP per capita of origin (log)	- 2.905*** 0.704	-1.891*** 0.729	- 2.935*** 0.703	-2.682*** 0.705	-1.031 0.753
GDP per capita of destination (log)	0.689* 0.380	0.226 0.386	0.687* 0.380	0.722* 0.374	-0.042 0.568
inflation of origin (log)	12.67*** 3.544	12.09*** 3.586	13.32*** 3.556	14.19*** 3.681	6.479* 3.492
inflation of destination (log)	- 0.120 0.202	-0.070 0.206	- 0.121 0.202	- 0.123 0.202	0.015 0.208
Bilateral trade (log)	0.411*** 0.151	0.535*** 0.165	0.417*** 0.152	0.368** 0.151	1.162*** 0.305
Distance (log)	- 0.407* 0.246	- 0.404* 0.232	- 0.386 0.246	- 0.435* 0.247	- 0.109 0.185
Dummy Financial Crises		-0.797*** 0.107			
Dummy Crisis 1997-1998			- 0.063 0.237		
Dummy Crisis 2000				- 0.501** 0.285	
Dummy Crisis 2007-2008					- 0.522*** 0.020
Constant	3.450*** 0.074	1.910*** 0.073	3.888*** 0.072	1.837* 0.072	1.458** 0.010
Number of observations	6486	6486	6486	6486	6486
Number of dyads	282	282	282	282	282
Wald test	151.69***	201.0***	153.6***	161.4***	303.0***
AR(1) Test	-12.35***	- 12.50***	-12.35***	- 12.39***	-12.31***
AR(2) Test	0.66	0.71	0.67	0.63	0.65

Notes: All regressions have a constant positive term.
Robust standard errors below coefficient estimates
All AR (1) test statistics statistically significant at 1% level; all AR (2) test statistics statistically insignificant
** if p < 0.10,* * if p < 0.05; *** if p < 0.01*

APPENDIX

List of all countries in the sample:

Algeria	DZA	Italy	ITA
Argentina	ARG	Japan	JPN
Australia	AUS	Korea, Republic	KOR
Austria	AUT	Malaysia	MYS
Brazil	BRA	Mexico	MEX
Bulgaria	BGR	Morocco	MAR
Canada	CAN	Netherlands	NLD
Chile	CHL	New Zealand	NZL
China	CHN	Norway	NOR
Colombia	COL	Panama	PAN
Costa Rica	CRI	Portugal	PRT
Denmark	DNK	Romania	ROM
Egypt	EGY	Saudi Arabia	SAU
Finland	FIN	Singapore	SGP
France	FRA	South Africa	ZAF
Germany	DEU	Spain	ESP
Greece	GRC	Sweden	SWE
Hungary	HUN	Switzerland	CHE
Iceland	ISL	Thailand	THA
India	IND	Turkey	TUR
Indonesia	IDN	United Arab Emirates	ARE
Iran	IRN	United Kingdom	GBR
Ireland	IRL	United states	USA
Israel	ISR	Venezuela	VEN