Empirical study on inter-country OFDI

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Abstract

This study analyzes the relationship between outward foreign direct investment (OFDI) stocks pertaining to thirty four OECD source and one hundred sixty destination countries (i.e. bilateral stocks) and other various variables such as size, distance, common language etc using augmented gravity model.

Our principal findings are as follows: (i). the variables of the gravity model (population size, per capita income and distance) explain nearly 50 per cent of the variation in the outward FDI stock. The coefficients are not only significant but are significantly close to the expected values. (ii). Common language and colonial linkages explain further variations in OFDI stock, over the gravity model (iii). Index of revealed comparative advantage of natural resources for source country bears positive relation with OFDI (iv).Common currency (Euro, in this study) between source and destination country lowers transaction costs and reduces risk in transactions between the source and destination countries to increase OFDI level. Overall, the gravity related variables have very large significance, and even if other variables are included their coefficients are unlikely to change.

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1.1 Introduction

The objective of this study is explain outward FDI stock from a country to another as a function of variables derived from the mainstream theory and competing or complementary theories like the finance theory of Aliber, and resource seeking theory. In order to do so rigorously an augmented gravity model for normalizing the estimating equation is used. In doing so the gravity model is better specified by allowing for the difference between two GDPs constituted differently as between per capita income and population. The economic theory related variables in so far as they can be defined at the country level are bilaterally are incorporated, subject to data availability.

Rather than using a vanilla gravity model (GDP*GDP), incorporating in the model the difference between two GDPs differently constituted as between per capita income and population size, greatly improves the power of the gravity model. Thus, economic variables methodologically ought to be seen as influencing sectoral FDI, and the variables of the gravity model. In this case, per capita income which then influences overall country level FDI stock.

In all the estimation models, a gravity model is embedded. The variables from economic theories both competing and complementary are introduced to take the analysis further. The main finding is that the gravity model explains a large part of the variation in outward FDI. The gravity model allows for the "normalization of OFDI stocks" more completely than has been in general use in the literature. The variables derived from economic theory, whether the mainstream OLI framework or the finance theory of Aliber (1970), to the extent that these could be marshaled at the country level, have in relation to the gravity model, much less explanatory power. Analysis

of firms/ industries with outward FDI in the literature though grant significant explanatory power to variables derived from economic theory. This would suggest that economic theories of OFDI, quite like economic theories of trade have the power to explain, the composition and nature of FDI, but not the overall volumes of FDI, just as much as trade theories do not have the power to explain the volume of trade, but only of its composition and nature. Methodologically, it means that as much as in the case of trade, studies of country to country FDI ought to be properly conditioned through the augmented gravity model, whether or not the dataset is for a limited set of countries.

Also, since we have used bilateral country level FDI stock rather than bilateral country level FDI flow, there is very little residual (to what the gravity related variables cover) variation to be picked up by these country level economic variables. We are confident that if we can access the OECD Country * Country *Time data on FDI, the country level economic variables such as "Fischer Open", technology generating activity of the source and destination countries, can be more correctly tested to have some discrimination or integration between competing /complementary theories.

1.2 Literature Review

Empirical studies on OFDI have been conducted at several levels: firm, industry and country levels. This essay focuses on the country level empirical estimation of OFDI data. There have been a number of comprehensive studies on the sources and determinants of inflow of FDI. Similarly, there are many studies that analyze the determinants of outward FDI to destination countries, from large countries. However, very little research has focused on outward FDI that is country to country (bilateral flows or stocks), i.e. from several source countries to many

destinations [2]. According to Hattori & Rajan (2008), "Eichengreen and Tong (2007); Liu, Chow, and Li (2007); and Sudsawasd and Chaisrisawatsuk (2006)" are some of the few papers that examine FDI to Asia using aggregate data. The following table sums up the findings of the past research done in this area.

Table 1 : Past studies

Study	**Unit of analysis**	**Findings**
Bormann (2005)	Bilateral FDI from 6 EU countries into 81 countries: 1996-2001 (6*81*5)	Gravity model variables: Size of source and destination country along with geographical distance are the most important determinants Other variables: Market potential of neighboring countries (to the destination countries) is important in determining regional FDI. Other measures of friction in interaction such as language are not so important.
Eichengreen & Tong (2005)	Bilateral OFDI from 29 source countries into 63 destination countries: 1988 to 2003 (63*29*15)	Gravity model variables: Size of source and destination countries along with the distance between the two are important Other variables: Common language, common land border, common colonizer, access to sea lanes have positive impact on OFDI
Banga (2007)	Outward FDI flow from13 developing economies of Asia :1980 to2002 (13*12)	Trade has facilitated OFDI. Higher imports have increased domestic competition and driven investment abroad. Internal push factors have also been important
Pantelidis el al (2003)	Outward FDI stock for 4 EU countries and 5 non-EU countries from 1977 to 1997	Gravity Model Variables: Real GDP is most important determinant of OFDI Other variables: Exchange rate and trade openness (measured by level of exports plus imports) are the other important variables for explaining OFDI.
Hattori & Rajan (2008)[3]	Bilateral OFDI flows from 24 source into 12 host countries for 1990-2005 (12*24*15)	Gravity model variables: Source country GDP has negative bearing on OFDI. GDP of destination is positively related to OFDI. Distance is more important for OFDI from non-Asia Pacific OECD economies than intraregional Asian flows. Other Variables: Time zone differences act as a hindrance to OFDI.
Rajan (2009)	Bilateral OFDI Flows among 15 developing Asian countries for 1997-2005 (15*15*8)	Gravity model variables: GDP of source and destination countries along with geographical distance between the two turn out to be significant Other Variables: Common Language, lower political risk in destination country, lagged exports from source country and FTA between source and destination country stimulate OFDI flows. Corporate tax and currency appreciation of source vis-a-vis host turn out to be insignificant

[2] Bilateral OFDI flow data refers to flow of OFDI from one country into various countries. OFDI flow, on the other hand, is the total OFDI from one country into all countries

[3] This study has significant problems due to misspecification of the model. By incorporating log GDP of the source country and log GDP of source * its identification as OECD, there is high multicollinearity, between these two explanatory variables. Hence, the erroneous conclusion. Also, the data used is not publicly available.

Fung et al (2009)	Bilateral OFDI flow for 4 Asian countries for various years starting from 1968	Gravity model variables: Home GDP explains OFDI in a significant way. Distance prevents investment from China and Korea Other variables: Technology seeking hypothesis holds for Taipei, China. It is measured by R&D expenditure in host country and expenditure on information and communication.
Sova et al (2009)	Bilateral FDI flows from 17 countries into 4 EU countries for 1990 to 2005 (17*4*16)	Gravity model variables: Size and distance are important for OFDI Other variables: Political stability, labor costs ratio between source and destination country and membership of free trade areas by both source and destination countries play important role in determining FDI

Source: Own Compilation

1. 3 Research Questions

The studies on OFDI are limited on two fronts. First, literature on OFDI for bilateral flows has looked beyond the basic determinants, such as size and distance, and brought in economic variables from concepts and theories of FDI but not in a way as to be clearly able to discriminate between theories. The variables from the mainstream theory have been more commonly used. OFDI can be influenced by other factors such as capital market imperfections (Aliber, 1970), motive of natural resource seeking (UNCTAD, 2007) and other qualitative factors such as colonial linkage etc. even as the variables from the mainstream OLI framework are important, This study attempts to address the existing research gap by incorporating the normalization of bilateral OFDI stocks rigorously by using an appropriate gravity model specification. It simultaneously brings in variables from the mainstream theory: OLI (advantage) theory, the financial theory of Aliber, and the natural resource advantage of destination countries (resource seeking), to the extent it is possible to operationalize the variables suggested by these theories and concepts at the country and bilateral levels. We were severely limited to find country level variables to clearly reflect the workings of especially the idea of the technological advantage of home country firms having positive influence on FDI. We used a country level variable i.e. R&D intensity with the caution that advantage concept (an aspect of the mainstream OLI theory) is largely based on the characteristics of the firm making the outward investment rather than of the

country, so that the non-significance of R&D intensity at the country level would not reject the hypothesis that innovating firms or firms with technological advantage have a higher propensity for outward FDI. However, it is the interesting to see if R&D intensity for the country as a whole, when the correct normalization via the gravity model is made, would still show up at the bilateral level. Most studies have been limited to geographical regions. The data used in this study has included the bilateral stock in all destination countries even though the number of source countries is limited. This kind of bilateral OFDI flows for as large a number of countries as in this study has not been attempted earlier. Methodologically, though, it can be applied to the entire set of n*n bilateral flows or stocks.

The following are the research questions studied in this essay

1. What are the determinants of OFDI?
2. Using bilateral data, how do factors such as common language, Fisher Open Differential, colonial linkage and other variables suggested by theory perform in explaining OFDI, while normalizing using a fresh specification of the gravity model
3. How can the gravity model, which embeds most models that study bilateral interaction, perform when re-specified to distinguish between GDPs constituted variously by per capita income and population?

1.4 The Model

This paper uses a model which captures the impact of host and source country characteristics on OFDI. For empirically understanding OFDI, this paper starts with the gravity model of trade pioneered by Tinbergen (1962) and later used for trade openness by Morris (1993) with per capita income and population being allowed to have slightly different coefficients. The gravity approach in a variety of forms has been extensively used in international trade for predicting

bilateral flows between two countries as a function of economic size and physical distance or cost of transactions between them. The economic size is generally taken to be GDP in case of countries. Further, distance usually refers to the geographical distance between two economies. In recent years, the use of this model has been extended for analysis of FDI flows to and from countries. The basic theoretical framework for trade between two countries (i and j) is given by the following equation:

$$F_{ij} = G (M_i M)_j/D_{ij}) \qquad (1)$$

Where,

F = trade flow
M = economic mass of each country
D = distance
G = constant
"i" and "j" refer to the two economies

In econometric applications, the above equation can be used as:

$$F_{ij} = G ((M_i^{\beta}{}_1 M_j^{\beta}{}_2)/D_{ij}^{\beta}{}_3)\eta_{ij} \qquad (2)$$

Where, η is the error term with expectation equal to 1. The gravity model is traditionally estimated by taking logs of both sides: (G is part of β_0):

$$\text{Ln } (F_{ij}) = \beta_0 + \beta_1 \ln (M_i) + \beta_2 \ln (M_j) - \beta_3 \ln (D_{ij}) + e_{ij} \qquad (3)$$

Equation (3) is the basic gravity model. In the empirical literature, however, this model is embedded in empirical analysis by using a variety of variables derived or suggested by economic theories so that, in terms of (3), these analysis may be seen as using the gravity model to condition the FDI/ trade or in other words "normalize" the same even if this is not explicitly recognized. The variables have generally been exchange rates, tariffs that tend to influence trade flows between countries. This augmented version is used for modeling OFDI. In the literature ,Stein & Daude (2006), Loungani, Mody and Razin (2002), Hattori and Rajan (2007), have used

embedded gravity like equations. Such embedding allows for the flexibility to control for several factors, and not just restrict to size and distance. Geographers have used gravity model as well to study various interactions such as trade, spatial interaction, including movements of people, communication etc. (Bergstrand (1985),Stein & Daude (2006),Loungani, Mody and Razin (2002)).

In order to capture the effect of variables from economic theory and estimate the coefficients correctly, normalization of any flow, or interaction variables is necessary. Often a variable capturing the size of the destination country (in studies of outward flows from one country) is incorporated. When outward flows from one country to several destinations are considered, the analyses would have to use size of the destination country as a conditioning variable. Similarly, when studying inward FDI from a number of countries into a country, the size of the originating country is used as the conditioning variable. When studying outward FDI at the firm level, firm size is used along with other explanatory variables derived from theory. Since we are studying bilateral stocks, normalization for size (of both origin and destination) countries is called for, in which case the use of the gravity model for normalization would be appropriate. However, it is necessary to distinguish between the two GDPs which as differently constituted as product of per capita income and population. We expect that say a GDP of 100 constituted with a population of 100 and a per capita GDP of 1, would have a different weight in the equation as compared to a GDP of 100 that is constituted by a population of 5 with a per capita GDP of 20. The latter richer country would have a greater weight in trade both originating (exports) and destination (imports). This is argued in Morris, S (1993). Hence, our model for FDI stocks from country i to country j i.e. FDI_{ij} is as follows in the log form:

$$\text{Ln } (FDI_{ij}) = \beta_0 + \beta_1 \ln (PCY_i) + \beta_2 \ln(Pop_i) + \beta_3 \ln (PCY_j) + \beta_4 \ln(Pop_j) - \beta_5 \ln (Dist_{ij}) + \beta_6 (Lang) + \beta_7 (Fod_{ij}) + \beta_8 X_{ij} + \beta_9 V_i + \beta_{10} V_j + \beta_{11} d + e_{ij} \quad (4)$$

Where,
Ln (FDI_{ij}) = Log of FDI from source country (i) into destination country (j)
ln (PCY_i) = Log of Per Capita Income of source country i
ln (PCY_j) = Log of Per Capita Income of host country j
ln(Pop_i) = Log of population of country i
ln(Popj) = Log of population of country j
ln ($Dist_{ij}$) = Log of the geographical distance between i and j
Lang = binary variable which equals one if source and host country have common language
(Fod_{ij}) = Fisher Open Differential
X_{ij} = Any one or more bilateral variables including dummies that are bilaterally defined (but covering limited sets of all of the possibilities m*m
V_i = source country variables
V_j = host country variables
e = error term

The dataset used in this study has a large number of missing values for bilateral FDI. This is because either there are a many countries between whom FDI is not taking place, or are not reported. This is corrected by substituting a percentage of unallocated OFDI regionally.. For example, if unallocated OFDI figure was reported by USA for North African region(as destination), it was divided among North African countries -Algeria, Egypt, Libya, Morocco and Tunisia for which figures were imputed separately like US- Algeria etc This was done by matching the inward FDI statistics reported by these countries. However, where no corresponding match was found for the region-wise unallocated figure, imputation was not done. Such imputation was done for very few observations.

1.4.1 Issues with estimation methods

The data is censored since for many cases of FDI_{ij}, the figures were zero or indistinguishably close to zero. There are a large number of destination countries given their sources for which there was no inward FDI from the source in question. When small countries are sources, the

numbers of such zero value data points are expected to be many. However, this was not a major problem for this dataset since the source countries are all OECD, and all of them had significant aggregate outward FDI. This paper uses Tobit and OLS as the preferred models. According to Stein & Daude (2006), Loungani, Mody and Razin (2002), Hattori and Rajan (2007), Tobit is the widely used model for censored data. In the literature, dealing with censored data, four types of estimation methods are primarily used[4]. Each method has its own advantages and disadvantages. It cannot be asserted that any one is superior to the other. The following table sums up the various estimation methods in the context of using the gravity model, their advantages, and disadvantages along with the source references:

[4] Stein, Ernesto, and Christian Daude. 2006. Longitude Matters: Time Zones and the Location of Foreign Direct Investment. Journal of International Economics 71: 96–112

Table 1 : Estimation methods: Advantages and Disadvantages

Estimation method	Advantages	Disadvantages	References
OLS	-Simple	-Loss of information (elimination of zero flows) -Biased coefficients	Linders and de Groot (2006)
Tobit (censored regression)	-Widely used for censored data	-Same set of variables to determine the probability that an observation will be censored and the value of the dependent variable -Lack of theoretical Foundation	Soloaga and Winters (2001); Anderson and Marcouiller (2002); Baldwin and diNino (2006); Schiavo (2007); Martin and Pham (2008)
Panel fixed effects	- Simple - Controls for unobserved heterogeneity	-Loss of information (constant terms in the regression are dropped) - Elimination of zero flows - Sample selection Bias	Matyas (1998); Egger (2000); Glick and Rose (2002); Egger and Pfaffermayr (2003); Micco et al. (2003); Andrews (2006); Henderson and Millimet (2008)
PPML (Poisson Pseudo Maximum Likelihood)	-Deals with the zero trade flows problem – It provides unbiased estimates in the presence of heteroskedasticity - All observations are weighted equally -Mean is always Positive	-It may present limited-dependent variable bias when a significant part of the observations are censored	Westerlund and Wilhelmsson (2009); Siliverstovs and Schumacher (2009); Liu (2009); Shepherd and Wilson (2009); Martínez- Zarzoso et al. (2007); Santos Silva and Tenreyro (2006); An and Puttitanun (2009)
NLS (Nonlinear Least Squares)	-Deals with the zero trade flows problem	-It assigns more weight to observations with a larger variance (inefficiency). - Not robust to heteroskedasticity - Sample selection Bias	Santos Silva and Tenreyro (2006)
FGLS (Feasible Generalized Least Squares)	- It is robust to heteroskedasticity	-Variance covariance matrix needs to estimated first	Martínez-Zarzoso et al. (2007)
GPML (Gamma Pseudo Maximum Likelihood)	-Robust to heteroskedasticity	- Less weight to observations with a large conditional mean (less prone to measurement errors)	Martínez-Zarzoso et al. (2007)
Melitz Model (2008)	- Provides a rationale for zero trade flows - Unbiased estimates	- Difficult to estimate - Additional data is required (exclusion variables)	Helpman et al. (2008); Santos Silva and Tenreyro (2008)

Source: Own Compilation

1.4.2 Data

The dependent variable is the outward FDI positions (or stock) data from around 34 source countries into 160 host countries[5]. There are totally 2499 non-missing observations. The data for independent variables is taken from a number of sources mentioned in table below.

Table 2: List of independent variables for both i and j: Details

Variable		Proxy for	Measured by	Data Source
GDP	SCV, DCV	Country Size	Gross Domestic Product	WDI, Penn Tables
Population		Market Size	Population of country	IMF
Per Capita Income	SCV, DCV	Income Measure	Per Capital Income	WDI, Penn Tables
RCA	SCV	Comparative advantage in natural resource	Revealed Comparative Advantage Index	UNCTAD
Economic Growth Rate	SCV	Growth of market	5-year M.A. of GDP growth rate	WDI, Penn Tables
R&D	SCV, DCV	Technological Advancement	R&D expenditure (% of GDP)	WDI
NRX	SCV, DCV	Natural Resources trade	Export of natural resource (% GDP)	Earth Trends
NRM	SCV, DCV	Natural Resource trade	Import of natural resource (% GDP)	Earth Trends
FI	BV	Interest Rate Differential	Fisher Index Differential	WDI,IMF
$(Dist)_{ij}$	BV	Distance between countries	Distance between countries I and j	CEPII
Common Language	BV	Common Language	Binary variable if 2 countries have common language	CEPII
Colonial Linkage1	BV	Colonial linkage	Binary variable if 2 countries had colonial linkage	CEPII
Colonial Linkage2	BV	Colonial Linkage	Binary variable if i has been colony of j	CEPII
Colonial Linkage3	BV	Colonial Linkage	Binary variable if j has been colony of i	CEPII
OECD	BV	OECD group	Binary variable if j belongs to the OECD	OECD
Intra-EU	BV	Benefit of belonging to EU	Binary variable if 2 countries belong to EU	EU site
Eurozone	BV	Common Currency	Binary if 2 countries belong to Eurozone	Eurozone
Unemployment Rate	SCV, DCV	Unemployment Rate	Unemployment Rate as a percent of total	IMF

Source: Own Compilation
SCV = Source Country Variable, DCV = Destination Country Variable, BV = Bilateral Variable

The data for dependent variable is taken from the OECD Statistics and cross-checked with Coordinated Portfolio Investment Survey (CPIS), IMF for the year 2009. The detail of each source is mentioned in the table below. Data on distance and common official language is taken from the CEPII (http://www.cepii.fr/).

The merit in this study is that this kind of bilateral OFDI for such a large number of countries has not been studied earlier. Though, a few regional specific studies have been undertaken, the data is limited on account of the following reasons. First, it is only for the stock data for the year 2009. It is so because when the study was conducted, IMF had recently started making this data available for the stock for the year 2009. So, adequate data points could not be collected. Secondly, the data is reported for around 34 source countries and 160 host countries. The number of source countries included is limited due to reporting issues. However, when compared to other datasets on bilateral OFDI, this remains the most comprehensive compilation available. Only a few countries report their outward FDI flow destination wise. And, with much resources it is possible to put such OFDI flow data together to add another dimension vis time and use a normalization akin to the one we use in this study. Despite the limitation of dataset, the model used makes it possible to extend the analysis using a larger sample with the availability of more data points. For allowing such extension, the program for data arrangement has been written with generalizable codes.

1.4.3 Independent Variables

This section lists the variables to normalize (or control variables). These are derived from the perspective of the gravity model.

1. Size

This study uses one of the following variable(s) for capturing the size of any economy: Per Capita Income (PCY) and Population (Pop) together as a proxy for a given country's size. It is a well-known economic measure for analyzing the size of country. We use Per Capita Income (PCY) along with population together. It is akin to GDP corrected for population size. We use this following the same economic reasoning mentioned for GDP. Both the variables are used for source and destination countries. Thus, our first understanding is that $FDIij = k^* (PCY_i)^{\beta 1} (Pop_i)^{\beta 2} (PCY_j)^{\beta 3} (Pop_j)^{\beta 4}$, with β_1 having a higher value than β_2 and $\beta_3 > \beta_4$. The reasoning is that a richer country would be both more specialized (have greater division of labor) when a source of trade or FDI, and a richer destination country would also show greater variety in consumption ad input use and specialization as well (Morris, 1994)

2. Distance

The role of distance cannot be ignored in a study of FDI flows. Greater distance between countries makes foreign operations more difficult and expensive to supervise; therefore, discourages FDI. Distance cost includes information, search cost and the cost of operating at a distance. If the distance between economies is less, we can expect that the motivation to invest abroad is low. One may argue that this factor is important for trade and not for OFDI as the latter is a one-time decision. However, this is not true. Though OFDI decision is undertaken at a point of time, OFDI is a continuous process. For example, after setting a manufacturing plant abroad, there are interlinkages across the domestic and foreign operations of a firm. The same has been endorsed by the interviews conducted with various companies selected for the earlier essay. These interlinkages can be in the form of transfer of employees, raw material etc. Though knowledge can be seemingly transferred through various modes of communication, the transfer

of physical and tangible assets as well as knowledge when not completely codified becomes a function of physical distance between countries. Smaller distance will therefore be better for the overall cost efficiency. Only local firms will operate if the distance costs are overwhelming. Indeed, the mainstream theory of FDI is cast as resulting from overcoming this cost of operating at a distance through advantage possessed by the foreign firm arising through "imperfection" in goods and services markets, in factor markets and in the trade in technology (Kindleberger, 1969). Distance constitutes an important component of difference between operations of local firms and foreign firms. It stacks the advantage in favor of the local firm. Our data on distance is taken from CEPII. This is calculated using the method prescribed by Head & Mayer (2002). Distance between two countries is based on the distance between the biggest cities of those two countries, those inter-city distances being weighted by the share of the city in the overall country's population[6]. This measure has been widely used in many empirical papers focused on FDI and gravity model (Praakash, Mody & Razin, 2002; Hattori & Rajan, 2007).

3. Economic Rate of Growth

We expect the rate of growth of GDP of the destination country averaged over a five year period to be positively related to the OFDI stock from any source country. However, on the growth in the source country, there is no firm theoretical basis in the literature to expect either a positive or a negative relationship. Off mainstream theories such as those derived from the vent for surplus (Magdoff,H, 1969) or the return to capital concept would expect that there is a negative relationship between the growth (presuming that there is no slack in output) to be revealed.

[6] CEPII - Accueil. (n.d.). Retrieved March 6, 2013, from http://www.cepii.fr/

4. Fischer Open Differential

According to Aliber (1970), the FDI flows across borders are governed by interest rate differentials adjusted for the depreciation in the currency i.e. the deviations from the uncovered interest parity, more than other factors such as locational advantage etc. This study adds to the existing literature as it tries to capture Aliber's theory by using fisher open differential denoted by the following:

$$(i_j - i_i) - (e_{ij} - e_{ij}\,(t\text{-}1))/\, e_{ij}$$

We expect the Fisher Open to have a positive relation between the past Fisher Open defined with reference to the host country in relation to the home country. In the above equation, i stands for the interest rate of the respective country measured by the prime lending rate i.e. PLR. The exchange rate reported by countries is used for finding the exchange rate differentials after converting all the variables into one currency. We have used the Fisher Open for 2008 prior to 2009.

5. Revealed Comparative Advantage in Natural Resources

With the heavy dependence of economies on natural resources and natural resource seeking being a major factor behind OFDI, it is imperative to understand the relation of OFDI with some measure of natural resource availability. Limited studies have controlled for natural resource availability as a determinant of FDI. Some of these studies are Morisset (2000) and Noorbakhsh et al. (2001). Asiedu (2002) argued that omission of a measure of natural resource can lead to biased results. Past studies have generally employed share of minerals and oil in total exports as a potential measure. This study uses a measure of revealed comparative advantage. Here, we

formulate a measure of RCA for food, raw materials, minerals and oil, all combined together. It is a further development of the measure used by Balassa, B. (1965)[7] and is given by:

RCA(Agriculture) ={ (Agriculture products, raw materials and food exports in exports of a country)/(Imports of the same in total imports of the country)}/{Ratio of all countries agriculture exports share of all countries agriculture imports share}[8]

It is possible to refine this measure for the country's current account balance of payments including that due to non-factor services (Morris, 2007), but the same has not been carried out. This data is taken from UNCTAD and the index is derived using the above formula. For the purpose of this study, agriculture includes food, fuel and agricultural raw material. RCA can also be seen as a direct evidence of agricultural land abundance. We have taken RCA for source country and natural resource exports and exports of agricultural products for destination country as a proxy for capturing dimension of natural resources.

6. Cultural Distance

The fact that common language can influence the FDI between two countries cannot be ignored. This variable is constructed from the data given by CEPII. The primary source of this data is the language information from ethnologue.org[9] and CIA World Factbook[10]. The variable takes the value "1" if the two counties (source and destination) share common language. Else, it is "0". The sign for coefficient of common language is expected to be positive indicating ease of better communication flow, ease of knowledge transfer and general understanding imperative for conducting business. The construction of dataset is as follows. For each country, CEPII reports

[7] Balassa, B. (1965), "Trade Liberalization and "Revealed" Comparative Advantage". The Manchester School. Vol. 33. pp. 99-123.
[8] Morris (2007), "Agriculture: A Perspective from History, the Metrics of Comparative Advantage, and Limitations of the Market to Understand the Role of State in a Globalizing World". IIM-A Working Paper No.2007-02-02
[9] Ethnologue. (n.d.). Retrieved March 12, 2013, from http://www.ethnologue.com/
[10] CIA - The World Factbook. (n.d.). Retrieved March 12, 2013, from https://www.cia.gov/library/publications/the-world-factbook/

up to three official languages. The variable takes value one for official language or if the language is spoken by at least 9 per cent of the population in both the countries[11].

7. **Colonial Linkages**

For capturing the colonial linkage, the study again uses the CEPII data. According to the data source, "Colonization is a fairly general term that we use to describe a relationship between two countries, independently of their level of development, in which one has governed the other over a long period of time and contributed to the current state of its institutions"[12]. The dummy constructed takes the value "1" if there was any colonial tie between two countries. Else, it takes value "0". There are additional dummies formulated for checking for biasness of data. This has been explained in the later section. It is expected that if there is a colonial linkage, the level of OFDI will be more. The hypothesis formulated for the same are mentioned here

8. Intra- European Union

According to Eurostat, the magnitude of trade of goods and services and FDI within European Union has witnessed a consistent increase. The dataset used here is for 34 source countries. A lot of these countries belong to the EU. To check for the evidence of high mobility of investment within EU and weightage of the same in this dataset, a dummy is created for EU-27. The dummy takes the value one if the source and destination countries belong to EU. It takes the value zero otherwise. FDI flows can significantly be impacted by the intra-regional geographical patterns. A positive and significant coefficient will indicate that there is more OFDI between countries belonging to EU. Yet some of the countries of the EU are only recently incorporated into the union. Hence, we would ceterius paribus expect deeper inter-country investments among those

[11] For more details on the reporting of this data, see http://www.cepii.fr/anglaisgraph/workpap/pdf/2011/wp2011-25.pdf.

[12] CEPII - Accueil. (n.d.). Retrieved March 6, 2013, from http://www.cepii.fr/

that have been more closely integrated at the macroeconomic level and for long. Recent countries have come in like Estonia, Poland, Slovakia and Slovenia which are not particularly more integrated than the non-EU trading partners. For capturing, this we created the next variable.

9. Eurozone: Common Currency Union

A dummy was constructed for capturing the impact of common currency union. The dummy took the value one when both source and destination country belonged to Eurozone, else zero. Also, the countries which joined Eurozone after 2005 where not considered for better representation of common currency union by 2009. This variable also gives insight into how common currency can act to reduce the friction in OFDI by reducing the costs of operating in a different currency regime. We, therefore, expect the sign of the Eurozone coefficient to be positive.

10. Unemployment

The traditional measure of unemployment is the unemployment rate. This is used as one of the characteristics of the source country. One could argue that unemployment in source country will be related to more OFDI from that country if that unemployment is structural and therefore the scope for further growth is low. Conversely, if the unemployment is not structural, then we could anticipate that the firm in that country has greater scope to invest in the country as well when it grows. Then we may see a relationship of unemployment together with growth.

11. Gross Government Debt

We took one additional variable i.e. general gross government debt (as per cent of GDP).

All the variables mentioned above were added in an incremental manner to the augmented gravity model. For estimating this model, a few other variables were used. Though the variables

were dropped either on account of sparse data or another available variable, the initial incorporation of these variables enhanced the overall understanding of the OFDI determinants. These were: Net national savings and measure of technological advancement i.e. Research and development (R&D) expenditure as a percentage of GDP. The following table sums up the statistics of the data used. For detailed summary statistics of other variables, see Appendix:

Table 3 : Some Characteristics of the Source and Destination Countries

	Source Countries	**Destination Countries**
Number	34	160
OECD Countries	34	34
Non-OECD Countries	0	126
Classification according to region		
East Asia & Pacific	4	23
Europe & Central Asia	25	50
Latin America & Caribbean	2	32
Middle East & North Africa	1	23
North America	2	5
South Asia	0	11
Classification according to Income level		
High Income: Non-OECD	0	21
High Income: OECD	34	33
Low Income	0	33
Lower Middle Income	0	41
Upper Middle Income	0	32
Other average characteristics		
Population	20.09(mn)	35.69(mn)
Per capita income	29547(USD)	13622.01(USD)
Average GDP	30511 (USD mn)	15003 (USD mn)
Gross Government Debt (% of GDP)	54.61(%)	48.29(%)
Revealed Comparative Advantage Index	1.002 (%)	1.7 (%)
Average economic growth rate	2.14 (%)	4.64(%)
Current account balance	(7347) (USD mn)	1755 (USD mn)

Source: Own Calculations[13]

[13] These are the averages over the 34 source countries and 160 destination countries respectively of the variables below, (without reference to the database) i.e. once taken.

This study uses data for 34 source countries and 160 destination countries. There are 34 countries belonging to OECD in both categories. According to UNCTAD stats, developed world accounted for around 50 per cent of FDI inflows and around 73 per cent of FDI outflows in 2009. This is captured decently by the data given the limitation on the source country side. The data is limited because of reporting issues. When we look at the regional distribution, majority of the countries belong to Europe. This is again on account of better reporting of bilateral data by European countries both as source and destination, compared to other countries which may have good reporting standards such as India For checking data bias in this regard, we used a dummy for capturing impact of European Union presence which takes value 1 if both source and destination belong to EU. The spread of destination countries across the world geography makes the data rich. When we look at the income classification, on the source country side, the data is quite limited. All countries belong to the high income category. However, the distribution is good for destination countries. With regard to the other average statistics reported in the table, the source countries are richer when measured by GDP. However, the economic growth rate is higher for destination countries. This can be attributed to the presence of growing Asian economies compared to the stagnating growth rate in OECD countries, is reflective of the fact that LDCs on the whole have been growing faster than DCs. The difference between the average inward FDI for source and destination countries is large. This can be attributed to the presence of various destination countries in terms of size, development level etc. Further, sixteen out of thirty four source countries have been the colony of another country, The past relation of colonial linkage has been captured by creating dummies.

1.5 Procedure

The following is a broad summary of the steps followed:

1. Data arrangement using 3-digit country codes

2. Cross- checking values with main data

3. Imputing figures from respective country sources where possible

4. Testing the gravity model

5. Testing the models that add variables capturing characteristics of i and j country, and reflecting competing/complementary economic theories6. Further, tests for heteroskedasticity and multicollinearity were done. Multicollinearity was not much of a problem. Where necessary, for addressing the issues of multicollinearity, the variables were either dropped or replaced by another proxy. There was mild heteroskedasticity observed which was taken care of by reporting robust standard errors (all acceptable). These are reported in the table of results.

1.6 Results

In this study, the first attempt was to test a baseline model i.e. the gravity model. Thereafter, variables were added. . The results are reported in the table below with the bracketed terms indicating the value of t-statistic. The values in italics are not significant at 1 per cent level. The significance of the components of basic gravity model is endorsed by the data analysis. Our principal findings are as follows:

(i) The variables related to the gravity model explain nearly 50 per cent of the variation in the OFDI stock and the coefficients are not only significant, but are significantly close to the expected values e.g. population's coefficients are close to 1,but less than 1 as anticipated. The coefficient of per capita income is significantly greater than 1, but close to 1, and stable in any test with additional variables, thereby supporting the revised formulation of the gravity model that distinguishes between per capita income and population in the constitution of the GDP, the

former having greater influence in the interaction through FDI. [14]. Despite the fact that while the source country coefficient of per capita is significantly greater than 1; it is significantly less than 1 for the destination country. This suggests that FDI stocks in recipient countries have a power law relationship with its per capita income that is significantly less than 1, so that the thesis that FDI like capital has a greater propensity, ceterius paribus to build up in a country when its GDP expands through population size rather than through per capita income

(ii). The variables covering common language, source country having been a colony of the destination country, and destination having been a colony of the source country explains further the variations in FDI stock over and above the gravity model. The variables all have signs as would be expected. This may be seen as further support to conditioning the country to country FDI stock through an improvement in the "distance" specification, since they can be seen as reducing the distance (the transaction cost) when prior governance interaction or common language reduces the friction in interaction. That the values of the coefficients are not too far from being 1.08 or 1.57/1.58 would imply that they do make an 8 or 60 per cent difference to the aggregated FDI stock. The coefficient of geographical distance between two countries is negative with distance elasticity of -0.80 indicating that OFDI is inversely related to distance.

(iii). Log RCA is natural resources exported including food with the coefficient being less than 1 but positive would mean the power of the power relation between FDI stock and RCA is less than 1. Thus, as a country has an advantage in natural resources, its outward FDI rises but at a rate less than 1 (and 0.70).This means that countries generating natural resources have a higher

[14] This is as to be expected in the case of trade as well for the reasons argued in Morris (1993)

but declining propensity to accumulate OFDI stocks. Conversely, the recipient country having revealed comparative advantage in natural resources and agriculture is not a significant factor[15].

(iv).Among the other related variables, pertaining to the recipient and source countries, the fact of being within a currency union namely in the Eurozone makes a significant difference which along with common language has the highest explanatory power. Since, common currency is also a variable that can be expected to improve mutual OFDI, by reducing on the risk of business with operations in both countries; it could also reduce friction and also lower risk. Moreover, since the same underlies capital flows as well, that FDI stock has the character of cumulative capital flows is further upheld.

(v). Other economic variables that we find robustly significant i.e. behaving systematically whether or not other variables are included, are: unemployment in the source country and outward FDI stocks being lower when unemployment is higher. The prior economic growth rate is negatively related to outward FDI stocks. This low prior economic growth and low unemployment in the source countries lead to enhanced OFDI stocks. Thus, it is the slowness in growth of "full employment output" that positively influences outward FDI. In other words, there is a slowness of growth not because of recession, but because the growth prospects are lower, and have been so in the immediate past. There is then a positive push to outward FDI reflecting in higher stocks.

(vi). Government Debt Ratio in the source country has a significant positive and robust positive impact on outward FDI. High government debt ratio may signify past high borrowings by

[15] This is one of the surprising findings and needs to be investigated further. Perhaps by taking a more restricted definition of natural resources that is only oil and mineral resources that grant the country market power (rather than using a more comprehensive definition that includes agriculture which is more ubiquitous) it is likely that RCA of the host country would also turn out to be positive and significant.

government inter alia to support domestic expenditures perhaps signifying long term recessionary conditions. The matter of course deserves more serious pursuit.

(vii). Other coefficient such as the one for fisher open differential is positive but just below the threshold level of significance. The insignificance of fisher open differential can be attributed to the fact that this data is only for one year. Moreover, unless the Fisher Open has been consistently in one direction in many of the years preceding 2009, its effect would cancel out. If we have data available for more years, we cannot rule out its significance.

(viii) The economic variables considered and which are significant, and brought out above, have a much lower significance, and there is some (but small) chance that the coefficients of the influencing economic variables would change. However, the gravity related variables have very large significance, and even if other variables are included their coefficients are unlikely to budge.

To sum up, we find significant relation between OFDI and the following variables : population of source and destination countries, per capita income of source and destination countries, distance between two countries, revealed comparative index of source country, unemployment rate of source country, economic growth rate of source country, common currency union and common language. Overall, the augmented gravity model furnishes the major explanation behind OFDI. The source country characteristics are further important in explaining OFDI.

The following table sums up the results. Figures in parentheses denote t-value. Figures in curly brackets are the robust standard errors corrected for heteroskedasticity

Table 4: OLS Regression Results - I (Equation 4)

Variables	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII
No. of Obs	**2499**	**2499**	**2156**	**2156**	**2156**	**2046**	**2046**
R-square	**0.4621**	**0.4801**	**0.4723**	**0.4902**	**0.5151**	**0.5157**	**0.5327**
F-Statistic	Sig. 356.87	Sig. 328.56	Sig. 240.18	Sig 217.51	Sig. 216.21	Sig. 196.91	Sig. 193.10
(Constant)	*.6848 (1.38)**	2.814125 (5.22)	3.491202 (6.00)	2.549733 (4.25)	3.148432 (5.36)	2.96423 (4.95)	3.343542 (5.66)
Log Population j	.9046202 (25.16) {.03938}	.9033071 (25.54) {.0349}	.8931323 (22.84) {.0387}	.8712015 (21.97) {.0385}	.8612783 (30.76) {.0373}	.8951233 (22.97) {.0378}	.9025093 (23.57) {.0372}
Log Population i	.9876577 (20.27) {.0479}	1.065021 (21.9) {.0478}	1.030762 (18.95) {.0507}	.9045809 (16.13) {.0521}	.853725 (15.55) {.0551}	.8560396 (15.59) {.0551}	.8485459 (15.72) {.0546}
Log Per Capita Income i	1.293732 (32.49) {.0393}	1.291767 (32.98) {.0394}	1.254742 (28.3) {.0441}	1.325496 (29.14) {.0469}	1.232249 (27.20) {.0471}	1.233441 (27.23) {.0471}	1.099314 (23.31) {.0461}
Log Per Capita Income j	.8650828 (33.20)	.8665042 (33.81) {.0258}	.8495386 (30.07) {.0284}	.8406835 (29.36) {.0284}	.8612783 (30.76) {.0276}	.8487305 (29.12) {.0293}	.8569492 (29.90) {.0291}
Log Distance	-.8967762 (-17.07) {.0264}	-.9323175 (-17.99) {.0535}	-.9506311 (-16.71) {.0534}	-.8925619 (-15.53) {.0557}	-.9144868 (-16.30) {.0531}	-.9033056 (-15.97) {.0536}	-.8886882 (-15.99) {.0532}
Log RCA i	.6988912 (8.82) {.0761}	.6339448 (7.56) {.0754}	.6043283 (5.30) {.1145}	.6042091 (5.31) {.1126}	.4964544 (4.45) {.1101}	.4928644 (4.42) {.1101}	.3623122 (3.28) {.1060}
Log Unemployment i		-1.016484 (-9.26) {.1130}	-1.003535 (-8.65) {.1139}	-1.375307 (-11.22) {.1263}	-1.467022 (-12.23) {.1227}	-1.46998 (-12.26) {.1226}	-1.335505 (-11.24) {.1246}
Log Economic Growth Rate i			-.481677 (-5.01) {.0971}	-.3975958 (-3.88) {.1049}	-.4756968 (-4.75) {.1025}	-.4759928 (-4.76) {.1024}	-.7068079 (-6.93) {.0998}
Log Government Debt i				.3705496 (5.40) {.0833}	.3492857 (5.22) {.0818}	.3481906 (5.20) {.0819}	.4218547 (6.36) {.0816}
Common Language					1.760132 (10.24) {.1512}	1.760191 (10.24) {.1509}	1.746333 (10.34) {.1535}
Log Natural Resource Exports j						-.0991989 (-1.54)* *{.0687}*	-.1004813 (-1.59)* *{.0671}*

Source: Own Calculations *Significant at 10%. All other results are significant at 1%.

1.6.1 Past History

Five additional dummies were created to correct for country categories that are relevant to the analysis. One is for OECD destination country dummy, second, when destination country has been the colony of the source country, third, when source country has been colony of destination country, the fourth and fifth are interaction dummies i.e. product of the first and second; product of first and third dummy. After running the regression, it was found that the dummy created for capturing whether the destination country has been colony of source country or not is significant. Also, whether destination country is OECD or not is not significant in explaining outward FDI stocks, when other economic and political variables such as past linkages, same currency, growth and unemployment are incorporated. The coefficient for interaction dummy of OECD with colonial linkage with destination is 1.681 indicating that, ceterius paribus, if destination country is OECD and colony of source country then the FDI flow will be more by this magnitude. This is as is widely known from anecdotal data that the mother country of the colony which remained underdeveloped has higher interaction among them even after independence. In this case the examples of UK-US, UK-Canada etc come to mind. Further, the variable of common language when introduced after removing the colonial linkage dummy; it is significant and positive as expected. These results are reported in the table below.

Table 5 : Regression Results – II

Variables	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII	Model VIII	Model IX
R-square	**0.4621**	**0.4629**	**0.4650**	**0.4645**	**0.4673**	**0.4824**	**0.4674**	**0.4635**	**0.4672**
F-Statistic	Sig. 356.87	Sig 306.74	Sig 309.26	Sig 308.65	Sig 273.09	Sig 331.68	Sig 273.14	Sig 307.42	Sig 311.99
No. of Obs	2499	2499	2499	2499	2499	2499	2499	2499	2499
(Constant)	*.6848 (1.38)**	*.4240252 (0.83)**	*.6544699 (1.32)**	.5466353 (1.10)	.5151081 (1.04)	.8054774 (1.66)	*.5298399 (0.285)**	*-.3157899 (-0.50)**	*.1918872 (0.38)**
Population j	.9046202 (25.16)	.8814796 (23.26)	.9116405 (25.38)	.8978016 (24.97)	.9048148 (25.20)	.9249649 (26.17)	.8645884 (33.05)	.9025864 (25.12)	.8827284 (24.46)
Population i	.9876577 (20.27)	.9880536 (20.29)	.9761484 (0.04)	.9879476 (20.32)	.9763726 (20.09)	.9353486 (19.45)	.9754991 (20.07)	.9918891 (20.37)	.9643511 (19.78)
Per Capita Income i	1.293732 (32.49)	1.293385 (32.49)	1.27562 (31.86)	1.296046 (32.60)	1.277844 (31.97)	1.236288 (31.30)	1.276879 (31.96)	1.295156 (32.55)	1.279107 (32.17)
Per Capita Income j	.8650828 (33.20)	.8342223 (27.27)	.8730936 (33.46)	.8563291 (32.75)	.8643249 (33.03)	.8784698 (34.31)	.8645884 (33.05)	.8593891 (32.89)	.8445028 (32.12)
Distance	-.8967762 (-17.07)	-.8617869 (-15.50)	-.8898694 (-16.96)	-.8792687 (-16.68)	-.8721969 (-16.58)	-.9030476 (-17.51)	-.8734777 (-16.61)	-.7865754 (-11.47)	-.8188001 (-14.96)
RCA i	.6988912 (8.82)	.7001486 (8.24)	.6796165 (8.00)	.7004894 (8.26)		.5800402 (6.88)	.6803393 (8.03)	.7016652 (8.26)	.7131917 (8.42)
OECD destination dummy		*.2567053 (1.92)**							
jCOLONYi			1.08181 (3.63)		1.088175 (3.66)		1.088715 (3.66)		
iCOLONYj				*1.571599 (3.30)**	*1.582761 (3.33)**				
Common Language						1.661919 (9.88)			
Interaction Dummy							1.680842 (3.36)		
European Union								.4320386 *(2.50)**	
Eurozone									1.224658 (4.84)

Source: Own Calculations

*Significant at 10%. All other results are significant at 1%

1.jCOLONYi is Dummy variable (when destination country has been colony of source country)

2.iCOLONYjDummy variable (when source country has been colony of destination country)

3.Interaction Dummy is (OECDd*jCOLONYi)

1.7 Conclusion: Limitations and Future Research

This paper investigated the determinants of bilateral OFDI stocks from source to destinations at the country level. The analysis commenced with the use of suitably augmented gravity model. With the augmented gravity model being always embedded, further variables capturing different dimensions of the source and destination country characteristics and reflecting the determinants as one would expect from competing and complementary theories of FDI, were added. In all the models estimated, the augmented gravity model related turn out to be the most significant in determining OFDI stocks. The variables of population, size, per capita income and distance explain the variations in OFDI to a considerable extent. Other economic variables are of lesser significance with an exception of common language. This would suggest that economists doing cross sectional and panel data analysis, especially of interactions like trade flows, FDI portfolio flows, and stocks reflecting cumulation of past flows would have to, in the first instance, be concerned about correctly "normalizing" or controlling, for size.

The study has limitations arising out of data limitations which can be overcome. The data is only for the year 2009. As and when more data on stocks becomes available for more years and more countries, the analysis can be without further ado extended. Further, the data is available for a limited set of source countries. Though attempts were made to impute values from other sources, nothing much could be done to increase the number of data points due to reporting issues. Future research can focus on extension of analysis with availability of data for longer time period and for more countries. Also, there is a need to identify more variables suggested by competing and complementary theories of FDI and operationalize them at the country level.

If flow data of bilateral OFDI from a number of countries is available for many years then the proper conditioning for size through embedding the augmented gravity model as in this study would be right way to analyze the influence of economic variables and relate the same to theory. With such bilateral flow data, the economic theories that consider FDI as a capital flow- for example the finance theory of Aliber(1970) would have a better chance of being tested complementary to the mainstream theory.

Appendix

Summary Statistics

Variable	Obs	Units	Mean	Std. Dev.	Min	Max
FDI from i to j	4710	USD million	2997.91	18672.65	-2958.993	481140
Distance	4824	Kms	6961.137	4437.818	59.61723	19629.5
Fisher Index	3476	%age	10.18578	53.01642	-17.58891	576.28
Natural Resource Exports of j	4824	USD thousand	.4107659	.2856914	.0016111	.9860319
Revealed Comparative Advantage of i	4994	%age	1.002884	.8932938	.0813474	4.867205
Population of j	4688	Million people	41.33404	154.5933	0	1334.74
Population of i	4994	Million people	20.10454	30.16068	0	151.874
Per Capita Income i	4994	'00 USD	428.1945	1420.518	1.210049	8325.12
Per Capita Income j	4586	'00 USD	175.4593	822.5338	.0355987	8325.12
Economic Growth Rate of j	4723	%age	4.383991	2.984461	-3.983914	16.02722
Economic Growth Rate of i	4847	%age	2.103467	1.517396	-.4476009	6.028847
Unemployment Rate in j	4654	%age	6.039637	5.662827	0	30
Unemployment Rate in i	4994	%age	8.183734	3.733492	3.166	18.01

Source: Generated in Stata from data compiled from various sources

Bibliography

Aliber, R.Z. (1970), "A theory of direct foreign investment", in Kindleberger, C.P. (Eds),The Int ernational Corporation, MIT Press, Cambridge, MA, pp.17-34

Asiedu E. (2002) "On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different?" World Development 30(1), 107-118

Asopa, V.N. (2006), 'Creating Competitiveness in Indian Floriculture,' Buenos Aires: International Food and Agribusiness Management Association's 16th Annual World Forum and Symposium, June 10-13

Athukorala (2009), "Outward Foreign Direct Investment from India", Asian Development Review, vol. 26, no. 2, pp. 125–153

Banga, R. (2003), "Do Productivity Spillovers from Japanese and U.S. FDI Differ?",mimeo, Delhi School of Economics

Banga, R. (2007), "Explaining Asian Outward FDI". Paper presented at ARTNeT Consultative Meeting on Trade and Investment Policy Coordination, Bangkok 2007. Retreived from http://www.unescap.org/tid/artnet/mtg/tipc_s6banga.pdf on 11th March 2013

Beiguang Zhu(2008): " Internationalization of Chinese MNEs and Dunning's Eclectic (OLI) Paradigm: A Case study of Huawei Technologies Corporation's Internationalization Strategy", Master Thesis, Lund University

Bergstrand, Jeffrey H. (1985). The gravity equation in international trade: Some micro-economic foundations and empirical evidence. Review of Economics and Statistics 67:474-8 1

Borrmann, C. (2003), Methodological Problems of FDI Statistics in Accession Countries and EU Countries, Ed Straubhaar, T. et al, hamburgisches Welt-Wirtschafts-Archiv (HWWA), Hamburg Institute If International Economics, ISS 0179-2253

Bormann,C. et al. (2005). What gravity models can tell us about the position of German FDI in Central and Eastern Europe. Hamburg Institute of International Economics Discussion Paper 328. Retreived from

http://www.fhrandenburg.de/~brasche/EU/k4/k44/k442/fdi_moel_gravity_HWWA_328.pdf on 11th March 2013

Buckley, P.J., Casson, M. (Eds.), The Economic Theory of the Multinational Enterprise:

Selected Papers. Macmillan, London , 1985

Capitaline Databases. (n.d.). Retrieved May 29, 2012, from http://capitaline.com/user/framepage.asp?id=1

Child, J., & Rodrigues, S. B. (2005). The Internationalization of Chinese Firms: A Case for Theoretical Extension?[1]. *Management and Organization Review*, *1*(3), 381-410. doi:10.1111/j.1740-8784.2005.0020a.x

Chandra, V. (2006). *Technology, Adaptation and Exports,* World Bank Publication

Cuervo-Cazurra, A. and Genc, M. (2008), "Transforming disadvantages into advantages: developing country MNEs in the least developed countries", Journal of International Business Studies , Vol. 39 No. 6, pp. 957-79

Dunning, John H. (1993): "Multinational Enterprises and the Global Economy", Addison-Wesley, pp. 81

Dunning, J. H. (2000). The eclectic paradigm as an envelope for economic and business theories of MNE activity. *International Business Review*, *9*(2), 163-190. doi:10.1016/S0969-5931(99)00035-9

Eaton, Jonathan & Akiko Tamura (1994). Bilateralism and regionalism in Japanese and U.S. trade and direct foreign investment patterns. Journal of the Japanese and International Economies 8:478-5 10

Fung et al (2009), "A Comparative empirical examination of outward Foreign direct investment from Four Asian economies: People's republic of China; Japan; republic of Korea; and Taipei, China". Asian Development Review, vol. 26, no. 2, pp. 86–101

Grosse, R. and L. J. Trevino, 1996, "Foreign Direct Investment in the United States: an analysis by country of origin," Journal of International Business Studies, 27, 139-55

Gujarati, D.N., 2003. Basic Econometrics. MacGraw-Hill, New Delhi.

Hattori & Rajan (2008), "Sources of FDI Flows to Developing Asia: The Roles of Distance and Time Zones", ADB Institute Working Paper No. 117. Retrieved from http://www.adbi.org/workingpaper/2008/10/06/2719.fdi.flows.developing.asia/ on 12th April 2012

Helpman et al (2008). "Estimating Trade Flows: Trading Partners and Trading Volumes," The Quarterly Journal of Economics, MIT Press, vol. 123(2), pages 441-487, 05

Hymer, S. (1976). The international operations of national firms, MIT Press, Cambridge, MA

Industrial Process Technology, Systems and Process Solutions | SPX. (n.d.). Retrieved May 28, 2012, from http://www.spx.com/en/industries/industrial-processes/

Kalegaonkar, A., Locke, R., & Lehrich, J. (2008). Biocon India Group.

Kindleberger, C.P. (1969). American Business Abroad (New Haven, Yale University Press).

Li, P. P. (2007). Toward an integrated theory of multinational evolution: The evidence of Chinese multinational enterprises as latecomers. *Journal of International Management*, *13*(3), 296-318. doi:10.1016/j.intman.2007.05.004

Linders, G.J.M. and H.F.L. de Groot (2006) Estimation of the gravity Equation in the Presence of Zero Flows, Tinbergen Institute Discussion Paper, 2006-072/3

Loungani, Prakash, Ashoka Mody, and Assaf Razin. 2002. The Global Disconnect: The Role of Transactional Distance and Scale Economies in Gravity Equations. Scottish Journal of Political Economy 18: 526–543

Liu, Li-gang, Kevin Chow, and Unias Li. 2007. Determinants of Foreign Direct Investment in East Asia: Did China Crowd Out FDI from Her Developing East Asian Neighbours. China and the World Economy May–June: 70–88.

Morris et al (2010), "FDI Outflows from India: An Examination of the Underlying Economics, Policies and their Impacts", IIM-A Working Paper 2010-03-01

Morris (2007), "Agriculture: A Perspective from History, the Metrics of Comparative Advantage, and Limitations of the Market to Understand the Role of State in a Globalising World". IIM-A Working Paper No.2007-02-02

Morris, S. (1987) "Trends in Foreign Direct Investment from India (1950-1982)," Economic and Political

Morris, S. (1990) "Foreign Direct Investment from India. Ownership and Control of 'Joint Ventures' Abroad," Economic and Political Weekly, 25, 7-8, pp, M23-M34

Morris, S..(1993). Structural Determinants of Openness of Economies: The Conceptual Basis and Cross-Sectional Evidence. IIMA Working Papers WP1993-08-01_01206, Indian Institute of Management Ahmedabad, Research and Publication Department

Morris S. (1994). Structural Determinants of the Openness of Economies: The Conceptual Basis and Cross Sectional Evidence, mimeo, International Economics Workshop, Dept. of Economics, Univ. of Pennsylvania, Feb.21, 1994

Morris, Sebastian, Towards Reform of the Land Acquisition Framework in India (May 1, 2007). Indian Institute of Management Working Paper No. 2007-05-04 . Available at SSRN: http://ssrn.com/abstract=1755343 or http://dx.doi.org/10.2139/ssrn.1755343

Morrisset P.(2000). "Foreign Direct Investment to Africa: Policies also Matter." Transnational Corporation, Vol. 9 (2): 107-125

Narayanan, K., & Bhat, S. (2011). Technology sourcing and outward FDI: A study of IT industry in India. *Technovation*, *31*(4), 177-184. Elsevier. doi:10.1016/j.technovation.2010.06.002

Noorbakhsh F, Paloni A, Youssef A. (2001) "Human Capital and FDI Inflows to Developing Countries: New Empirical Evidence" World Development 26 (7), 1593-1610.

Pradhan & Singh (2008), "Outward FDI and Knowledge Flows: A Study of the Indian Automotive Sector". ISID Working Paper 2008/10

Pradhan, J. P. (2004) 'The Determinants of Outward Foreign Direct Investment: A Firm-level Analysis of Indian Manufacturing', Oxford Development Studies, 32(4), pp. 619-639.

Pradhan, J. P. (2005) "Outward Foreign Direct Investment from India: Recent Trends and Patterns", GIDR Working Paper, No. 153, February.

Pradhan, J. P. and Vinoj Abraham (2005) "Overseas Mergers and Acquisitions by Indian Enterprises: Patterns and Motivations", Indian Journal of Economics, vol. LXXXV, no. 338, pp. 365

Rajan, R. S. (2008), 'Intra-Developing Asia FDI Flows: Magnitudes, Trends and Determinants', in Soesastro, H. (ed.), Deepening Economic Integration- The ASEAN Economic Community and Beyond-, ERIA Research Project Report 2007-1-2, Chiba: IDE-JETRO, pp.204-238

Ranganathun. K.V.K. (1988) Indian Joint Ventures Abroad. New Delhi: Indian Institute of Public Administration. Corporate Studies Group Working Papers

Ramachandran, J., Khorakiwala, H. F., Rao, J., Khera, P., Dawar, N., & Kalyani, B. N. (2004). Indian Companies in Overseas Markets: Perspectives, Patterns, and Implications.

Reserve Bank of India. (n.d.). Retrieved February 6, 2013, from http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=11359#T2

Ricardo, David (1817) On the Principles of Political Economy and Taxation. Piero Sraffa (Ed.) Works and Correspondence of David Ricardo, Volume I, Cambridge University Press, 1951, p.135

Vernon, R., 1966. International investment and international trade in the product cycle. The Quarterly Journal of Economics 80 (2), 190–207.

Wells L. T. Jr. (1981). Foreign Investment from the Third World, in Kumar K. and Mcleod M.G.(1981), Multinationals From Developing Countries, Lexington Books, New York.

World Investment Report, UNCTAD (2007)

Data sources

CEPII - Accueil. (n.d.). Retrieved March 6, 2012, from http://www.cepii.fr/
IMF -- International Monetary Fund Home Page. (n.d.). Retrieved March 12, 2012, from http://www.imf.org/external/index.htm
ISI Emerging Markets. (n.d.). Retrieved March 12, 2012, from http://www.securities.com/
OECD Statistics (n.d.). Retrieved March 12, 2012, from http://stats.oecd.org/
Penn World Table (n.d.). Retrieved March 12, 2012, from https://pwt.sas.upenn.edu/
The World Bank. (n.d.-a). Retrieved March 12, 2011, from http://data.worldbank.org/
UNCTADstat. (n.d.). Retrieved May 12, 2011, from http://unctadstat.unctad.org/UnctadStatMetadata/Documentation/UNCTADstatContent.htm