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• ***Abstract.*** This paper re-examines the role of exchange rates as determinant of FDI. It extends the analysis to include the issue of how exchange rates determine the decision of invest in one country depending on whether the firm is deciding to invest on the country to service the local market or to invest on the country in order to re-export. This paper offers a broad literature review of the state of the empirical research in order to draw conclusions of the real importance of the exchange rate as a determinant of FDI. Details of FDI current behavior in Latin American are described and I propose a model of FDI to be applied for these countries. Data sources are given.

Key words: FDI, Exchange Rate, Exchange Rate Variability.

JEL Classification: F21, F23,F31, F41.

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Exchange Rate as a Determinant of Foreign Direct Investment: Does it Really Matter? Theoretical Aspects, Literature Review and Applied Proposal.

Isabel Cristina Ruiz

1. Introduction

There are several determinants of foreign direct investment (FDI). Empirical economists have been dedicated to study the reasons of why multinational firms (MNCs) or transnational corporations (TNCs) invest in one country or another. Much of this research has been dedicated to the analysis of location specific determinants. Others have worried about institutional factors and market reforms. In general, one question to answer has been, why does FDI flows more to some countries than to others?

According to Trevino, et all (2002), empirical studies of FDI stem either from a micro or a macro perspective. The idea of many of these studies is to establish the reasons of why companies choose one country over another to invest and in general, they point out that the two major reasons that MNCs and TNCs look at is their perceptions of comparative opportunity and risk. According to Trevino (2002), *opportunity* is referred to either gain markets or to acquire resources; *risk* is related to political, monetary or competitive factors. Because companies' motives competencies, perceptions, and tolerance for risk may differ substantially, what may be very attractive country for one company may be simultaneously unattractive for another.

This paper deals with the second issue; the risk generated by a particular location specific determinant: the exchange rate (ER). It has often been argued that

the level of ER affects the decision to invest in one country depending on whether the host country currency is overvalued or not in comparison with the investing country. Others have argued that is not the level but its variability what matters in terms of FDI flows. Much research has been done on the relations' -FDI and ER-, -trade and ER- but in general, it has often been inconclusive. Thus this paper raises some questions that have not been clearly answered in the literature: does ER really matters as a determining motive of FDI? If it does, does the investor see it from a microeconomic (as in Dixit (1994)) or just as another macroeconomic determinant (as in Goldberg and Klein (1997) and Campa (2000)? And finally, can it be incorporated in the literature instead as financial variable?

This paper attempts to contribute to this kind of literature by doing an extensive literature review of the empirical evidence of the role of ER determining FDI. Furthermore, it attempts to uncover what the empirics have shown about how it, and how it might alter the relationship between FDI and trade (this is, is a company using ER as a strategy to re-export or is just simply serving the local market). Therefore, analysis of ER on trade is also conducted. It is important to note that the main emphasis is on the evidence that has been presented for Latin American countries (LACs). Therefore, the second section of this paper proposes a model that can be applied to these countries. This topic is still relevant since FDI is viewed as a stable source of financing and growth for developing countries and any type of research trying to establish determinant motives of attracting FDI is relevant for a country strategic economic policy.

2. Literature review

This section, discusses the existent literature in ER and FDI by dividing it in five sections. The first section describes the literature that emphasizes the role of ER as determinant in the decision-making process to do FDI or trade. The second section makes reference to the empirical literature that concerns international experience (other countries other than LACs). The third section stresses the empirical work that has been done for LACs, and the fourth section is a description of current aspects of Latin American countries. Lastly, section five concludes.

1.1. The Role of Exchange Rate as Determinant of FDI: Theoretical Aspects.

The role of FDI within a decision-making process perspective has been analyzed primarily from a microeconomic context. These studies have usually taken into consideration risk adverse agents that make the decision of whether to invest in a specific country or not. Basically, the ER is a variable in the process that can either benefit or worse the chances of a host country to be chosen but, in general, most of the literature has focused on analyzing how ER and the ER variability affect the decision of carrying FDI into a country. A smaller branch in the literature has also focused on how ER alters the decision process in the FDI-trade relationship. Most of the studies have focus on either one or the other; this paper pretends to develop and propose a model to analyze both. The interest of this study is to focus on both issues: the level and the variability of ERs determining the FDI channel and how ER alters the relationship between FDI and trade.

Following the arguments by *Bennassy and Fontagne (1999)* movements in the ER may change the decision of doing FDI and therefore determine its relation with respect to trade. On one hand, if the investor whishes to serve the local market, FDI and trade are substitutes and the relationship is as follows: an appreciation of the currency increases FDI inflows due to higher purchasing power of the local consumers; on the other hand, a depreciation might as well increase FDI since it increases the relative wealth of foreign firms and hence their capacity to invest (through the reduced cost of capital). Alternatively, *Bennassy and Fontagne (1999)* show us that if FDI aims at producing for re-export, it complements trade, then an appreciation of the local currency reduces FDI inflows through lower competitiveness due to high labor costs while a depreciation increases wealth of foreign investors and stimulate agents demand for investment.

Another issue that has been analyzed in the literature, stresses the role that uncertainty has on the decision-making process of a firm when investing. Two seminal papers in this area are Dixit (1989) and Dixit and Pindyck (1994). These papers emphasize the value of the option to wait in presence of uncertainty and sunk costs. Dixit (1989) examines a firm's entry and exit decisions when the output price follows a random walk and suggest a solution to uncertainty based on two trigger prices, one for entry and other for exit.

Another example on this area is the paper by *Froot and Stein (1991)*. Their model is built on the idea that when there are informational asymmetries about an asset's payoff, it will be costly or impossible for entrepreneurs to finance that asset solely with externally obtained funds. The model features an information asymmetry problem with regard to assets under an entrepreneur's direct control in a situation where the ER can have pervasive results on investment. According to *Froot and Stein (1991)* there are other competing explanations for the observed FDI-ER relationship. Some of them are: i). Tax code changes, ii) the fact that FDI is a fixed proportion of the overall gross capital inflow, which itself may be correlated with ERs also iii). Some assets may have sticky prices in the face of ER changes and that somehow, creates a temporary window of opportunity for foreign buyers and lastly, iv). Trade barriers are a likely outcome of an increased trade deficit and therefore, FDI allows foreign firms to avoid these barriers. Thus, if trade deficits tend to precede currency depreciations, the FDI increase may coincidentally happen at about the same time that currency falls in value.

1.2. FDI, Trade and Exchange Rates: The International Experience

The empirical literature on the relations FDI-ER, trade-ER presented here has been applied for set of countries from the OECD, members and possible entrants to the European Monetary Union (EMU), individual countries like U.K., U.S and Canada. The evidence is presented in chronological order. In general, the evidence presented tends to show a negative relationship between ER and FDI.

Froot and Stein (1991) is a paper that focuses the analysis on the industry level. It examines the connection between ERs and FDI into thirteen U.S. industries in the presence of globally integrated capital markets that are subject to informational imperfections. The idea is that ER cause changes in wealth and these changes translate in changes in the demand for direct investment. By analyzing different types of capital inflows they find that FDI is the only type of capital inflow that is statistically negatively correlated with the value of the dollar. The ER effects are pervasive even in very disaggregated level of industries. The strongest ER effects appear in manufacturing industries. Their model and empirical results lend some credence to the claim that a depreciated currency can give foreigners incentive in buying control of productive corporate assets since ER changes have important impacts on international wealth.

Bennassy and Fontagne (1999) consider the role of ER as a determinant in the microeconomic decision strategy of risk adverse firms facing uncertainty. By stressing the importance of FDI as a stable source that allows boost in economic growth, the authors argue that foreign investors should worry about ER regimes, because they cannot hedge at their horizon and they have to secure the behavior of macroeconomic variables such as relative labor costs or purchasing power. Their model portrays a trade-off between price competitiveness and a stable nominal ER. It is tested empirically considering a fixed effect panel of 42 developing countries receiving FDI from 17 OECD countries, during the 1984-1996, period. The authors are able to show that nominal ER volatility is detrimental to FDI. The main results indicate that the building of currency blocks could be a way of increasing FDI to emerging countries.

Lopez Cordova and Meissmer, (2000) differ from the existing literature in that it focuses not only in the relationship of trade and ER but also in how currency unions affect trade. The paper is very unique in that they present evidence for the Classical Gold Standard era by using an unbalanced panel consisting of 1110 country pair observations and the data covers the period 1870-1910. Their results indicate that controlling for ER stability will spur the amount of trade between two countries since countries with the same currency are associated with a doubling of trade flows via decreases in the transaction costs of trade. Their gravity model explains up to 70% of the variance in trade patterns in the late nineteenth century. A main conclusions is that membership in a monetary union is correlated with a twofold increase in bilateral trade between any two members. On the other hand, adherents to the gold standard traded roughly 60% more with each other than with nations not in the gold club. As a result, the idea that coordination on a commodity money regime and membership in a monetary union considerably increases international trade is supported.

Brzozowski (2003) analyzes theoretically and empirically the likely impact of the reduction in ER uncertainty, due to the European Monetary Union (EMU) accession by emerging countries on the intensity of FDI inflow into candidate countries. *Brzozowski (2003)* develops his model by considering two existent FDI-ER approaches: the production flexibility approach and the long run risk aversion approach. In the first approach the effects of ER volatility depend on sunk costs in capacity, competitive structure and convexity of the profit function in prices. The

final conclusion of this approach is that ER volatility boosts FDI if there is a strategic dimension added to the model; otherwise is negative. This approach is very theoretical. The second approach is more empirical and it focuses on risk aversion. ER risk arises because of the time lag between investment and profits in foreign currency. The usual conclusion of this approach is that increased ER volatility has a positive effect on FDI. *Brzozowski's (2003)* empirical results tend to find negative impact of ER on FDI flows for emerging countries.

Becker, B and Hall S. (2003) investigate the case of multinational firms FDI in industrial R&D in the U.K. Their focus is mainly on the role of ER uncertainty. The main contribution of the paper is that it also considers the covariance between ERs. In the same lines of Brzozowski (2003), Becker, B and Hall S. (2003) make their analysis in the context of a possible entry of U.K. into the EMU and the motivation is that the pound sterling has been more powerful than the euro and possible insertion can cause misalignments in the allocation of FDI and be either a positive or negative factor for U.K. Their theoretical model is built within a framework in which risk adverse firms benefit from FDI diversification and generate conditional volatilities of the ER. The micro foundation for the model is the idea that a firm who is purely interested in maximizing expected profits should invest only in the country or countries with the highest returns, but a firm that is concerned with both, maximizing profits and minimizing risk would exploit any correlation between net returns and the variance of total return[1]. They used a panel of 11 UK manufacturing industries and their results suggest that an increase in the volatility of the euro dollar ER tends to relocate R&D investment from the Euro Area to the UK.

1.3. FDI, Trade and Exchange Rates in Latin-American countries.

This section studies the existent literature for LACs. The goal is to establish the main conclusions that the empirical research has obtained for these countries. I also hope to establish the possible patterns found in the empirical results and high light other main determinants of FDI in Latin America that may be added in the model proposed. FDI, trade and ER relationship in Latin American countries has

[1] For the covariance estimates they use a GARCH model between the log of real or nominal values of the euro dollar ER and the sterling dollar ER.

been analyzed for authors like Trevino, et al, (2002), Campa (2001), Goldberg, L. and Klein, M. (1997).

Trevino, et al, (2002), conducts an empirical investigation on market reforms and FDI in are Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela[2]. This paper is not primarily focused on the role of the ER as determinant of FDI but instead, it analyzes several determinants for FDI by relating opportunity, risk and market reform factors to FDI flows as undertaken by TNCs. Although their model didn't find any influence of ER as determinant of FDI, it explains almost three-quarters of the variance in FDI flows and uncovers other determinants[3]. The most significant factors explaining FDI flows are gross domestic product (GDP as a measure of market size); the number of privatizations within each country and consumer price index (CPI, supporting the idea that TNCs observe inflation as a detrimental factor for FDI).

Campa (2001) has pioneered the literature in the case of LACs. He studies the effects that large nominal and real ER devaluations have on the structure of trade flows of 8 Latin American devaluating countries for the 1989 to 2000 period. The paper focuses on the behavior of three indicators of external activity: *changes in the industry composition* of trade flows, *changes of the country's composition* of trade flows and, changes in the aggregate and bilateral trade flows. For changes in the country composition trade flows, the author computes bilateral ER for each of the top 10 trading partners using consumer price indexes, he finds that the behavior of relative trade flows is extremely persistent across the different trading partners, but there is more persistence in the ranking of the industry composition than that of the trading partners. The three main conclusions of his study are: First, there is a strong persistence in the relative ranking of import and export industries and trading partners. In most cases large nominal ER devaluations imply neither major changes in the industry patters of import and exports into the country nor in the relative importance of major trading partners. Second, after ER devaluation occurs, the devaluating country increases on average its trade flows with neighboring countries. Third, bilateral export flows with industrialized countries are most sensitive to real

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2 These seven countries account for over 85% of FDI within Latin America

3 The results indicated that Chile is the most successful country in attracting FDI, followed by Colombia, Venezuela, Argentina, Mexico and Brazil.

ER movements, while bilateral import flows do not show much reaction to changes in the bilateral ER.

On the other hand, *Goldberg, L. and Klein, M. (1997)* is a very important paper since it is a pioneer in making a systematic examination of FDI activity in developing countries and the role of currency as a linkage between FDI and trade. They analyze the patterns of FDI, trade and real ER linkages in Southeast Asia (SEA) and LACs. They investigate specifically, the case of Japan and U.S. FDI and how the ER shapes FDI's relationship with trade when interacting with a set of third-country markets: SEA and LACs. By examining the time series interactions between the three variables in question, the paper provides stylized facts on the channels through which particular ER movements strengthen or weaken international linkages[4]. With no theoretical background, their empirical model is a time series panel of FDI into each developing country from either Japan or the U.S. Real FDI is expressed as a function of bilateral ER and the real income of the source and host country. Further regressions explore the determinants of the developing country exports and imports from either the U.S. or Japan; this regressions express real exports and real imports as functions of real income, bilateral ER and real investment from both sources of countries[5].

The Results indicate that ER significantly affects trade, especially for SEA countries. For SEA ER affect trade not only from Japan but also from the U.S. Also, FDI from Japan into this region has been very sensitive to changes in the yen-dollar ER; dollar depreciations lead to investment surges from Japan. For LAC, FDI from the U.S. and Japan are not very responsive to the ER. Also, the trade promoting effects of this FDI appear to be weak or insignificant with regard LAC trade with the U.S. and Japan. In conclusion, the set of relationships between ER and FDI, and between FDI and trade, support two channels through which the ER affects trade: a direct effect on the relative price of goods and an indirect effect through FDI.

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4 The SEA countries are: Malaysia, Philippines, Indonesia and Thailand. The LACs are Argentina, Chile and Brazil.

5 The data set used in the regressions consists of a cross section time series panel of annual observations for the 1978 to 1993 or 1994 period, depending upon the country. In particular, FDI is measured as the log of annual real dollar value of direct investment from either Japan or U.S.

6 http://www.census.gov/foreign-trade/www/

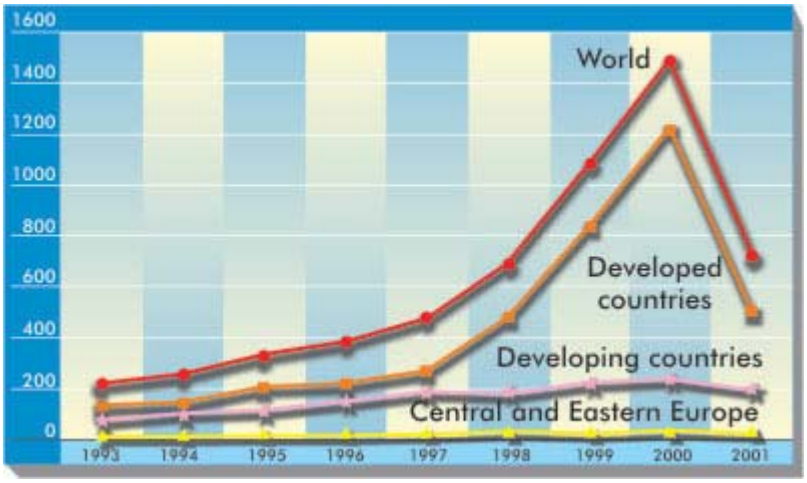
1.4. Characteristics of FDI in Latin-American Countries (LAC)

As stated by Trevino, et al (2002), LAC is a useful region of study because Latin America and Caribbean countries receive a significant portion of the FDI inflows going to developing countries. According to UNCTAD (1999); between 1999 and 1998, the share of FDI in total capital flows to developing countries increased from 28% to 58%. Historically, FDI in LACs has been concentrated on manufacturing activities, FDI has been supplying this markets that used to be highly protected.

Since the region started a period of opening up, FDI has focused to non-tradable service activities (telecommunications, energy, transport, banking, etc.). Other activities that have been getting a lot of relevance are the ones related to the exploitation of natural resources that used to be under state control (mining and hydrocarbons). FDI related to manufacturing industries has been directed mainly to countries with large domestic markets like Brazil, Mexico and Argentina or countries that serve as export platforms like Mexico and the Caribbean.

According to recent statistics of UNCTAD, the main source of FDI flows into Latin America is the United States. However the participation of Japan and European countries, specifically U.K. and Spain has grown strongly in the energy and telecommunications sector. According to ECLAC (2003) the three main forms of FDI in the region were: acquisitions of private assets, privatizations and investment in new assets. The main inflow of FDI started happening in the nineties through the privatization of state enterprises, while more recently there has been an increase in acquisition of local companies. The following table is an update on the behavior of FDI as year 2002 for some Latin American countries, provided by the UNCTAD.

Table 1
Global inflows of FDI 1993-2001
USD billions, by group of countries



Source: UNCTAD.

Table 1

Country	**FDI Recent characteristics in 2002**
Argentina	FDI inflows in 2002 diminished to less than $1 billion, compared to the peak of $24 billion in 1999
Brazil	Brazil largest recipient of FDI in Latin America
Chile	FDI inflows into Chile were lowest since 1993
Costa Rica	Export-oriented manufacturing dominates FDI inflows in Costa Rica
Ecuador	Oil industry dominates FDI in Ecuador
Mexico	FDI outflows continue to grow in 2002
Venezuela	FDI inflows in Venezuela drops sharply in 2002

1.5. Does Exchange Rate Really Matters for FDI in LACs?

A close look to the distribution of the estimated coefficients of explanatory variables of FDI in most of these papers indicates that, the size of the market and a country's openness to trade are more likely to be correlated with its FDI than other potential determinants.

The international experience for industrializes nations has shown that most of the time a host country with a volatile ER is negatively affected in its FDI inflows. On the other hand, it has been demonstrated that ER affects FDI into LACs depending on whether the firm decides to serve the local market or it decides to re-export although most of the time it is not a very powerful explanation of FDI into these countries. The most significant factors explaining FDI in LACs are GDP; the number of privatizations within each country and the main nominal variable is the inflation. Others are international environment, national policies and the strategies of business concerns ECLAC (1998).

Therefore, to answer the question of does exchange rate really matters for LACs? We should have to answer that it does. It is just not as important as in the case of other structural determinants but the point of this paper is to high light new approaches to study how ER determines FDI and offer an alternative ways other than the usual one that only incorporates a single equation for FDI and has no consideration for exports or local demand.

2. Empirical Model Proposal

The model is inspired on *Bennassy and Fontagne (1999)* and *Goldberg and Klein (1997)* since they are able to show that a firm might re-consider the decision of serving a country depending on whether the ER is beneficial for exporting or doing FDI. The main interest on applying this research to LACs is that there is still some need in building evidence on the factors that determine the course of FDI for these countries. It is important to note that the model is constructed for the case of FDI and trade not in services but in goods, therefore is intended to explain mainly the manufacturing sector.

The idea of this model is to find out if the level or the variability of ER alters the FDI trade relationship. The idea is to uncover how much of FDI is complementary with trade and or if FDI is being destined to serve the local market and how is this

relationship affected by the ER. Then, the first thing to establish is a function explaining FDI that depends on exchange rates and its variability. Therefore, following what has been done in the literature, equation (1) presents our first equation in the system of equation where FDI s consider as a transfer of capital thus, it can be interpreted in terms of comparison of expected returns on alternative decisions of investment. The impact of exchange rates on investment decision is dual: the level and the variability of the exchange rate matter.

$$\ln FDI_{ij}^{kq} = \beta_0 + \beta_1 C_{ij} + \beta_2 UNC_{ij} + \beta_3 \ln\left[\frac{GDP_i}{Pop}\right] + \beta_4 \ln\left[\frac{GDP_j}{Pop}\right] + \beta_5 LnDist_{ij} + \beta_6[\Delta e_{ij} * Ind^{q}{}_{ik}] + \beta_7 Open + \beta_8 CPI_j + \varepsilon_t \quad (1)$$

The dependent variable is the log of the stock of FDI received by country *i* (in our case a LAC) from country *j* in industry *k* to produce good *q*. The competitiveness of a country is proxied with the level of real ER and a variability or uncertainty measure of the level of ER. Transportation costs are measured as the distance between the 2 countries. An openness variable is introduced to control for the nature of FDI and market size is determined by each country GDP per-capita. An interaction variable between exchange rate and the specific industry k is introduced in order to quantify how is the impact of exchange rate variation for the specific industry.

Since we want to see how exchange rates determine the relationship between FDI and trade, now we have to account for two things: exports and internal demand of goods from industry k because we know that if the firm is going to serve the local country either appreciation or depreciation will be benefit but if its an export platform it an appreciation might have negative consequences but a depreciation might be beneficial through the reduction in costs. Therefore, accounting for trade, we want to see the reaction of exports in the investing country within the same industry. The idea is to work with very disaggregated data to be able to infer conclusions:

$$\ln X_i^{kq} = \beta_0 + \beta_1 X_{it-1} + \beta_2 Cij + \beta_3 UNC_{ij} + \beta_4 \ln\left[\frac{GDPi}{Pop}\right] + \beta_5 Open_i + \beta_6 CPI_j + \varepsilon_t \quad (2)$$

Where X_i^{kq} are the exports of good *q* in the country that is receiving FDI from country *j* in industry *k*. Exports are a function of past exports, the level and variability (C) of exchange rate (UNC), the exporting country market size, the openness of the economy and their own inflation. According to *Bennassy and Fontagne (1999)*, a firm facing large exchange rate volatility will produce in the local country if it intends to sell on the local market, but it will avoid doing it if it intends to re-export. Therefore we need to specify the local demand:

$$D_i^{kq} = f(C_{ij}, \left[\frac{GDPi}{Pop}\right], P_q, P_c, P_s) \qquad (3)$$

Where equation (3) is the local demand of good *q* from industry *k* is a function of the level of exchange rates as an international comparison measure, the market size of the country (GDP per capita) and the local price of the good, the price of its complements and the price of its substitutes. The three equations generalize a three set system of reaction functions, all depending on the real exchange rates that will allow establish the patterns of whether a firm is doing FDI to a specific country to serve the local market or is doing to use if as an export platform.

3. Data Sources and Description

a. *FDI stock:* Data for FDI can be obtained from the OECD statistics or UNCTAD. Also, in the U.S. Census Bureau: Foreign Trade Statistics[6]. The idea is to find it such that it is disaggregated by industries by SIC. A popular and used measure is:

   Log FDI = (log FDI stock / World Consumer Price Index)

b. *Competitiveness:* The competitiveness is tested with the level of the real ER of the receiving country versus the investing country. It can be obtained from several sources like IMF – IFS-CDROM or each country's central bank.

c. *Volatility or Uncertainty:* For constructing the volatility or uncertainty measure, the exchange rate of each FDI receiving country can be used. This data can be obtained from the IFS-CD ROM for each country.

Volatility 1: *Constructed for a given year as a sample "standard deviation" of the change in the logarithm of the nominal average monthly exchange rate (E):*

$$V1t = [(1/m) \sum_{i-1}^{m} (E_{t+i+1} - E_{t+1})^2]^2$$

Where t is a yearly index.

Volatility and Uncertainty 2: Can be constructed with a sample-based measure of dispersion of unpredictable innovations. This is given by the conditional variance of the innovation constructed using the generalized autoregressive conditional heteroscedasticity GARCH specification. By using monthly data the general model of exchange rates with conditional heteroscedasticity would assume that the conditional mean and variance of exchange rates are generated as follows:

$$E_t = X_t b_i + m_t$$

$$m_t \sim N(0, s_t^2)$$

$$s_t^2 = Z_t a$$

Were E_t is the exchange rate, X_t is a vector of explanatory variables contributing to its conditional mean, m_t is a heteroscedastic error term with conditional variance s_t^2 and Zt is a vector of variables contributing to the conditional variances$_t^2$; Then,

$$E_t = b_o + \sum_{i=1}^{N} b_i E_{t-i} + e_t \qquad (4)$$

$$s_{et}^2 = a_o + a_1 e^2_{t-1} + a_2 s^2_{et-1} \qquad (5)$$

Where the Eq. (4) is an autoregressive representation of the conditional mean of exchange rates. Eq. (5) is a GARCH representation of the conditional variance. Since we are dealing with a parametric model, GARCH estimation gives an explicit test of whether the movement in the conditional variance of a variable over time is statistically significant.

Measure of Uncertainty 3: Another measure of uncertainty can be obtained through a simple mean of fitted values of equation (5).

$$UNCERT_t = (1/m)\sum_{i=1}^{m}\sigma_{it}^2$$

d. *Exports and Imports:* Data for exports and imports can be found in several places and at a very disaggregate level from: Division of Trade Statistics: http://unstats.un.org/unsd/comtrade/, IMF-IFS-CDROM.

e. *Market Size:* Market size is measured as each country GDP per capita. GDP data is widely available in several sources as each country central bank, OECD Statistics, U.N. Statistics, IMF statistics and finally, the most used source is IMF-IFS-CDROM.

f. *Openness:* The usual measure for openness is the sum of total exports and imports of the receiving country divided by its own GDP. The data sources are the same as in d. and e.

g. *Population:* U.N Statistics Division: http://unstats.un.org/unsd/citydata/default.asp?contid = 3

h. *Inflation:* The level of prices can be measured with the growth of the CPI (consumer price index) of each country. The most used source for this variable is IMF-IFS-CDROM or each country's central bank.

i. *Distance:* Distance between countries i and k can be obtained from WebPages like: http://www.zenithair.com/misc/distance.html

j. *Prices of Substitutes and Complements of good q:* This variable can be obtained from the national statistics of each country.

4. Conclusions

This paper's number one goal was to do a complete literature review on exchange rate and FDI. The idea was to put together what has been found in the empirics and generalize the main results. An overall review indicates that the literature on the relationship between exchanges rates and FDI its broad and while in many occasions it indicates a negative effect of the level of ER; for the variability and uncertainty the evidence was most of the time inconclusive.

This paper proposes a model for LACs. Three sets of reaction functions, all depending on the real exchange rates and its variability or uncertainty. The idea is to focus on a specific industries and specific goods in order to be able to underline patterns that the exchange rate and its variations have on the motives of FDI. This is, if we find that due to exchange rate variations, FDI react in certain way and also local markets and exports react in similar way; we might be able to infer conclusions of what are the reasons of FDI to serve certain country: either to serve the local market or to re-export. The model could be tested for individual countries or as a panel data with fixed effects dummies. If we consider all the variables are in logarithms we can interpret the estimated coefficients as elasticity.

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