# The Impact of Exchange Rate Volatility on Foreign Direct Investment (FDI) in BRIC Countries

**By**

**Danqing Wang**

A Research project submitted in partial fulfillment of the requirements for the degree of Master of Finance

Saint Mary's University



Written for MFIN 6692, September 2012

Under the direction of Dr. Colin Dodds

Approved: Dr. Collin Dodds
Faculty of Advisor

Approved: Dr. Francis Boabang
MFIN Director

Date: September 3, 2013

# Acknowledgements

Firstly and foremost, I would like to extend my sincere gratitude to my supervisor, Dr. Colin Dodds for his instructive advice, useful suggestions, professionalism, and patience on this paper. I am deeply grateful of his help in the completion of this study.

Also, high tribute should be paid to Dr. Francis Boabang who helped me choose my MRP topic and encouraged my studies over the past year.

Finally, I am indebted to my beloved family for their continuous support and loving considerations.

# Abstract

The Impact of Exchange Rate Volatility on Foreign Direct Investment (FDI) in BRIC Countries

By

Danqing Wang

September, 2012

The paper is aimed at exploring the relationship between exchange rate volatility and foreign direct investment in selected emerging economies, specifically, Brazil, Russia, India, and China (BRIC). The sample of data was selected over the period of 1994-2012 for both exchange rate volatility and foreign direct investment for all countries. The standard deviation of monthly exchange rate changes is applied to examine the exchange rate volatility and its influence upon foreign direct investment using an Autoregressive Distributed Lag (ARDL) approach and the Cointegration and Error Correction Model, developed by Pesaran, Shin and Smith (2001).

The results indicate a negative long-run relationship between exchange rate volatility and foreign direct investment for India and Russia. The existence of a short-run association was found in China, India, and Russia. However, for Brazil no connection between the two variables was observed.



**Key Words: Exchange Rate Volatility, Foreign Direct Investment, ARDL, and ECM.**

# Table of Contents

# List of Figures and Tables

# Chapter 1: Introduction

## 1.1 Purpose of Study

Foreign Direct Investment (FDI), as one of the sources of cash inflows, has been widely considered to be important in contributing to productivity growth in the host country, especially in emerging or developing countries. A meta-analysis study has confirmed that the FDI can significantly enhance the local economy (Havranek, T., & Irsova, Z., 2010) because of the technology transfer from foreign investors to local firms.

The components of FDI defined by the UNCTAD (United Nations Conference on Trade and Development, n.d.) are equity capital, reinvested capital and other capital, and FDI includes various forms such as direct investment, portfolio investment, and private capital flows.

Inward FDI can provide lots of benefits such as the creation of employment, the transfer of resources, the enhancement of financial stability, and the boosting of an economy. Foreign investors can also receive a share of advantages. For instance, FDI may reduce overall risks of foreign corporations because of diversification of holdings, and it may be used to enter a potential market (Economy Watch, 2010). It may also reduce costs through economies of

scale. However, foreign investors are exposed to numerous types of risks as well, such as political risk and legal risk. Among the ongoing risks they would face, is exchange rate risk. Indeed, this is one of the most important that foreign investors will think over before making a strategic move.

The goal of this report is to explore the effect of volatility in exchange rate upon selected emerging markets, specifically, in Brazil, Russia, India, and China (BRIC).

### 1.2 Background: Volatility in Exchange Rate

After the Bretton Woods System collapsed in 1971, the US currency lost its unique power position in international trade. The reform which brought fluctuating exchange rates produced a new financial order to the world and left exchange rates for many countries to be settled in the market through the demand and supply mechanisms (Stephey, 2008).

The uncertainty of exchange rates has widely affected international trade in terms of cash inflows and outflows. There are two theoretical arguments regarding to the effects of volatility in exchange rates upon FDI, “production flexibility” and “risk aversion”. The first one advises a direct relationship between

exchange rate volatility and FDI whereas the second one describes an inverse association between the two variables (Reinert, et al, 2010). Moreover, FDI also influences the exchange rate at the same times as inflows can lead to the potential appreciation of the domestic currency while outflows can cause a potential depreciation.

### 1.3 Background: FDI in BRIC Countries

BRIC stands for the economies of Brazil, Russia, India, and China. The abbreviation of BRIC was first used by the Chief Economist of Goldman Sachs in 2001 (Ministry of Finance, Government of India, 2012); and later studies speculated that these four economies would exceed most of the current developed economic powers by the year 2050 (Goldman Sachs, 2003).

In the BRICS report (Ministry of Finance, Government of India, 2012), the GDP of Brazil, Russia, India, and China in 2010 were ranked $8^{th}$, $6^{th}$, $4^{th}$, and $2^{nd}$ in the world, respectively , and the combined GDP accounted for 24.9% of world GDP share. Certainly, FDI as a direct cash inflow played a significant role in the contribution of GDP. According to the World Bank Database (2013), the net inflows of FDI in terms of percentages of GDP in Brazil, Russia, India, and China in 2011 were 2.9%, 2.9%, 1.7%, and 3.8%, respectively.

## 1.4 The Framework of Study

The framework of this paper is as follows. A literature review of relevant studies is described in Chapter 2, whereas Chapter 3 introduces the hypotheses and the methodological framework as well as the selection of the data. The results are analyzed in Chapter 4. Chapter 5 discusses and summarizes the findings.

# Chapter 2: Literature Review

## 2.1 Theoretical Arguments

In the past few years, especially after the collapse of the Bretton Woods System in 1971, the investigation of the association between exchange rate uncertainty and macroeconomic variables containing FDI has become increasingly compelling. By 1973, the majority of developed world economies had implemented the flexible exchange rate system which allowed their currencies to float freely against the US dollar. There were lots of studies conducted in this area, and most of them recognize the existence of a relationship between exchange rate uncertainty and FDI. Also, as mentioned above, there are two theoretical considerations, “production flexibility” and “risk aversion”.

The first one demonstrates that producers need to commit investment capital and production costs to domestic and foreign capacity before making decisions. Therefore, the higher the volatility in exchange rates, the higher the FDI in the ex-ante phase. Also the higher the volatility, the higher the potential excess capacity and production shifting in the ex-post phase (Reinert, et al, 2010). The second one assumes that higher exchange rate variability lowers

investment projects such as FDI because investors are risk averse and require a return for risks. Also, higher exchange rate volatility lowers the certainty of return (Reinert, et al, 2010). These two theoretical arguments offer different directions for the implications of exchange rate uncertainty upon FDI.

### 2.2 Positive or Null Relationship between Exchange rate Volatility and FDI

Contrary to the empirical considerations, Bailey and Tavlas (1991) found no evidence that an increasing exchange rate volatility under the managed floating system impairs FDI whereas Kogut and Chang (1996) documented for electronic companies of Japanese to the US, that the movements in the exchange rate significantly affect FDI, especially the timing of investments. Firoozi (1971) observed the existence of an association between the behavior of a global company regarding its FDI and exchange rate volatility. Crowley and Lee (2003) concluded that volatility in exchange rates is not an important determinant for FDI below a certain level of exchange rate flexibility. But the exchange rate volatility-investment relationship is robust if the movements of exchange rates are excessively unstable. Also, Xing (2006) found that the exchange rate between China and Japan has a critical role in determining the FDI of Japan, and the depreciation of Yuan encouragingly affected the export FDI of Japan

and improved China's competitiveness.

Chong and Tan (2008) found little evidence of a connection between volatility in exchange rate and macroeconomic variables in the short-run in Southeast Asian countries, but in the long-run, an association is observed. Jeon and Rhee (2008) evidenced the link between the FDI inflows in Korea and the real rate of exchange. Chowdhury and Wheeler (2008) documented an encouraging effect of exchange rate uncertainty upon FDI, and the impact takes place with a lag. Furceri and Borelli (2008) found that a country's openness is a significant factor in determining the consequence of a fluctuanting exchange rate to FDI. Specifically, volatility in exchange rates has a negative impact on the higher level of openness of economies and vice versa. Lee and Min (2011) concluded a robust and persistent relationship between exchange rate uncertainty and FDI. Additionally, they observed a non-linearity relationship between the two variables in Korea, specifically after the 1997 crisis. However, Nyarko, et al (2011) observed little significant in the existence of an effect of exchange rates on FDI inflows in Ghana.

The most recent study written by Chaudhary, et al (2012) showed mixed results. They proved the effect of exchange rate uncertainty upon FDI in almost half of the sample countries in selected Asian economies such as Pakistan,

India, Bangladesh, Indonesia, Singapore and Thailand.

### 2.3 Negative Relationship between Volatility in Exchange rate and FDI

Many studies proved a discouraging association between the exchange rates volatility and FDI, and the revaluation or devaluation of a certain currency also affects the association between the two.

For instance, Campa (1993) found that the volatility in exchange rate negatively affects FDI for the US, and Benassy-Quere, et al (2001) also proved the existence of a negative association between the two variables in developing countries. Similarly, Bleaney and Greenaway (2001) found the same results in sub-Saharan Africa.

Kiyota and Urata (2004) observed in Japan, that the depreciation of the Yen enhanced FDI while the increase in exchange rate uncertainty discouraged FDI at both aggregated and disaggregated industry levels. Chen, et al (2006) also found an inverse relationship of exchange rate uncertainty to the outflow of FDI of companies. From a different perspective, Schnabl (2008) introduced that the stability of exchange rates has a positive association with the growth of international trade and international capital flows at the EMU periphery.

Interestingly, Kyereboah-Coleman and Agyire-Tettey (2008) concluded

different results from the work of Nyarko, et al (2011). They found that the exchange rate volatility in Ghana negatively affects its inward FDI. The difference may be that Kyereboah-Coleman and Agyire-Tettey analyzed FDI at firm levels whereas Nyarko, et al investigated at the national level.

Vita and Abbott (2008) observed that the exchange rate uncertainty in UK negatively affects FDI inflows. Correspondingly, Udoh and Egwaikhide (2008) found that the inclusion of exchange rates as well as inflation uncertainty in Nigeria had a significant negative effect on FDI. Schmidt and Broll (2008) concluded that the exchange rate uncertainty depressingly influences the FDI flows across all sectors in the US. Udomkerdmongkol, et al (2009) documented that the volatility in exchange rate and the devaluation of host currency have discouraging effects on FDI inflows in the emerging economic sectors of the US.

Arratibel, et al (2011) concluded that there was a strong negative effect of exchange rate uncertainty upon FDI in selected EU members. Mahmoud, et al (2011) observed negative relationship between the two variables in Pakistan.

### 2.4 Production Possibility Argument

The validity of the production possibility argument asserts that the increase in FDI is partially caused by the increase of volatility in exchange rates

(Chaudhary, et al, 2012). Different studies have examined this area.

Cushman (1985) concluded an optimistic association between volatility in the real exchange rate as well as expectations and FDI in the US. Goldberg and Kolstad (1995) found that exchange rate volatility not only affects the investment decisions made by a multinational, but also determines its production location in response to the increase in production capacity.

Baek and Okawa (2001) showed that the appreciation of the Japanese Yen against both the US dollar and other Asian currencies significantly enhances the FDI by Japan in manufacturing, export-oriented electrical machinery sector, and other subsectors of Asia. Gorg and Wakelin (2002) documented no connection between exchange rate variation and US inward or outward FDI. However, they observed a constructive association between a revaluation of a host currency and US outward FDI, as well as a negative association between the appreciation of the US dollar and inward FDI. Gottschalk and Hall (2008) found a strong evidence for the exchange rate uncertainty of the Japanese Yen against the US dollar in determining the locations of Japanese and US investors. Additionally, the exchange rate uncertainty positively affects the outward FDI in these two countries. Osinubi and Amaghionyeodiwe (2009) documented the encouraging connection between the depreciation of the Nigeria's currency and the inward FDI.

Dhakal, et al (2010) found that the increase in exchange rate uncertainty enhances the FDI in sample countries in East Asia. Meanwhile, Takagi and Shi (2011) found an affirmative association between the revaluation of the Japanese currency against countries' currencies selected from Asia, and also a favorable influence of exchange rate uncertainty upon FDI. Nagubadi and Zhang (2011) also documented a positive impact of appreciations of an investing country's currency and exchange rate volatility on the FDI between US and Canada.

As discussed in this section, there are numerous studies regarding the association between exchange rate volatility and FDI using various macroeconomic variables and approaches. The results are diverse and ambiguous with some presenting significant connections between the two, whereas others showed impaired or no affiliation between the two. Some other variables such as the revaluation or devaluation of local currency, the location decisions, and the FDI policy of a country also matter.

This paper concentrates upon the BRIC countries, and is an extension of existing studies. To the best of my knowledge and study, there is no specific study about this topic for these economies, and this paper attempts to this gap.

# Chapter 3: Data and Methodology

## 3.1 Data Selection

In order to examine the association between exchange rate uncertainty and FDI in BRIC economies, this paper uses the annual data for FDI provided by the World Bank and monthly data for exchange rate provided by the OECD StatExtracts database over the period of 1994-2012. In the data, the FDI is expressed in terms of the US dollar, and the exchange rates are extracted as Direct Quotation with the value of each country's currency against the US dollar.

## 3.2 Methodology Framework

This paper measures the volatility in the exchange rate by using the standard deviation of monthly exchange rate changes (σ). Furceri and Borelli (2008) also used the same method to estimate exchange rate volatility. An alternative method for estimating volatility is the GARCH (Generalised Autoregressive Conditional Heteroscedasticity) developed by Bollerslev (1986). The GARCH is an improved version of ARCH (Autoregressive Conditional Heteroscedasticity) developed by Engle (1982). These three methods are the

most popular ones for estimating and forecasting volatility. This paper is aimed at exploring if there is any long-term or short-term connection between exchange rate uncertainty and FDI; therefore, for the simplicity of work, the first method (i.e., the standard deviation of monthly exchange rate changes) is used in the study.

The paper uses an ARDL Framework for cointegration and error correction model modified by Pesaran, et al (2001) to investigate the effects of exchange rate volatility upon FDI. The dependent variable in the model is FDI, and the independent variable is exchange rate volatility. The ARDL framework is particularly useful if the variables have stationarity issues. Different studies have used the same methodology, for example, Alam (2010) and Hassan and Nasir (2008). The analysis is based on the following regression:

$$FDI=\beta_0 + \beta_1 (VER) + \varepsilon \text{---------- (3.1)}$$

where FDI represents the foreign direct investment of each of the BRIC countries and is taken as the independent variable; VER represents the exchange rate volatility of each of the BRIC countries and is taken as a dependent variable. $\beta_0$ and$\beta_1$ are coefficients and$\varepsilon$ is the error term.

To examine if the long-term relationship exists or not, the ARDL model is used. Moreover, in order to eliminate the insignificant lagged variables and achieve better results, the model is further expanded by Chaudhary, et al. (2012). They use the “general to specific approach” developed by Campos, et al (2005). The model is formulated as:

$$\triangle(FDI)_t = \beta_0 + \Sigma\mu_i \triangle(FDI)_{t-1} + \Sigma\phi_i \Delta(VER)_{t-1} + \beta_1 (FDI)_{t-1} + \beta_2 (VER)_{t-1} + \varepsilon_t \text{ -------- (3.2)}$$

where VER stands for exchange rate volatility; $\beta_0$, $\beta_1$ and $\beta_2$ are coefficients, and $\varepsilon$ is the error term.

The null hypothesis assumes that there is no cointegration between the exchange rate volatility and FDI, and the F-statistics value is calculated to test the null hypothesis. The hypothesis is stated as following.

$$H_0: \beta_1 = \beta_2 = 0. \qquad H_1: \beta_1 \neq \beta_2 \neq 0.$$

If the calculated F-statistic value is higher than the upper boundary critical value, the null hypothesis is rejected, and if the F-statistic is lower than the lower boundary critical value, the null hypothesis is not rejected. Conversely, if the F-

statistic is between the upper and lower bounds critical values, the conclusion is ambiguous.

For examining short-term association, the following model is applied:

$$\triangle(FDI)_t = \beta_0 + \Sigma\mu_i \triangle(FDI)_{t-1} + \Sigma\phi_i \Delta(VER)_{t-1} + \psi(ECM_{t-1}) + \varepsilon_t \text{ ---------- (3.3)}$$

where ψ is the speed of adjustment.

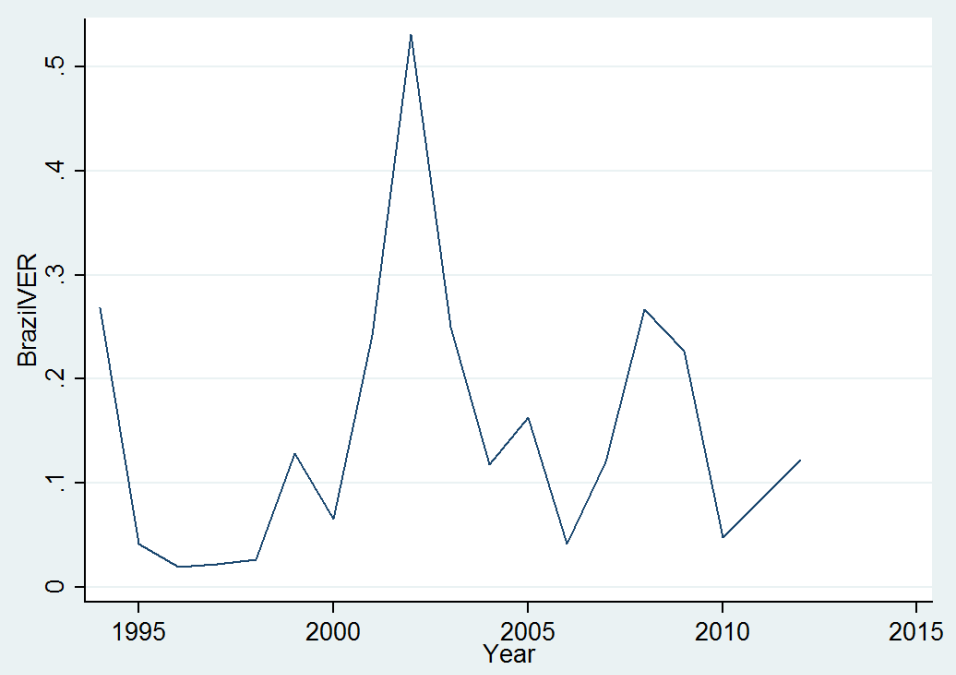
# Chapter 4. Data Analysis and Results

## 4.1 Descriptive Statistics for Exchange Rate Volatility and FDI

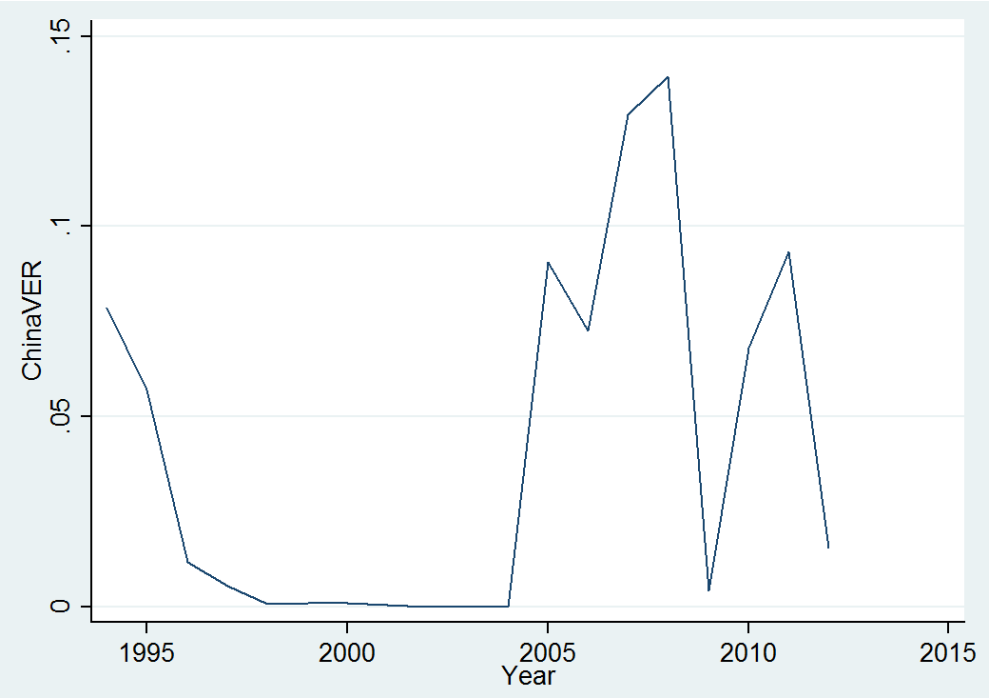
The standard deviations of the monthly exchange rate changes are applied to estimate the exchange rate volatility for all countries, and the movement trends for BRIC economies are shown in Figure 4.1 (a)-(d).

**Figure 4.1 Movements of Volatility in Exchange Rates**

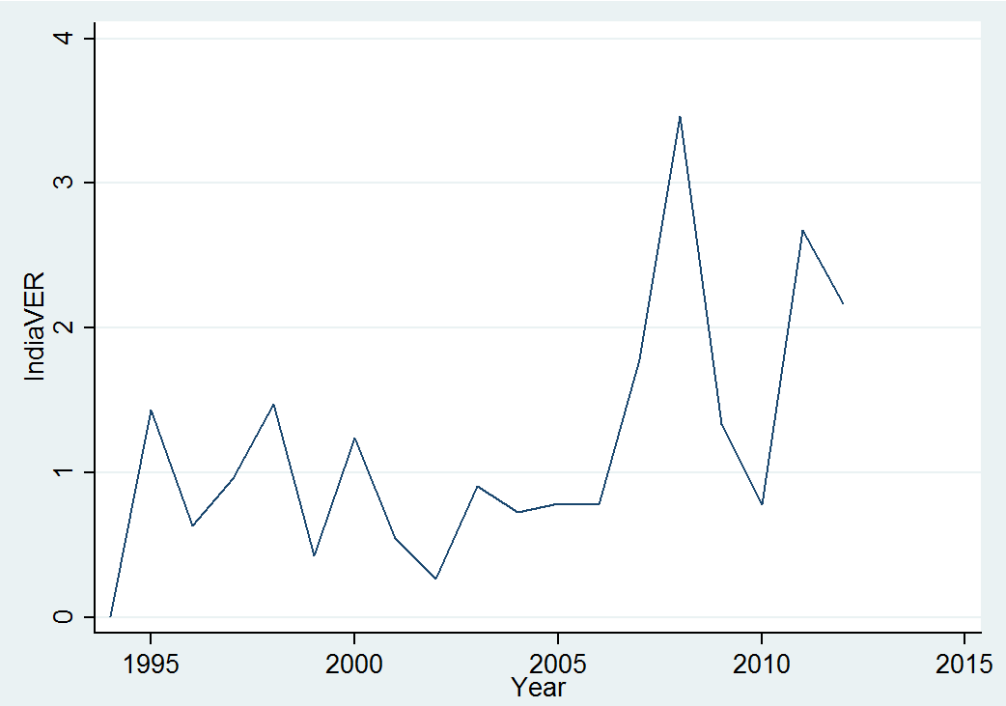
**(a) Brazil.**



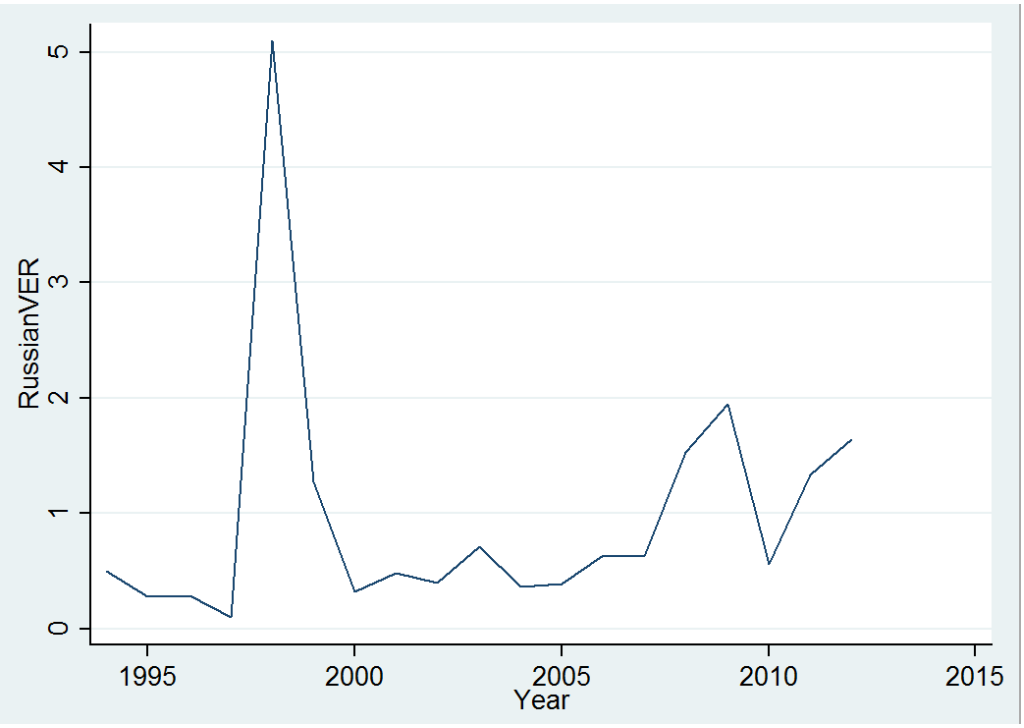
**(b) China.**




**(c) India.**



**(d) Russia.**




The results of these descriptive statistics show that the mean values as well as maximum and minimum values of exchange rate volatility for Brazil are 0.1467156, 0.5319396, and 0.0193454, respectively, whereas the mean value, the maximum and the minimum value of FDI for Brazil are 29.6, 76.1 ,and 3.07 billion of the US$, respectively.

The mean value, the maximum, and the minimum values of exchange rate volatility for China are 0.0404526, 0.1392964, and 0, respectively, whereas the mean value, the maximum and the minimum values of FDI are 102, 280, and 33.8 billion of the US$, respectively. As China had been using a fixed exchange

rate against the US dollar during the period of April 2001 to June 2005, its minimum value of exchange rate volatility is 0.

The mean value, the maximum, and the minimum values of exchange rate volatility for India are 1.177094, 3.461683, and 0.007, respectively, whereas the mean value, the maximum, and the minimum value of FDI are 12.7, 43.4, and 0.973 billion of the US$, respectively.

The mean value, the maximum, and the minimum value of exchange rate volatility for Russia are 0.9736188, 5.102637, and 0.0966234, respectively, whereas the mean value, the maximum, and the minimum value of FDI are 22, 74.8, and 0.69 billion of the US$, respectively. Table 4.1 provides a summary.

| Country | Variable | No. of Observations | Mean | Std. Dev. | Minimum | Maximum |
|---|---|---|---|---|---|---|
| Brazil | VER | 19 | 0.1467156 | 0.1281167 | 0.0193454 | 0.53194 |
| | FDI | 19 | 2.96E+10 | 2.10E+10 | 3.07E+09 | 7.61E+10 |
| China | VER | 19 | 0.0404526 | 0.0481495 | 0.00 | 0.139296 |
| | FDI | 19 | 1.02E+11 | 8.23E+10 | 3.38E+10 | 2.80E+11 |
| India | VER | 19 | 1.177094 | 0.8579692 | 0.007 | 3.461683 |
| | FDI | 19 | 1.27E+10 | 1.38E+10 | 9.73E+08 | 4.34E+10 |
| Russia | VER | 19 | 0.9736188 | 1.132501 | 0.966234 | 5.102637 |
| | FDI | 19 | 2.20E+10 | 2.40E+10 | 6.90E+10 | 7.48E+10 |

**Table 4.1: Descriptive Statistics for Exchange Rate Volatility and Foreign Direct Investment (1994-2012).**

### 4.2 F Test

After measuring the volatility in exchange rates for these four countries, the F-statistics values were calculated, and the null hypothesis of no cointegration was tested. Additionally, as suggested by Narayan (2004), the paper chooses maximum two lag orders as optimal lag lengths for all countries. Also, bound testing was employed, and the F-statistics values were compared with the lower and upper bound critical values reported by Pesaran et al (2001). The null hypothesis of no cointegration is rejected if the calculated F-statistics value is higher than the upper bound critical value, and the null hypothesis is not rejected if the F-statistics value is lower than the lower bound critical value. Moreover, the calculated F-statistics values lying between the lower and upper bound critical values indicate inconclusive results.

The outcomes show that the calculated F-statistics values for India and Russia are higher than the upper bound value at the 1% significant level, which indicates possible cointegration exists. On the other hand, the hypothesis is not rejected for Brazil and China, which means the cointegration does not exist among the variables. Table 4.2 summarizes the bound testing results.

| Country | F-Statistics value | Lower bound (1%) | Upper Bound (1%) |
|---|---|---|---|
| Brazil | 2.042 | 4.94 | 5.58 |
| China | 0.697 | 4.94 | 5.58 |
| India | 4.958 | 4.94 | 5.58 |
| Russia | 8.594 | 4.94 | 5.58 |

**Table 4.2: The Results of F Tests**

### 4.3 Results of Long-Run Relationship and Error Correction Model

The results of the ARDL model show that the association between exchange rate volatility and FDI for India and Russia is statistically significant. The exchange rate uncertainty of the two countries is found to negatively affect their FDI in the long-run. A unit change in the independent variable approximately changes the dependent variable by 16.5247 and 3.5710 billion of the US$ of FDI for India and Russia, respectively. On the other side, no evidence of a relationship between the two variables has been found in the long-run for the countries of Brazil and China. However, all of the BRIC countries' dependent variables are found to be positively related to their own lagged value (one lag) in the long-run. The results are presented in Table 4.3 (a).

| Country | Nature of Relationship | Coefficient | T-statistics value |
|---|---|---|---|
| Brazil | Long-run | -59.2413 | -0.7901 |
| China | Long-run | -327.5408 | -0.9924 |
| India | Long-run | -16.5247 | -5.3033 |
| Russia | Long-run | -3.571 | -3.5486 |

**Table 4.3 (a): The Results of Long-Run Relationship**

On the other side, the existence of a short-term effect of exchange rate uncertainty upon FDI is only observed in China, India, and Russia. There is no indication showing a short-term association for Brazil. The overall outcomes indicate that the existence of the association between exchange rate volatility and FDI in both the long-run and the short-run is found in India and Russia. However, for Brazil no connection between the two variables was found while the existence of the association of short-run was observed in the case of China. Table 4.3 (b) presents the results of the ECM model.

| Country | Nature of Relationship | Coefficient | T-statistics value |
|---|---|---|---|
| Brazil | Short-Run | -27.5143 | -0.5712 |
| China | Short-Run | -21.1019 | -3.5745 |
| India | Short-Run | -10.0416 | -4.2713 |
| Russia | Short-Run | -2.5789 | -5.5024 |

**Table 4.3 (b) Results of Error Correction Model**

## Chapter 5. Conclusions

After the Bretton Woods System collapsed in 1971, many nations adopted fluctuating exchange rates. The investigation of the effect of exchange rate uncertainty upon macroeconomic variables, including FDI has been raised as concerns in the past few decades. Numerous researchers have been directed to this subject and have emphasized different macroeconomic variables and countries. The outcomes differ from study to study indicating an encouraging or discouraging relationship between exchange rate volatility and FDI. Whereas others demonstrate inconclusive results or no evidence at all. This paper is an attempt to try to explain the association between exchange rate uncertainty and FDI in the largest emerging markets, the BRIC countries.

The paper utilizes the Autoregressive Distributed Lag Framework (ARDL) for cointegration and Error Correction Model (ECM) to inspect the relationship between the exchange rate uncertainty and FDI. The results indicate that the volatility in exchange rate negatively affects FDI in the long-run for India and Russia. Additionally, the evidence of existence of the short-run relationship was also found in China, India, and Russia. However, no evidence of the existence of either long-term or short-term relationship was observed for Brazil.

For more comprehensive results, the exploration of the influence of

exchange rate uncertainty upon macroeconomic variables can be expanded in the future by including more variables such as unemployment rates, tax rates, interest rates, and GDP growth rates.

## References


Alam, S. (2010). A reassessment of the effects of exchange rate volatility on Pakistan's export demand: ARDL approach. *European Journal of Economics, Finance and Administrative Sciences, 21,* 77-91.

Arratibel, O., Furceri, D., Martin, R., and Zdzienicka, A. (2011). The effect of nominal exchange rate volatility on real macroeconomic performance in the CEE countries. *Economic Systems, 35,* 261-277.

Baek, I-M., and Okawa, T. (2001). Foreign exchange rates and Japanese foreigndirect investment in Asia. *Journal of Economics and Business, 53,* 69-84.

Bailey, M. J., and Tavlas, G. S. (1991). Exchange Rate Variability and Direct Investment. *The Annals of the American Academy of Political and Social Science,* July 01,*516,* 1, 106-116.

Benassy-Quere, A., Fontagne, L., and LahrEche-Revil, A. (2001). Exchange-ratestrategies in the competition for attracting foreign direct investment. *Journal of the Japanese and International Economics, 15(2),* 178-198.

Bleaney, M., and Greenaway, D. (2001). The impact of terms of trade and real exchange rate volatility on investment and growth in sub-saharan Africa. *Journal of Development Economics, 65(2),* 491-500.

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics, 31,* 307-327.

Campa, M.J. (1993). Entry by foreign firms in the United States under exchange rate uncertainty. *The Review of Economics and Statistics, 75(4),* 614-622.

Campos, J., Ericsson, R.N., and Hendry, F.D. (2005). General-to-specific modeling: An overview and selected bibliography. Board of Governors of the Federal Reserve System. *International Finance discussion paper # 838*


.

Chen, M.K., Rau, H.H., and Lin, C.C. (2006). The impact of exchange rate movements on foreign direct investment: Market oriented vs cost-oriented. *The Development Economics, 15(3),* 269-87.

Chaudhary, G.M., Shah, S.Z.A., and Bagram, M.M.M. (2012). Do Exchange RateVolatility Effects Foreign Direct Investment? Evidence from Selected Asian Economies. *Journal of Basic and Applied Scientific Research, 2(4),* 3670-3681.

Chong, L-L., and Tan, B-H. (2008). Exchange rate risk and macroeconomic fundamentals: Evidence from four neighboring Southeast Asian economies. *International Research Journal of Finance and Economics, 16,* 88-95.

Chowdhury, A., and Wheeler, M. (2008). Does real exchange rate volatility affect foreign direct investment? Evidence from four developed economies. *International Trade Journal, 22(2).*

Crowley, P., and Lee, J. (2003). Exchange rate volatility and foreign investment: International evidence. *The International Trade Journal, 17(3),* 227-252.

Cushman, D.O. (1985). Real exchange rate risk, expectations, and the level of directinvestment. *Review of Economics and Statistics, 67(2),* 297-308.

Cushman, D.O. (1988). Exchange rate uncertainty and foreign direct investment in the United States. *Weltwirtschatliches Archiv, 124:*322-336.

Dhakal, D., Nag, R., Pradhan, G. and Upadhyaya, P.K. (2010). Exchange rate volatility and foreign direct investment: Evidence from East Asian countries. *International Business & Economics Research Journal, 9(7),* 121-128.

Economy Watch. (2010). Benefits of Foreign Direct Investment. Retrieved from http://www.economywatch.com/foreign-direct-investment/benefits.html

Engle, R.F. (1982). Autoregressive conditional hetreoscedasticity with estimates of variance of United Kingdom inflation. *Econometrica, 50,* 987-1008.

Firoozi, F. (1997). Multinationals FDI and uncertainty: an exposition. *Journal of Multinational Financial Management,* October 17, 3, 265-273.

Furceri, D., and Borelli, S. (2008). Foreign direct investment and exchange rate volatilityin the EMU neighborhood countries. *Journal of International and Economic Studies, 1(1),* 42-59.

Goldberg, S.L., and Kolstad, D.C. (1995). Foreign direct investment, exchange rate variability and demand uncertainty. *International Economic Review, 36(4),* 855-873.

Goldman Sachs. (2003). *2003 Annual Report.* Retrieved from http://www.goldmansachs.com/investor-relations/financials/archived/annual-reports/attachments/2003-annual-report.pdf

Gorg, H., and Wakelin, K. (2002). The impact of exchange rate volatility on US direct investment. *The Manchester School, 70(3),* 380-397.

Gottschalk, S., and Hall, S. (2008). Foreign direct investment and exchange rateuncertainty in South-East Asia. *International Journal of Finance and Economics, 13*, 349-359.

Hassan, A., and Nasir, M.Z. (2008). Macroeconomic factors and equity prices: An empirical investigation by using ARDL approach. *The Pakistan Development Review, 47(4),*501-513.

Havranek, T., and Irsova, Z. (2010). Which Foreigners are Worth Wooing? A Meta-Analysis of Vertical Spillovers from FDI. JEL Codes: C42; F23.

Jeon, N.B., and Rhee, S.S. (2008). The determinants of Korea's foreign direct investment from the United States, 1980-2001: An empirical investigation of firm-level data. *Contemporary Economic Policy, 26(1)*,118-131.

Kiyota, K., and Urata, S. (2004). Exchange rate, exchange rate volatility and foreign direct investment. *The World Economy, 27(10),* 1501-1536.

Kogut, B., and Chang, S. J. (May 01, 1996). Platform Investments and Volatile Exchange Rates: Direct Investment in the U.S. by Japanese Electronic Companies. *The Review of Economics and Statistics, 78,* 2, 221-231

Kyereboah-Coleman, A., and Agyire-Tettey, F.K. (2008). Effect of exchange rate volatility on foreign direct investment in sub-saharan Africa: The case of Ghana. *Journal of Risk Finance, 9(1),* 52-70.

Lee, B.-S., and Min, B. S. (November 01, 2011). Exchange rates and FDI strategies of multinational enterprises. *Pacific-basin Finance Journal, 19,* 5, 586-603.

Mahmood, I, Ehsanullah, M., and Ahmed, H. (2011). Exchange rate volatility & macroeconomic variables in Pakistan. *Business Management Dynamics, 1(2),* 11-22.

Ministry of Finance, Government of India. (2012). *The BRICS Report (New Delhi 2012).* Oxford University Press. Retrieved from http://www.g20civil.com/documents/brics/brics-report.pdf

Nagubadi, V.R., and Zhang, D. (2011). Bilateral foreign direct investment in forest industry between the U.S. and Canada. *Forest Policy and Economics, 13,* 338-344.

Narayan, P.K. (2004). Reformulating critical values for the bounds F-statistics approach to cointegration: an Application to the tourism demand model for Fiji. *Discussion papers, Department of Economics, Monash University*, Australia.

Nyarko, P. A., Nketiah-Amponsah, E., and Barnor, C. (July 19, 2011). Effects of Exchange Rate Regimes on FDI Inflows in Ghana. *International Journal of Economics and Finance, 3,* 3.)

OECD StatExtracts database. (2013). Exchange rates. Retrieved from http://stats.oecd.org/

Osinubi, T.S., and Amaghionyeodiwe, L.A. (2009). Foreign direct investment and exchange rate volatility in Nigeria. *International Journal of Applied Econometrics and Quantitative Studies, 6(2),* 83-116.

Pesaran, H.M., Shin, Y., and Smith, J.R. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16(3),* 289-326.

Reinert, K.A., Rajan, R.S., Glass, A,J., and Davis, L.S. (2010). *The Princeton Encyclopedia of the World Economy. P394.* New Jersey. Princeton University Press.

Schmidt, W.C., and Broll, U. (2008). The effect of exchange rate risk on U.S. foreign direct investment: An empirical analysis. *MPRA Paper No. 10713.*

Schnabl, G. (2008). Exchange rate volatility and growth in small open economies at the EMU periphery. *Economic Systems, 32,* 70-91.

Stephey, M.J. (2008). A Brief History of Bretton Woods System. *Time Business & Money.* Retrieved from http://www.time.com/time/business/article/0,8599,1852254,00.html

Takagi, S, and Shi, Z. (2011). Exchange rate movements and foreign direct investment (FDI): Japanese investment in Asia, 1987-2008. *Japan and World Economy.*

The World Bank Database. (2013). *Foreign direct investment, net inflows (% of GDP).* Retrieved from http://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS

Udoh, E., and Egwaikhide, O.F. (2008). Exchange rate volatility, inflation uncertainty and foreign direct investment in Nigeria. *Botswana Journal of Economics, 5(7),*14-31.

Udomkerdmongkol, M., Morrissey, O., and Gorg, H. (2009). Exchange rates and outward foreign direct investment: US FDI in emerging economies. *Review of Development Economics, 13(4),*754-764.

UNCTAD. (n.d.). Definitions of FDI. Retrieved from http://unctad.org/en/Pages/DIAE/Definitions-of-FDI.aspx

Vita, D.G., and Abbot, A. (2008). Do exchange rates have any impact upon UK inward foreign direct investment? *Applied Economics, 39(20),* 2553-2564.

Xing, Y. (January 01, 2006). Why is China so attractive for FDI? The role of exchange rates. *China Economic Review, 17,* 2, 198-209.