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Exchange Rate Volatility and FDI Inflows: Evidence from Cross- Country Panel Data

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Abstract

Using a panel of 80 developing and developed countries for the period 1990-2015, this study analyses the relationship between exchange rate volatility and foreign direct investment (FDI) inflows. The results reveal a negative relationship between de facto exchange rate volatility and FDI. Reducing exchange rate volatility by 10% over one-year can boost FDI inflows—*ceteris paribus*—by an estimated 0.48 percentage points of GDP while the same reduction over the past five years can boost FDI inflows by 0.27 percentage points over the long-run. The results are applied to the case of South Africa, which has been experiencing high volatility of the rand in recent years. Reducing the rand’s volatility to that of developing country peers, South Africa could boost FDI inflows by a potential of 0.25 percentage points of GDP.

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Keywords: Exchange Rates, Exchange Rate Volatility, Investment, Foreign Direct Investment

Exchange Rate Volatility and FDI Inflows: Evidence from Cross-Country Panel Data

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1. Introduction

The world has become more integrated over the last few decades as countries have opened themselves up to greater trade and capital flows with the rest of the world. Being more integrated with the world creates more investment opportunities for investors locally and abroad. Investment is important for many social outcomes, including job creation and poverty reduction, as demonstrated in a recent World Bank study on South Africa (World Bank, 2017). One potential deterrent to investment, especially to Foreign Direct Investment (FDI), is exchange rate volatility which increases risk (i.e. the variance of the return) of overseas investments.

This paper examines the relationship between exchange rate volatility and FDI in a panel analysis of 80 countries between 1990 and 2015. The results suggest that reducing exchange rate volatility by 10% can increase FDI inflows by 0.48 percentage points of GDP. This impact of exchange rate volatility on FDI investments are found to persist in the long-run.

The results are then applied to the case of South Africa. Qualitative evidence from investor surveys suggests that exchange rate volatility is a major concern to investors in South Africa. This paper attempts to magnify the potential foregone investment and FDI due to volatility of the rand. Reducing the rand's volatility to that of developing country peers, South Africa could boost FDI inflows by a potential of 0.25 percentage points of GDP.

The paper is structured as follows: Section 2 provides a review of the literature on exchange rate volatility and investment, to couch the following discussion in the scientific discourse. 3 outlines the methodology used. The results are presented and discussed in Section 4. Section 5 applies the results to South Africa. Finally, section 6 concludes.

¹ The World Bank.

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2. Literature Review

Serven (2002) analyzed exchange rate volatility for 61 developing countries between 1970-1995 and found a significant negative relationship. This study builds on Serven (2002) methodology using a more recent sample period and analyzing different period lengths of exchange rate volatility. Benassy, Fontagne and Lahreche (2001) found three-year exchange rate volatility to have a negative impact on investment inflows into developing countries between 1984-1996. Bleaney and Greenaway (2001) have looked at a specific sample of 14 low-income countries in Sub-Saharan Africa (SSA) between 1980-1995 and found investment to be adversely affected by exchange rate volatility. They find that a 1% increase in the real exchange rate volatility decreases investment (% of GDP) in SSA by a staggering 28.5%.

Country specific or country-group specific studies have also been conducted. Goldberg and Kolstad (1995) looked at investment outflows for four major developed countries between 1978-1991 and found three-year volatility to have a positive effect on the investment outflows. Cushman (1985, 1988), using a bigger sample of investment outflows and inflows for six developed countries between 1963-1978, also found that short-run volatility had a positive effect for investment flows, both inflows and outflows. Exchange rate volatility can be favorable to investors when movements are in their favor. Exchange rates that follow a random walk have likely the same probability of moving in a favorable direction than a non-favorable one (Fowkes, Loewald and Marinkov, 2016). Global uncertainties and shocks around the world have, however, increased the risk aversity of investors which caution many of them away from high exposure to exchange rate risk.

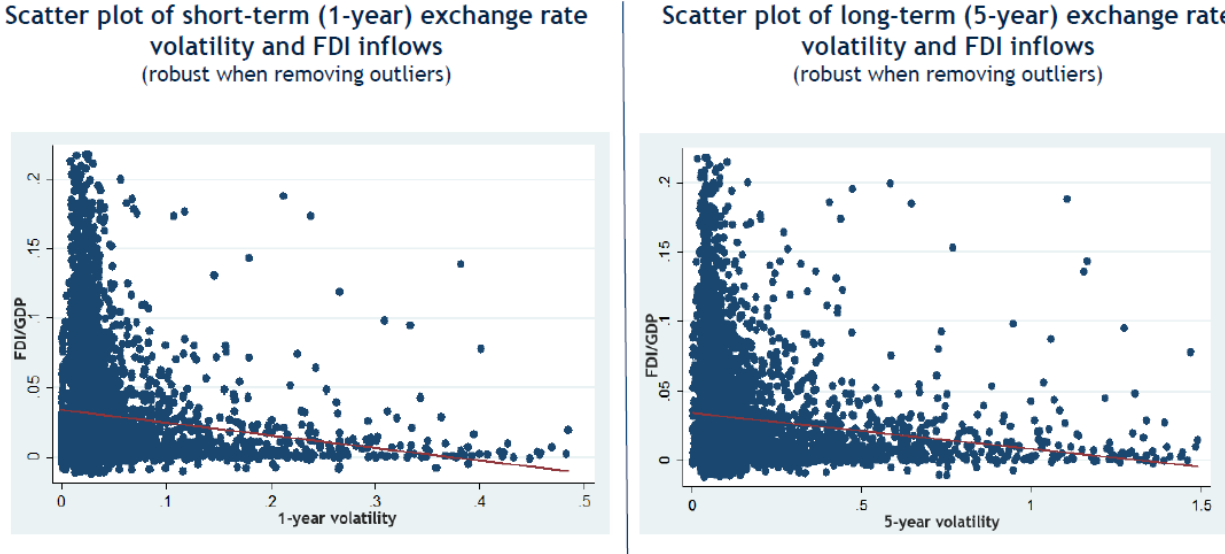
Looking at sector-level data in the US, Goldberg (1993) found that exchange rate volatility had different effects on different sectors over time. In the 1970s, exchange rate volatility had a significantly positive relationship with investment in the metal and machinery sectors, while, in the 1980s, exchange rate volatility, by contrast, had a negative effect on investment in the transport, glass and fabricated metals sectors. Looking at firm level data for 117 Japanese firms during 1980-1994, Urata and Kawai (2000) found that five-year exchange rate volatility had a negative impact on these firms' investment decisions. Kiyota and Urata (2003) looked further into the firm level data and analyzed how exchange rate volatility effected Japanese firms' investment decisions into specific regions. They found that volatility in the host currency/yen has a negative impact on Japanese firms investing in Latin America and East Asia, while, the volatility in the host currency/USD has a greater negative impact on Japanese firms investing in Latin America compared to East Asia. Using firm-level or sector-level data overcomes aggregation bias issues experienced with country-level data. The second part of this study uses firm level data for South Africa to analyze how the effects of exchange rate volatility are disaggregated across the country's major sectors. Using national-level data, Maepa (2016) found that long-run exchange rate volatility had a significant

negative effect on investment in South Africa between 1970-2014, while short-run volatility showed no significant effects.

The World Bank (2001) highlights that FDI investment are a key factor to boost growth and reduce poverty. Apart from boosting growth, FDI investments can reduce poverty through additional job opportunities the investments can create (Saravanamuttoo, 1999) and by crowding in additional domestic investment (Jenkins and Thomas, 2002). By reducing exchange rate volatility, countries can attract further investments which can reduce poverty.

Using a panel set including 80 developing and developed countries spanning 1990-2015, this paper tests whether a reduction in exchange rate volatility leads to an increase in investment in a country. A simple plot of exchange rate volatility against FDI investment (% of GDP) (Figure 1) reveals a simple negative relationship between the variables. Section 3 delves further into the methodology used in this paper to determine the statistical relationship between the exchange rate volatility and FDI inflows.

Figure 1: A simple correlation between exchange rate volatility and FDI inflows



Source: Haver Analytics; World Bank staff calculation

3. Methodology

1.1 Data

Annual data between 1990-2015 is used in this study which is available from the World Bank's World Development Indicators (WDI). In calculating exchange rate volatility, monthly data is used from Haver Analytics. A de facto exchange rate volatility measure is used by taking the monthly standard deviation of the LCU/USD exchange rate over n-months and normalizing it by the average exchange rate over the same period. Short-run exchange rate volatility is measured as a 12-month normalized standard deviation and long-run volatility is measured using a 60-month normalized standard deviation. To maintain the same frequency as the rest of the variables, the monthly normalized standard deviation is annualized by taking the average over a 12-month *calendar* period.

Investment is taken as the ratio of FDI inflows (in real USD, deflated by US CPI) over the country's lagged GDP (in real USD, deflated by lagged US CPI). The effect of exchange rate volatility on investment is analyzed by controlling for several possible confounding factors. These include the development of the country (GDP per capita), exposure to global growth (World GDP per capita interacted with the country's level of openness), terms of trade (ToT) and the real effective exchange rate (REER). GDP per capita, openness and the REER are lagged due to endogeneity concerns. For most countries, world GDP per capita and ToT are exogenous, thus, used at time t. Time dummies are included to capture global effects at time t which impact all countries in similarly, while country dummies capture time-invariant fixed effects within a country. Controlling for time and country effects make the specification, which is presented in Equation 1, more demanding.

Equation 1

$$\begin{aligned} \frac{FDI_{i,t}}{GDP_{i,t-1}} = & \beta_1 + \beta_2 ExchangeRateVolatility_{i,t} \\ & + \beta_3 \ln(GDPpc)_{i,t-1} + \beta_4 \{ \ln(WorldGDPpc_t \times (Openness_{i,t-1})) \} + \beta_5 \ln(REER)_{i,t-1} + \beta_6 ToT_{i,t} \\ & + fe_t + fe_i + v_{i,t} \end{aligned}$$

The country's GDP per capita is expected to have a negative relationship with investments as there are greater investment opportunities and returns in less developed countries. World GDP per capita is weighted by the openness of a country to estimate the impact the global economy has on local FDI inflows. The

relationship is expected to be positive. The literature is ambiguous on the sign of real effective exchange rate (REER) as a depreciated currency provides greater competitiveness, whereas, a stronger currency can provide greater returns. Terms-of-trade (ToT) is expected to have a positive impact on investment as higher exports translates into higher growth and returns.

FDI inflows and exchange rate volatility have a two-way relationship. High movement of FDI flows due to external factors can induce higher exchange rate volatility, which in turn has a secondary impact on FDI. The endogeneity between the variables makes it difficult in establishing causality. To address the endogeneity concerns, lagged exchange rate volatility is used in a second specification (Equation 2). Lagged exchange rate volatility can impact current FDI, but current FDI has no impact on past exchange rate volatility. Lagged output and lagged real exchange rate are dropped from Equation 2 to avoid contemporaneous correlation with exchange rate volatility. The following specification is estimated:

Equation2

$$\frac{FDI_{i,t}}{GDP_{i,t-1}} = \beta_1 + \beta_2 ExchangeRateVolatility_{i,t-1} + \beta_3 \{ \ln(WorldGDPpc_t \times Openness_{i,t-1}) \} + \beta_4 ToT_{i,t} + fe_t + fe_i + v_{i,t}$$

Outliers at the top and bottom 1 percentile as well as 5 percentile were removed. The results remain robust with and without outliers.

4. Discussion of results

Tables 1 and 2 provide the results for the impact of short and long-run exchange rate volatility on FDI investments, respectively. Columns (1) in both Tables present the simple relationship result for 187 countries included in the panel sample. After controlling for the confounding factors, the sample drops to 80 countries. Columns (2) present in both Tables the baseline results where the important control variables are included and columns (3) rerun the specification of (1) on the 80 countries included in (2). The results suggest that exchange rate volatility has a negative impact on FDI investment, both in the short-run (Table 1) and long-run (Table 2).

Column (2) in Table 1 reveals that a 10% reduction of exchange rate volatility over one year is associated with higher FDI inflows by 0.48 percentage points of GDP with the confidence interval of [-0.081;-0.015]. Column (2) in Table 2 reveals that FDI inflows can increase further in the long-run by 0.27 percentage points of GDP with the same reduction in exchange rate volatility over the past five years (confidence interval is [-0.47;-0.007]). Plotting the residuals of FDI inflows against the residuals of exchange rate volatility (Figure 2) confirm that the negative relationship exists after controlling for the relevant control variables. The results are robust when removing the 1 and 5 percentile outliers (see Figure A1 in the Appendix).

Table 1: Association between contemporaneous one-year exchange rate volatility and current FDI inflows

VARIABLES	(1) FDI Inflow	(2) FDI Inflow	(3) FDI Inflow
Method	Pooled OLS	Pooled OLS	Pooled OLS
Sample	unrestricted	unrestricted	Restricted to sample in column (2)
1-year exchange rate volatility	-0.036* [0.019]	-0.048*** [0.017]	-0.053*** [0.016]
Log(Real GDP pc)(t-1)		-0.000 [0.004]	
Log(Real world GDP pc)*Openness(t-1)		0.001 [0.001]	
Log(real exchange rate)(t-1)		-0.011 [0.007]	
Terms of trade (t)		-0.003 [0.004]	
Constant	0.040*** [0.002]	0.084** [0.042]	0.038*** [0.004]
Observations	3,914	1,460	1,460
R-squared	0.166	0.176	0.165
Number of countries	187	80	80

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Association between contemporaneous five-year exchange rate volatility and current FDI inflows

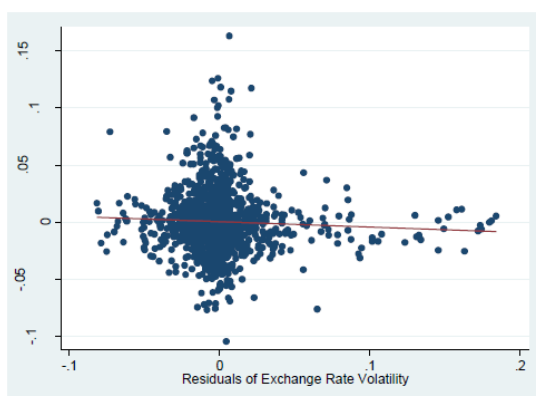
VARIABLES	(1) FDI Inflow	(2) FDI Inflow	(3) FDI Inflow
Method	Pooled OLS	Pooled OLS	Pooled OLS
Sample	unrestricted	unrestricted	Restricted to sample in column (2)
5-year exchange rate volatility	-0.010* [0.006]	-0.027*** [0.010]	-0.019** [0.009]
Log(Real GDP pc)(t-1)		-0.000 [0.004]	
Log(Real world GDP pc)*Openness(t-1)		0.002 [0.001]	
Log(real exchange rate)(t-1)		-0.015** [0.007]	
Terms of trade (t)		-0.004 [0.004]	
Constant	0.039*** [0.002]	0.101** [0.042]	0.038*** [0.004]
Observations	3,891	1,452	1,452
R-squared	0.169	0.179	0.164
Number of countries	187	80	80

Robust standard errors in brackets

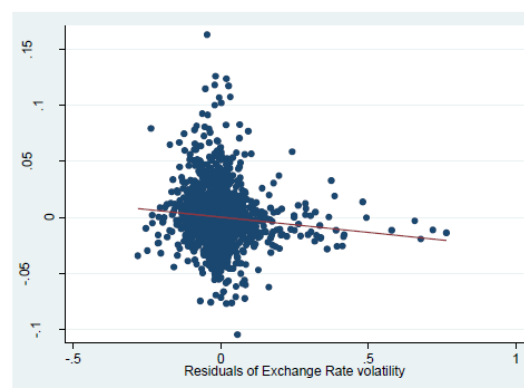
*** p<0.01, ** p<0.05, * p<0.1

Figure 2: Visual relationship of residuals of exchange rate volatility and FDI inflows after controlling for other explanatory variables

Scatter plot of residuals of short-term exchange rate volatility and FDI inflows (robust when removing outliers)



Scatter plot of residuals of long-term exchange rate volatility and FDI inflows (robust when removing outliers)



Source: Haver Analytics; World Bank staff calculation

Tables 3 and 4 present the result using specification 2, where lagged exchange rate volatility is used. We see no impact of past short-run exchange rate volatility and current FDI inflows (Table 3). However, there is a significant relationship between past long-run exchange rate volatility and current FDI inflows (Table 4). This implies persistent exchange rate volatility matters a great deal in FDI inflows (even the volatility was in the past). In other words, while investor could forgive past short-run volatility, they remember long-standing, chronic exchange rate volatility. Column (2) in Table 4 reveals that for a 10% reduction in past exchange rate volatility in the previous five years, FDI inflows can increase by 0.29 percentage points of GDP (with a confidence interval of [-0.047;-0.011]). This is not too different from the result in in Table 2.

Table 3: Association between contemporaneous one-year lagged exchange rate volatility and current FDI inflows

VARIABLES	(1) FDI Inflow	(2) FDI Inflow	(3) FDI Inflow
Method	Pooled OLS	Pooled OLS	Pooled OLS
Sample	unrestricted	unrestricted	Restricted to sample in column (2)
1-year exchange rate volatility (t-1)	0.002 [0.021]	-0.002 [0.022]	0.017 [0.025]
Log(Real world GDP pc)*Openness(t-1)		0.004*** [0.001]	
Terms of trade (t)		-0.001 [0.004]	
Constant	0.039*** [0.002]	0.009 [0.007]	0.037*** [0.003]
Observations	3,905	3,025	3,025
R-squared	0.162	0.189	0.157
Number of cc	187	169	169

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Association between contemporaneous five-year lagged exchange rate volatility and current FDI inflows

VARIABLES	(1) FDI Inflow	(2) FDI Inflow	(3) FDI Inflow
Method	Pooled OLS	Pooled OLS	Pooled OLS
Sample	unrestricted	unrestricted	Restricted to sample in column (2)
5-year exchange rate volatility (t-1)	-0.003 [0.006]	-0.029*** [0.009]	-0.018** [0.009]
Log(Real world GDP pc)*Openness(t-1)		0.001 [0.001]	
Terms of trade (t)		-0.004 [0.004]	
Constant	0.039*** [0.002]	0.110** [0.043]	0.037*** [0.004]
Observations	3,881	1,452	1,452
R-squared	0.163	0.179	0.162
Number of cc	186	80	80

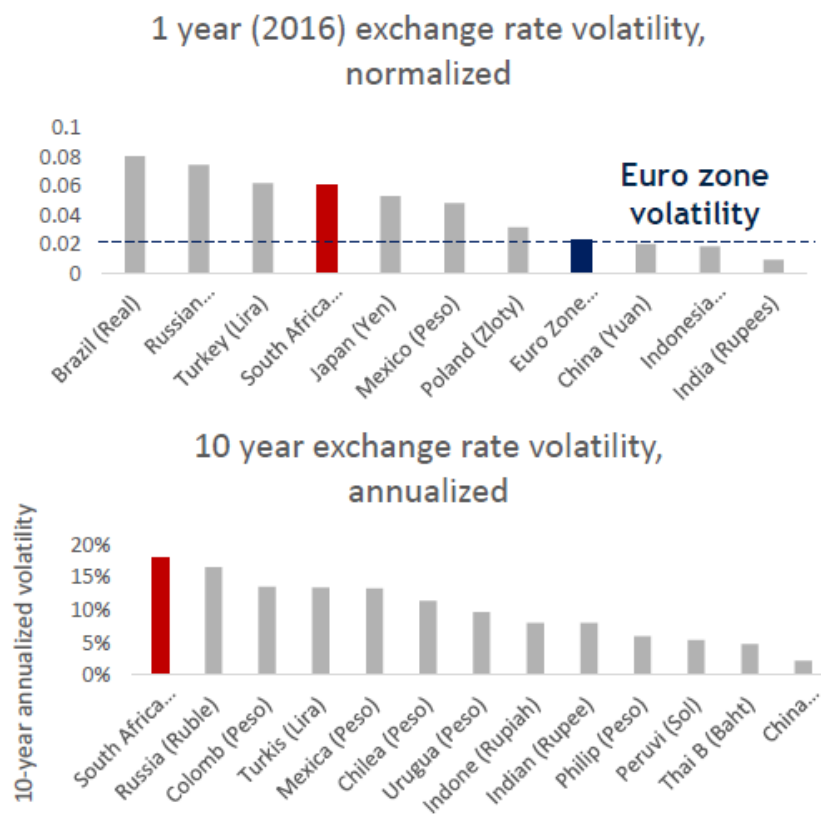
Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

5. The case of South Africa

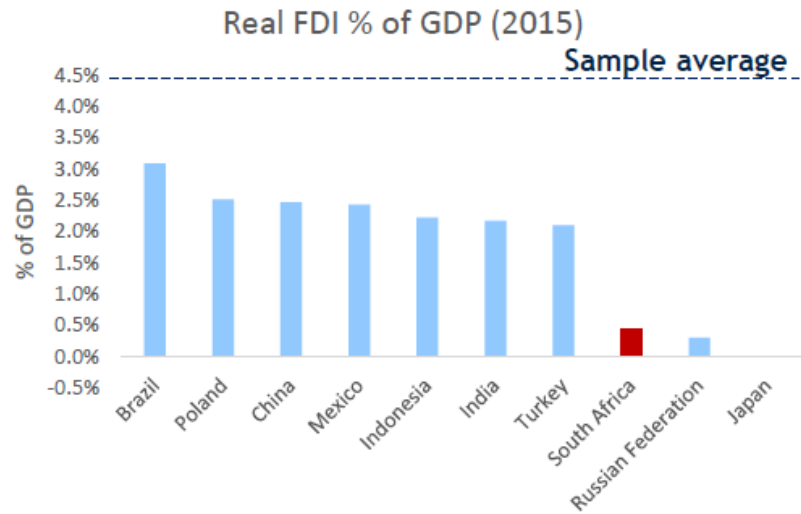
South Africa's financial development and its key role in Africa makes the rand one of the most traded developing countries' currencies. With a volatility that was 62.8% more volatile than the Euro (relative to the USD) in 2016, the rand has experienced some of the highest volatility amongst developing and other comparable countries (Figure 3). The International Monetary Fund (IMF) finds that South Africa's exchange rate volatility is mainly driven by commodity price shocks, domestic policy uncertainty and global market volatility. Foreign and domestic factors have contributed to low foreign investment and investors have explicitly mentioned the high exchange rate volatility in South Africa as a factor that deters them from investing in the country. FDI inflows into South Africa have been lagging substantially compared to peers (Figure 4). Exchange rate volatility can be argued as a significant factor to the low FDI inflows experienced. Using the results in specification 1, reducing the rand's volatility to developing country peer levels (Figure 5) could boost FDI inflows by 0.25 percentage points.

Figure 3: Exchange rate volatility in 2016



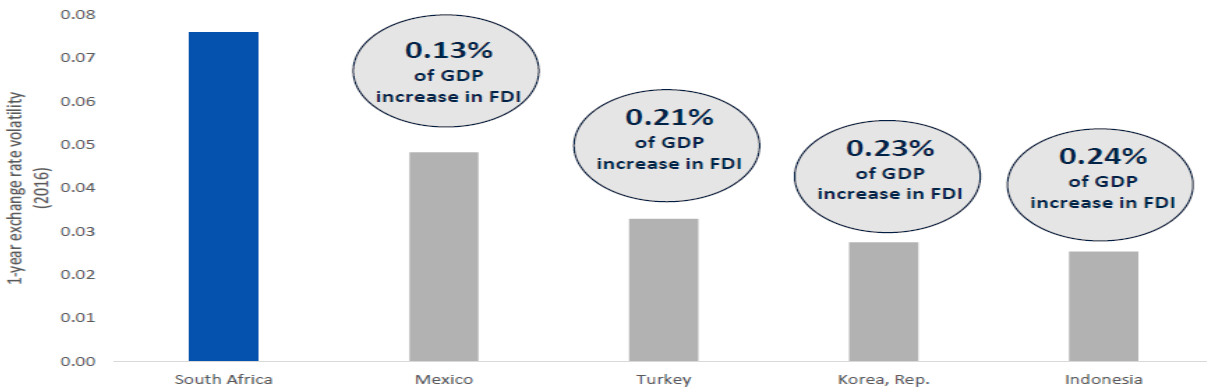
Source: Haver Analytics; World Bank staff calculation

Figure 4: South Africa's FDI inflows are lagging



Source: Haver Analytics; World Bank staff calculation

Figure 5: Reducing South Africa's exchange rate volatility to levels of peers could potentially boost FDI inflows



Source: Haver Analytics; World Bank staff calculation

6. Conclusion

Using a panel of 80 developing and developed countries for the period 1990-2015, this study has found an inverse relationship between short-run and long-run exchange rate volatility and current FDI inflows although the relationship between the long-run exchange rate volatility and current FDI inflows is more robust.

The results are applied to the case of South Africa, which has been experiencing high volatility of the rand in recent years. Reducing the rand's volatility to that of developing country peers, South Africa could boost FDI inflows by a potential of 25 percentage points of GDP. Being 62.8% more volatile than the Euro, a rand that is stable at a EUR/USD level can boost FDI inflows as a percentage of GDP by 3 percentage points.

References

- Amano Robert. A. and Simon van Norden, (1998), "Exchange Rates and Oil Prices", *Review of International Economics*, 6(4), 683 – 694
- Aron J., Elbadawi I., and Kahn B., (1997), "Determinants of the Real Exchange Rate in South Africa", Centre for the Study of African Economies, Institute of Economics and Statistics, WPS/97-16, Oxford
- Baltagi, B. H. (2001), *Econometric Analysis of Panel Data* (2nd ed., Chichester, UK: John Wiley and Sons).
- Barrel, R., and Pain, N. (1998). "Real Exchange Rates, Agglomeration and Irreversibilities: Macroeconomic Policy and FDI in EMU", *Oxford Review of Economic Policy*, 14, 152-167.
- Bénassy-Quéré, A., L. Fontagné and A. Lahrière-Révil (2001), 'Exchange Rate Strategies in the Competition for Attracting Foreign Direct Investment', *Journal of the Japanese and International Economies*, 15, 2, 178–98.
- 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, 491-500
- Cashin, Paul, Luis Cespedes, and Ratna Sahay, (2002), "Keynes, Cocoa, and Copper: In Search of Commodity Currencies", IMF Working Paper WP/02/223 (Washington: International Monetary Fund).
- Cashin, Paul, Luis F. Cespedes and Ratna Sahay (2004), Commodity Currencies and the Real Exchange Rate, *Journal of Development Economics*, Elsevier, 75(1), pp. 239–268.
- Cavalcanti, Tiago, Kamiar Mohaddes and Medhi Raissi (2011) "Commodity price volatility and the source of growth".
- Chen, Yu-Chin, Kenneth Rogoff and Barbara Rossi (2010), Can Exchange Rates Forecast Commodity Prices?, *The Quarterly Journal of Economics*, MIT Press, 125(3), pp. 1145–1194.
- Chen Y. and K. Rogoff, (2002), "Commodity Currencies and Empirical Exchange Rate Puzzles", IMF Working Paper WP/02/27 (Washington: International Monetary Fund).
- Creamer, K. (2014). South Africa as an Open Economy: Problems and potentialities. In Meyima, M. Nkondo, M. Chitiga-Mabugu, M. Sithole and F. Nyamhjoh (eds), *State of the Nation: South Africa 1994-2014 A Twenty-Year Review of Freedom and Democracy*. Pretoria: HSRC Press, 142-157.
- Cushman, D. O., (1988). "Exchange-Rate Uncertainty and Foreign Direct Investment in the United States", *Weltwirtschaftliches Archiv*, 124, 322-336.

Douglas, Justin, Harley Thompson and Peter Downes, (1997), “Modelling the Exchange Rate and Commodity Prices in the Treasury Macroeconomic (TRYM) Model” Economic Division Commonwealth Treasury, 1997 Conference of Economists, 29 September to 1 October 1997 University of Tasmania

Edwards, Sebastian, (1985), “Commodity Export Prices and the Real Exchange Rate in Developing Countries: Coffee in Colombia”, NBER Working Paper Series WP1570 Edwards, Sebastian, (1985b), “Commodity Export Boom and the Real Exchange Rate: The Money Inflation Link”, NBER Working Paper Series WP1741

Fowkes, D., Loewald, C. and Marinkov, M. (2016). “Inflating our troubles: South Africa’s economic performance and the exchange rate”. *Economic Research Southern Africa*, Policy Paper 22

Froot, K. A. and J. C. Stein (1991), ‘Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach’, *Quarterly Journal of Economics*, 106, 4, 1191–217.

Gali and Monacelli (2004). Monetary policy and exchange rate volatility in a small open economy.

Goldberg, L.S. (1993). “Exchange rates and investment in the United States industry”. *The Review of Economics and Statistics*, 75(4), 575-588

Goldberg, L. S. and M. Klein (1998), ‘Foreign Direct Investment, Trade, and Real Exchange Rate Linkages in Developing Countries’, in R. Glick (ed.), *Managing Capital Flows and Exchange Rates: Perspectives from the Pacific Basin* (Cambridge, UK: Cambridge University Press), 73–100.

Goldberg, L. S. and C. D. Kolstad (1995), ‘Foreign Direct Investment, Exchange Rate Variability and Demand Uncertainty’, *International Economic Review*, 36, 4, 855–73.

International Institute of Sustainable development (2008) “Boom or bust: how commodity price volatility impedes poverty reduction, and what to do about it”

IMF. (2012). “Commodity prices and exchange rate volatility: Lessons from South Africa’s capital account liberalization”, *IMF Working Paper*

Ito, T. (2000), ‘Capital Flows in Asia’, in S. Edwards (ed.), *Capital Flows and the Emerging Economies* (Chicago, IL: University of Chicago Press), 255–96.

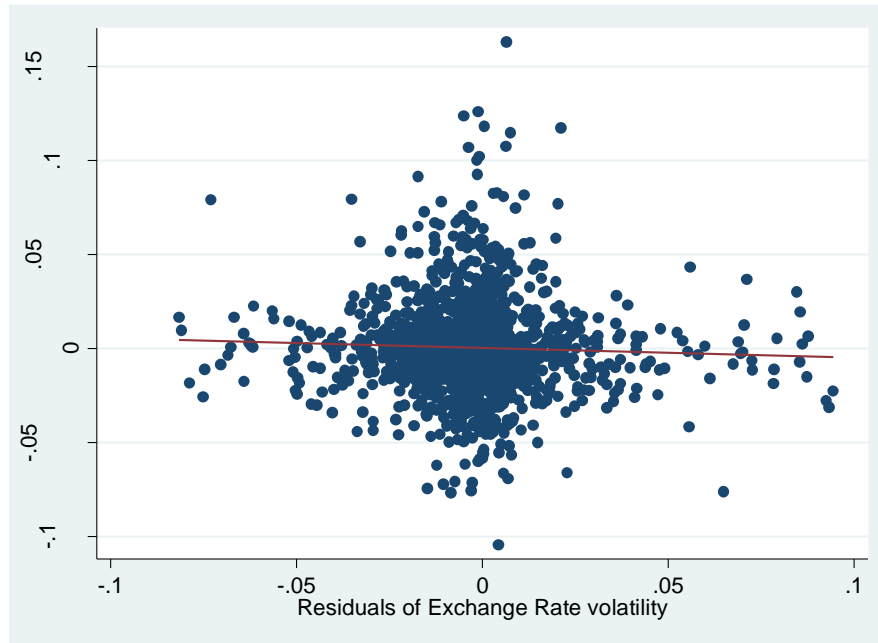
Ito, T., Isard, P., Symansky, S., and Bayoumi, T. (1996). “Exchange Rate Movements and Their Impact on Trade and Investment in the APEC Region”, chapter IV, *IMF Occasional Paper* No 145, December.

Jenkins, Carolyn and Lynne Thomas (2002), “Foreign Direct Investment in Southern Africa: Determinants, Characteristics and Implications for Economic Growth and Poverty Alleviation”, Final Report, October, Globalization and Poverty Project, Centre for the Study of African Economies, University of Oxford.

- Klein, M. W. and E. Rosengren (1994), 'The Real Exchange Rate and Foreign Direct Investment in the United States: Relative Wealth vs. Relative Wage Effects', *Journal of International Economics*, 36, 3/4, 373–89.
- MacDonald, R. and Ricci, L. (2003). "Estimation of the equilibrium exchange rate for South Africa", *IMF Working Paper*, WP/03/44
- Maepa, M. (2016). "The effects of exchange rate volatility on South African investments", *Economic Research Southern Africa*, working paper 609
- Nickell, S. J. (1981). "Biases in Dynamic Models with Fixed Effects". *Econometrica*, 49(6), 1417-1426.
- Saravanamuttoo, N. (1999), "Foreign Direct Investment and Poverty Reduction in Developing Countries", Turn Course Solutions, Canadian International Development Agency.
- Sazanami, Y. and Y. C. Wong (1997), 'Strategies of Japanese Multinationals: Changes in the Locational Importance of Asia, the EC and North America', in P. J. Buckley and J.-L. Mucchielli (eds.), *Multinational Firms and International Relocation* (Cheltenham, UK: Edward Elgar), 103–22.
- Sazanami, Y., S. Yoshimura and K. Kiyota (2003), 'Japanese Foreign Direct Investment to East Asia and Exchange Rate Policies: Some Longer Term Policy Implications after the Crisis', *Keio Economic Studies*, 40, 1, 1–26.
- Serven, L. (2002). "Real exchange rate uncertainty and private investment in developing countries", *World Bank Policy Research Working Paper*, 2823
- Hassan, S. (2015). "Speculative flows, exchange rate volatility and monetary policy: the South African experience", *South African Reserve Bank Working Paper Series*, WP/15/02
- Urata, S. and H. Kawai (2000). 'The Determinants of the Location of Foreign Direct Investment by Japanese Small and Medium-sized Enterprises', *Small Business Economics*, 15, 2, 79–103.
- World Bank (2001). "Foreign direct investment and poverty reduction", *OECD Global Forum on International Investment*, Mexico City
- World Bank (2017). "Private investment for jobs", *South African Economic Update* ed.9

Appendix

Figure A1: : Scatter plot of exchange rate volatility and FDI inflows (after the removal of observations with high exchange rate volatility)



List of 80 countries

Algeria, Antigua and Barbuda, Armenia, Australia, Bahamas, Bahrain, Belize, Bolivia, Brazil, Bulgaria, Burundi, Cameroon, Canada, Central African Republic, Chile, China, Colombia, Congo Dem. Rep., Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominica, Dominican Republic, Ecuador, Equatorial Guinea, Fiji, Gabon, Gambia, Georgia, Ghana, Greece, Grenada, Guyana, Hungary, Iceland, Iran, Islamic Rep., Israel, Japan, Latvia, Macedonia, FYR, Malawi, Malaysia, Malta, Mexico, Moldova, Morocco, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Papua New Guinea, Paraguay, Philippines, Poland, Romania, Russian Federation, Samoa, Saudi Arabia, Sierra Leone, Singapore, Slovak Republic, Solomon Islands, South Africa, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sweden, Switzerland, Togo, Trinidad and Tobago, Tunisia, Uganda, Ukraine, United Kingdom, Uruguay, Zambia