FDI LOCATION AND EXCHANGE RATES. IS THERE REALLY A RELATIONSHIP BETWEEN THE TWO?

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Abstract

The exchange rate led foreign direct investment (FDI), FDI led exchange rates and feedback effect hypotheses summarise the literature around the nature of the relationship between FDI and exchange rates. So many authors on this subject over a long period have been found to generally side with of the above-mentioned hypothesis or another without a consensus. Despite this lack of consensus with regard to the exact nature of the causal relation between these two variables, what is coming out clearly from the literature is that there indeed exist a relationship between FDI and exchange rates. The lack of consensus has prompted this current study that used the ARDL (Autoregressive distributed lag)-bounds testing approach. The study revealed the existence of causality from (1) the rand value to FDI in the long run and (2) FDI to the rand value only in the short run in South Africa. The author recommends that policies which strengthen the value of the rand should be put in place in order to attract FDI in the long run. The flow of FDI into South Africa will in turn not only stabilises the value of the rand.

Keywords: Exchange; FDI; Rand; South Africa

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1 Introduction

Although the exchange rate led FDI hypothesis is the main dominant view in literature in as far as the relationship between FDI and exchange rates is concerned, the FDI led exchange rates and feedback effect hypothesis remain deeply part of this subject. What is very clear from the literature is that there is indeed a relationship between FDI and exchange rates. In other words, the hypothesis that there is no relationship between FDI and exchange rates falls away as informed by the literature.

Ruiz and Pozo (2008) revealed that exchange rate volatility had a negative impact on FDI from the US into Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela) during the period between 1994 and 2005. The persistency in exchange rate volatility is the one that resulted negative FDI inflow from the US to the Latin American countries, argued Ruiz and Pozo (2008). According to Greenaway et al (2012), multinational enterprises whose origin was outside the European Union (EU) were the least affected by exchange rate volatility whilst the multinational enterprises from the EU region were found to be more susceptible to exchange rates changes.

Furceri and Borelli (2008) found out that exchange rate volatility positively attracted FDI in relatively closed economies whilst exchange rate volatility had a negative impact on FDI in countries which enjoyed high level of trade openness. For countries whose trade openness was above 125%, the impact of exchange rate volatility was found to be negative whereas those countries characterized by less than 125%, the influence of exchange rate volatility on FDI were found to be positive (Furceri and Borelli (2008).

Athukoraka and Rajapatirana (2003) showed that real exchange rates strengthened in response to the total capital flows whilst the same study further revealed that an increase in FDI inflow in particular led to the weakening of the real exchange rate in Asian and Latin American countries. The study by Athukoraka and Rajapatirana (2003) further revealed that the appreciation of the real exchange rate in response to increased capital inflows was more pronounced in Asian countries as compared to in Latin American countries, an indication that the impact can be region specific.

On the other hand, Lartey (2007) discovered that FDI was behind the appreciation of the local currencies in the sub-Saharan African countries during the period between 1980 and 2000. The influence of aid on local exchange appreciation was more pronounced as compared to the influence of FDI inflows on local exchange rates in the sub-Saharan African countries between 1980 and 2000, argued Lartey (2007). South Africa being part of the sub-Saharan Africa, it will be interesting to see if the results of the current study mirror findings by Lartey (2007) or if there is some kind of resemblance between the two sets of findings.

What is quite clear from the literature is that there is no consensus yet with regard to the direction of causality between FDI and exchange rates despite the exchange rates led FDI hypothesis being the dominant hypothesis. This has triggered the author to investigate the exact direction of causality between FDI and exchange rates in South Africa using the recently developed Auto Regressive Distributive Lag (ARDL) -Bounds testing methodology.

This paper uses FDI, net inflow (% of GDP) as a proxy for FDI and the official exchange rate of the South African Rand against the United States dollar (R/US$) as a proxy for exchange rate. The findings from this study enable South policy makers and other relevant authorities to formulate FDI and exchange rate policies that are going to provide a cornerstone for long term business growth and success in South Africa.

This paper is structured as follows. Section 2 discusses literature review on FDI and exchange rates whilst section 3 looks at FDI and exchange rates trend in South Africa during the period between 1980 and 2013. Section 4 dwells on research methodology whilst section 5 concludes the study. Section 6 provides the reference list.

2 Review of related literature.

The literature review is discussed under three main categories. These are FDI led exchange rates hypothesis, exchange rates led FDI hypothesis and the bi-directional hypothesis. FDI led exchange rates hypothesis maintains that FDI have got a bigger role to play in terms of influencing exchange rates in the host country. Exchange rates led FDI hypothesis says that the movement of exchange rates has got a significant impact on FDI location decisions whilst the bi-directional view states that both FDI and exchange rates influence each other.

The exchange rate led FDI inflow hypothesis is supported by Haile and Pugh (2013), Husek and Pankova (2008), Jeanneret (2005), amongst others. According to Husek and Pankova (2008), a depreciation of the host country's currency leads to significant inflow of FDI because the multinational enterprises want to take advantage of the weaker currency before it strengthens.Using data from the 27 OECD countries during the period between 1982 to 2002, Jeanneret (2005) found out that the relationship between FDI inflows and exchange rate stability was depicted in a U-shape format. High levels of exchange rate volatility was associated with negative FDI inflows whilst low levels of exchange rate volatility generally led to positive FDI inflows in the 27 OECD countries.

According to Caglayan and Torres (2011), the depreciation of the Mexican currency resulted in more FDI inflow whilst exchange rate volatility negatively impacted on FDI especially in the export oriented sectors of the Mexican economy. Furthermore, Caglayan and Torres (2011) showed that the impact of exchange rate volatility on FDI to a larger extent was much stronger in the non-durable goods sectors of the Mexican economy during the period 1994 to 2003. Greenaway et al (2012) on the other hand discovered that multinational enterprises whose origin was outside the European Union (EU) were the least affected by exchange rate volatility whilst the multinational enterprises from the EU region were found to be more susceptible to exchange rates changes. Moreover, Ruiz and Pozo (2008) found out that exchange rate volatility negatively impacted on FDI from the US into Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela) during the period between 1994 and 2005. The same study by Ruiz and Pozo (2008) revealed that persistency in exchange rate volatility is the one that resulted negative FDI inflow from the US to the Latin American countries.

In contrast, Bolling et al (2007) showed that host countries whose currencies are undervalued received increased FDI inflows whilst countries characterized by overvalued currencies receive low FDI. If the home country's currency gains in value, firms are likely to find themselves recording high profits and having excess capital to invest in other countries, argued Bolling et al (2007). However, Furceri and Borelli (2008) suggested that the impact of exchange rate volatility on FDI inflows largely depends on the level of trade openness. If the latter is high, exchange rate volatility tends to have a greater influence on FDI. The same study by Furceri and Borelli (2008) noted that exchange rate volatility positively attracted FDI in relatively closed economies whilst exchange rate volatility had a negative impact on FDI in countries which enjoyed high level of trade openness. For countries whose trade openness was above 125%, the impact of exchange rate volatility was found to be negative whereas those countries characterized by less than 125%, the influence of exchange rate volatility on FDI were found to be positive (Furceri and Borelli, 2008).

According to Tomlin (2008), high exchange rate volatility insignificantly dampened Japanese FDI inflows into tradable and non tradable producer services in the United States (US) during the period between 1974 and 1994. Contrary to most studies that say that currency depreciation leads to increased FDI inflows, the study by Tomlin (2008) showed that the appreciation of the US dollar led to an increased flow of Japanese FDI into the service industry of the US. Yet, a study carried out by Baek and Okawa (2001) showed that a depreciation of the Asian currencies against the US dollar attracted quite a substantial amount of FDI into the export-oriented electrical machinery sector as compared to the manufacturing sector. The current study seeks to clarify these contradictions.

In support of the exchange rate led FDI hypothesis, Aizenman (1992) discovered that free floating exchange rate regime discourages FDI inflow whilst fixed exchange rate regime attract FDI because foreign investors can plan in advance about their foreign exchange rate exposures. This study was further done by Aizenman (1992) under real and nominal shocks scenarios. Aizenman (1992) revealed that if the dominant shocks are real, the free floating exchange rate regime in the host country will lead to a positive inflow of FDI. On the other hand, if the dominant shocks are nominal, the free floating exchange rate regime will discourage FDI inflow into the host country. Furthermore, Gopinath et al (1998) showed that an appreciation of the US dollar triggered more FDI outflows as strengthening of the US dollar boosted the wealth levels of the US food processing companies and left them better able to invest abroad through FDI. The study by Froot and Stein (1991) had earlier on supported the exchange rate –led FDI hypothesis. Moreover, Blonigen (1997) using the maximum likelihood estimates from discrete dependent model revealed that the weakening of the US dollar attracted more Japanese FDI into the United States of America during the period between 1975 and 1992.

Empirical studies that are consistent with the FDI –led exchange rate include those undertaken by Abri and Baghestani (2015), Lartey (2007), amongst others. Abri and Baghestani (2015) found out that FDI inflow into China, India, Malaysia, Singapore and South Korea reduced the exchange rate volatility. The same study on the contrary observed that FDI inflow actually increased the exchange rate volatility in Indonesia, Philippines and Thailand.Using dynamic panel techniques, Lartey (2007) noted that FDI was one of the factors that were behind the strengthening of the local currencies in the sub-Saharan African countries during the period between 1980 and 2000. However, the impact of the inflow of aid on local exchange appreciation was much more than the influence on exchange rate appreciation from FDI inflows into sub-Saharan African countries from 1980 to 2000 (Lartey, 2007).

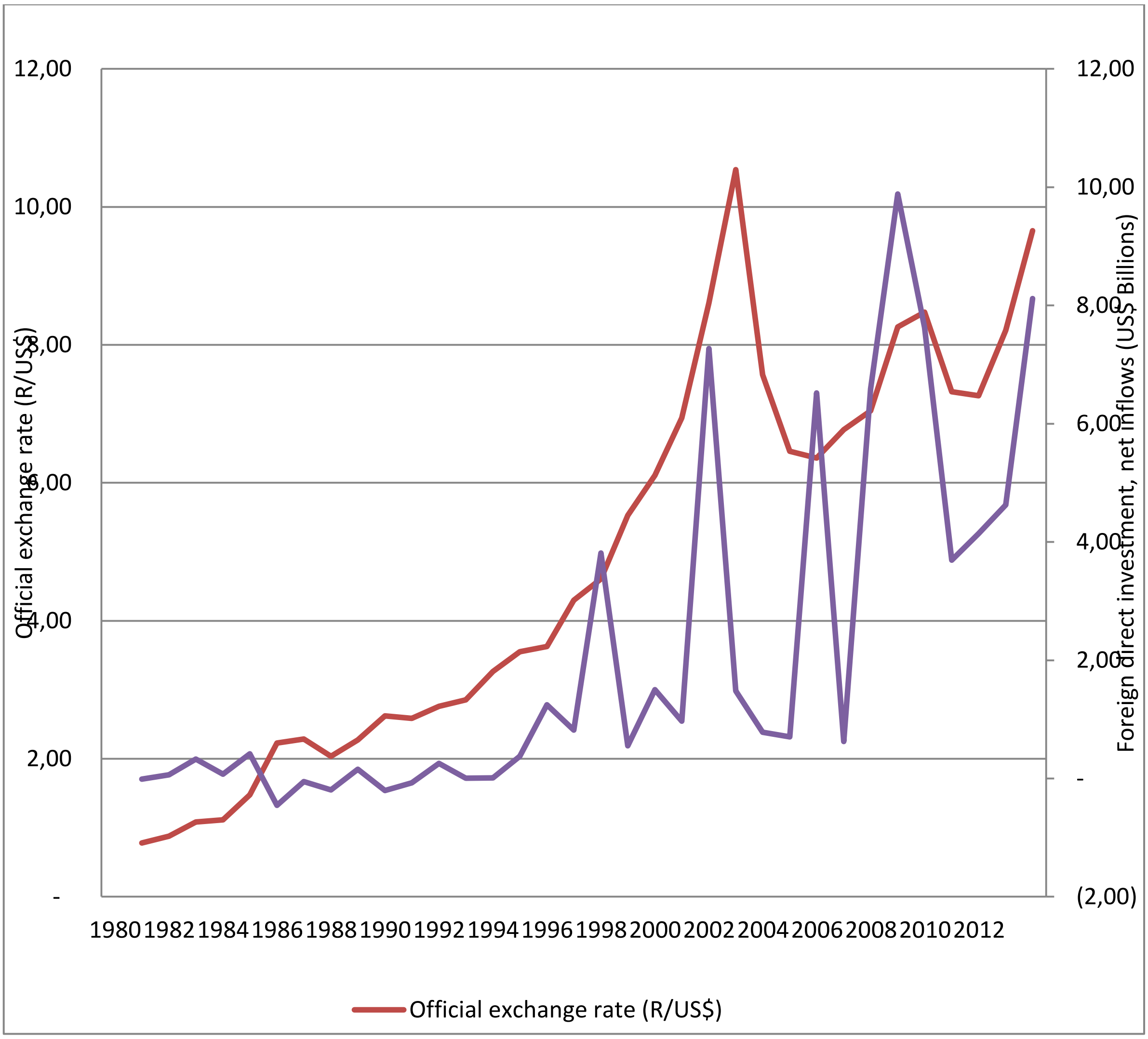
Among the few researchers whose studies supported the bi-directional hypothesis which says that both exchange rate and FDI affect each other include Emmanue and Luther (2014) and Athukoraka and Rajapatirana (2003). Using Vector Autoregressive, Emmanue and Luther (2014) established that a stable exchange rate was instrumental in attracting FDI into Ghana whilst FDI inflow played a part in as much exchange rate stabilization is concerned in Ghana. Exchange rate stability can help to explain FDI inflows on condition that the host country's economy is liberalized (Emmanue and Luther, 2014). Athukoraka and Rajapatirana (2003) observed that real exchange rates strengthened in response to the total capital flows whilst the same study further revealed that an increase in FDI inflow in particular led to the weakening of the real exchange rate in Asian and Latin American countries. In addition, the strengthening of the real exchange rate in response to increased capital inflows was more pronounced in Asian countries as compared to in Latin American countries, argued Athukoraka and Rajapatirana (2003).

3 FDI and Exchange rates trends in South Africa

According to World Bank (2014) statistics, FDI, net inflows (US$) massively declined from a negative US$10.3 million to a further negative US$452.643 million during the period between 1980 to 1985 and this was as expected associated with a depreciation of the South African Rand against the United States dollar from R/US$ 0.78 in 1980 to R/US$ 2.23 in 1985 (see Figure 1). Moreover, FDI, net inflow further declined by 83.27%, from a negative US$452.643 million in 1985 to a negative US$75.722 million in 1990 whilst the South African Rand further depreciated by 16.09%, from R/US$ 2.23 in 1985 to R/US$ 2.59 in 1990. Although, the period between 1990 and 1995 was characterised by positive growth of FDI, net inflows, from a negative US$75.722 million in 1990 to a positive US$1.248 billion in 1995, the South African Rand continued to lose its value by further depreciating by 40.19% between the period 1990 and 1995 (see to Figure 1).

FDI, net inflows plummeted by 22.40%, from US$1.248 billion in 1995 to US$968.831 million in 2000 and the South African Rand responded by depreciating another 91.33% during the same time frame. However, the period between 2000 and 2005 saw the South African Rand appreciating in value by 8.36% in response to a massive 573.19% positive growth in FDI, net inflow (from US$968.831 million in 2000 to US$6.522 billion in 2005) during the same time frame. Furthermore, FDI, net inflow decreased by 43.37%, from US$6.522 billion in 2005 to US$3.693 billion in 2010 whilst the South African Rand lost 15% of its value against the United States dollar during the same time frame. The South African Rand was R/US$6.36 in 2005 and decreased in value to R/US$7.32 in 2010. Although South Africa was characterised by a 119.81% positive growth in FDI, net inflow during the period between 2010 and 2013, its currency massively lost its value by 31.88%, from R/US$7.32 in 2010 to R/US$9.66 in 2013. This is in line with the currency areas theory that says depreciation of the host country's currency attracts more FDI inflows but however contradicts other researchers who have the opinion that a positive FDI, net inflow into the host country leads to the appreciation of that host country's currency.

Figure 1. Foreign direct investment, net inflows (US$) and official exchange rate (R/US$) trends for South Africa between 1980 and 2013

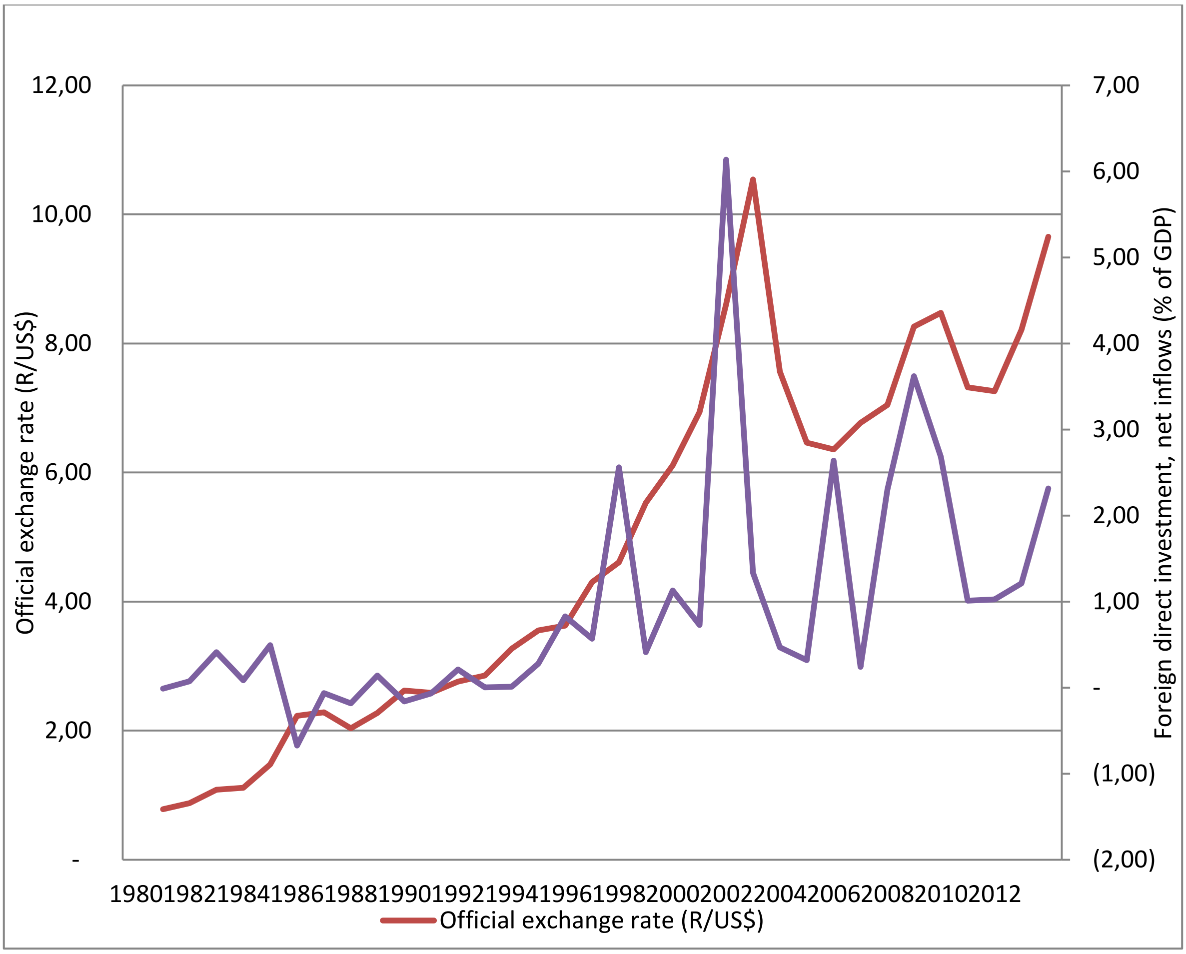


Source: World Bank (2014)

Figure 2 shows the trend of official exchange rate (R/US$) and FDI, net inflows (% of GDP) trends for South Africa between 1980 and 2012. According to World Bank (2014) statistics, FDI, net inflow (% of GDP) went down by 0.66 percentage points, from a negative 0.01% in 1980 to a negative 0.67% in 1985 whilst the South African Rand depreciated by a massive 186.16% during the same time frame (see Figure 2). Although FDI, net inflow (% of GDP) grew by 0.61 percentage points, from a negative 0.67% in 1985 to a negative 0.07% in 1990, the South African Rand actually lost its value against the US dollar by 16.09% (from R/US$2.23 in 1985 to R/US$2.59 in 1990) during the same time frame. Another positive growth in FDI, net inflow (% of GDP) by 0.89 percentage points, from a negative of 0.07% in 1990 to a positive 0.83% in 1995 was associated with a 40.19% decline in South Africa Rand during the same time frame. This gave credence to past researchers who are of the view that a decline in the currency of a host country attracts FDI inflow into that host country.

The South African Rand depreciated by a massive 91.33%, from R/US$3.63 in 1995 to R/US$6.94 in 2000 and this was matched by a 0.10 percentage points decline in FDI, net inflow (% of GDP), from 0.83% in 1995 to 0.73% in 2000. This was followed by a 1.91 percentage points positive growth in FDI, net inflow (% of GDP), from 0.73% in 2000 to 2.64% in 2005 and an 8.36% decline in the value of the South African Rand. The latter changed from R/US$6.94 in 2000 to R/US$6.36 in 2005 (see Figure 2.

Figure 2. Foreign direct investment, net inflows (% of GDP) and official exchange rate (R/US$) trends for South Africa between 1980 and 2012



Source: World Bank (2014)

The World Bank (2014) statistics shows that the South African Rand significantly lost its value by 15.13%, from R/US$6.36 in 2005 to R/US$7.32 in 2010. This was associated with a 1.63 percentage points decline in FDI, net inflow (% of GDP), from 2.64% in 2005 to 1.01% in 2010, thus supporting literature that says a decline in FDI inflow in the host country contributes to the depreciation of that host country's currency. Last but not least, the three year period between 2010 and 2013 saw FDI, net inflow (% of GDP) marginally going up by 1.30 percentage points whilst the South African Rand devaluated by a significant 31.88% during the same time frame. FDI, net inflow (% of GDP) was 1.01% in 2010 and increased to 2.32% in 2013 whilst the value of the South African Rand against the United States dollar plummeted from R/US$7.32 in 2010 to R/US$9.66 in 2013.

4 Methodological approach

4.1 Data sources and proxies

Thirty four years annual time series data, from 1980 to 2013 was used for the purposes of this study. FDI, net inflow (% of GDP) was used as a measure for FDI whilst South Africa Rand against the United States dollar (R/US$) data was used as a proxy for exchange rate. The proxy is also denoted by rand value in this study. Both FDI, net inflows (% of GDP) and South Africa Rand against the United States dollar (R/US$) data was obtained from the World Bank (2014) Development Indicators. Both FDI, net inflow (% of GDP) and South Africa Rand against the United States dollar (R/US$) data variables were auto-correlated at level. However, the auto-correlation for both data sets was removed at first difference.

4.2 Unit root tests

Both FDI and exchange rates data sets were tested for stationarity using Augmented Dickey Fuller (ADF), Philips-Perron (PP) tests and the Dick-Fuller GLS.The exchange rate data was found to be non-stationary at 1% significance level whilst FDI data was stationary across all the three testing methods at both 1% and 5% significance level (see Table 1).

Table 1. Stationarity Tests of Variables in Levels

Variable	Test Statistic – Trend &Intercept	Critical Values	
Stationarity Tests of Variables on levels - Augmented Dickey-Fuller - Test			
FDI	-5.628601	-4.262735*	-3.552973**
RAND	-3.287416	-4.273277*	-3.557759**
Stationarity Tests of Variables on levels – Phillips-Perron (PP) Test			
FDI	-6.451904	-4.262735*	-3.552973**
RAND	-2.336393	-4.262735*	-3.552973**
Stationarity Tests of Variables on levels – Dickey-Fuller GLS (ERS) Test			
FDI	-5.796872	-3.770000*	-3.190000**
RAND	-3.390180	-3.770000*	-3.190000**

Note:
1) * and ** denote 1% and 5% levels of significance, respectively.
2) * MacKinnon critical values for rejection of hypothesis of a unit root.
3) The truncation lag for the PP tests is based on Newey and West (1987) bandwidth.

Stationarity tests were then done at first difference on both data sets using the Augmented Dickey Fuller (ADF), Philips-Perron (PP) tests and the Dick-Fuller GLS (see results in Table 2).

Table 2. Stationarity Tests of Variables on first Difference

Variable	Test Statistic – Trend &Intercept	Critical Values	
Stationarity Tests of Variables on first Difference - Augmented Dickey-Fuller - Test			
DFDI	-6.977467	-4.296729*	-3.568379**
DRAND	-4.334309	-4.273277*	-3.557759**
Stationarity Tests of Variables on first Difference – Phillips-Perron (PP) Test			
DFDI	-18.83070	-4.273277*	-3.557759**
DRAND	-4.944869	-4.273277*	-3.557759**
Stationarity Tests of Variables on levels – Dickey-Fuller GLS (ERS) Test			
DFDI	-6.892788	-3.770000*	-3.190000**
DRAND	-4.468535	-3.770000*	-3.190000**

Note:
1) * and ** denote 1% and 5% levels of significance, respectively.
2) * MacKinnon critical values for rejection of hypothesis of a unit root.
3) The truncation lag for the PP tests is based on Newey and West (1987) bandwidth.
4) Critical values for Dickey-Fuller GLS test are based on Elliot-Rothenberg-Stock (1996, Table 1).

Table 2 shows that FDI, net inflow (% of GDP) and South African Rand against the United States dollar (R/US$) data variables were stationary at both 1% and 5% levels of significance using Augmented Dickey Fuller (ADF), Philips-Perron (PP) tests and the Dick-Fuller GLS.

4.3 ARDL-bounds Co-integration test

The study then investigated the existence of a co-integrating vector using the recently developed ARDL-bounds testing approach expressed as follows (see Odhiambo, 2009).

$$\Delta InFDI_t = a_0 + \sum_{i=1}^{n} a_{1i} \Delta InFDI_{t-i} + \sum_{i=0}^{n} a_{2i} \Delta InRAND_{t-i} + a_3 InFDI_{t-1} + a_4 InRAND_{t-1} + \mu_t \text{..........} \quad \text{.....}(i)$$

$$\Delta InRAND_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta InRAND_{t-i} + \sum_{i=0}^{n} \beta_{2i} InFDI_{t-i} + \beta_3 InFDI_{t-1} + \beta_{4I} InRAND_{t-1} + \mu_t \text{..........} \quad \text{..........} \quad \text{......}(ii)$$

Where: In RAND = Log of value of the South African rand against the US dollar; In FDI = Log of FDI data; Δ = first difference operator.

The order of lags on the first differenced variables in equations (i) and (ii) using the Akaike Information Criterion (AIC) and the Schwartz-Bayesian Criterion (SBC) were examined. The results of the AIC and SBC tests (not reported here) indicate that the optimal lag of both FDI and the Rand value is 4.

After determining the optimal lag length, the bounds F-test to equations (i) and (ii) were applied in order to investigate if a long-run relationship between FDI and the Rand value really exist. Table 4 shows the bounds test results.

Table 4. Bounds F-Test Results

Dependent variable	Function		F-test statistic		
FDI	FDI(RAND)		4.341112		
RAND	RAND(FDI)		5.967465*		
Asymptotic Critical Values					
	1 %		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Pesaran et al. (2001), p. 301, Table CI(v) Case V	4.40	5.72	3.47	4.57	3.03	4.06

Note: * denotes statistical significance at the 1% level.

This research concludes that there exists a unique co-integrating vector between FDI and the rand value in South Africa based on the findings that are shown in Table 4. This is confirmed by the F-statistic in the rand equation which is higher than the asymptotic critical values at 1% level of significance.

4.4 Granger Causality tests

The results reported in the previous section reveal the existence of a long run relationship been FDI and the value of the South African Rand. Granger causality between the two data sets was then done using the following model (Narayan and Smyth, 2008).

$$\Delta InFDI_t = \phi_0 + \sum_{i=1}^{n} \phi_{1i} \Delta InFDI_{t-i} + \sum_{i=0}^{n} \phi_{2i} \Delta InRAND_{t-i} + ECM_{t-1} + \mu_t \text{........}(iii)$$

$$\Delta InRAND_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i} \Delta InRAND_{t-i} + \sum_{i=0}^{n} \delta_{2i} \Delta InFDI_{t-i} + ECM_{t-1} + \mu_t \text{..........}\ \text{...}(iv)$$

Where ECM_{t-1} = the lagged error-correction term obtained from the long-run equilibrium relationship.

Where InRAND = Log of rand value; InFDI = Log of foreign direct investment variables; ECM_{t-1} = the lagged error-correction term obtained from the long-run equilibrium relationship; Δ = first difference operator; μ is a white noise error whilst subscripts $_t$ and $_{t-i}$ represents time periods.

According to Narayan and Smyth (2006), the lagged error correction term (ECM) measures the Granger causality in the long run whilst the co-efficients in the equations (iii) and (iv) test the Granger causality in the short run. Table E contains Granger causality test results in the long run whilst Table F shows causality tests in the short run when FDI is the dependent variable.

Table E. Granger Non-Causality Tests in the long run

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-2.616320	0.950856	-2.751543	0.0127
C(2)	1.300219	0.823151	1.579564	0.1307
C(3)	0.418893	0.656902	0.637679	0.5313
C(4)	-0.054177	0.523384	-0.103513	0.9186
C(5)	0.141740	0.360592	0.393076	0.6986
C(6)	0.053706	0.444623	0.120790	0.9051
C(7)	0.093921	0.475701	0.197436	0.8456
C(8)	0.296913	0.509547	0.582699	0.5669
C(9)	-0.541611	0.321339	-1.685484	0.1082
C(10)	0.036791	0.229577	0.160256	0.8744

R-squared	0.781405	Mean dependent var	0.063103
Adjusted R-squared	0.677860	S.D. dependent var	1.761485
S.E. of regression	0.999772	Akaike info criterion	3.104220
Sum squared resid	18.99135	Schwarz criterion	3.575701
Log likelihood	-35.01119	Hannan-Quinn criter.	3.251882
F-statistic	7.546534	Durbin-Watson stat	2.289867
Prob(F-statistic)	0.000117		

C(1) is a coefficient for the ECM whilst the other co-efficients measures the short run causality when FDI is the dependent variable. C(1) is negative and significant because its corresponding probability is less than 5%. This means that the rand value Granger caused FDI in the long run. The error correlation term is significant and its sign is negative, it means that there exists long run causality from the rand value to FDI.

Table F. Granger Non-Causality Tests in the short run

Wald Test:

Test Statistic	Value	df	Probability
F-statistic	0.727153	(4, 19)	0.5843
Chi-square	2.908611	4	0.5732

Null Hypothesis: C(6)=C(7)=C(8)=C(9)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(6)	0.053706	0.444623
C(7)	0.093921	0.475701
C(8)	0.296913	0.509547
C(9)	-0.541611	0.321339

We cannot reject the null hypothesis because the corresponding p-value of the Chi-squared test statistic is 57.32% which is more than 5%. It means the co-efficients c(6) to c(9) jointly are zero and all the rand values having 4 lags jointly cannot cause FDI. In other words, there is no short run causality coming from the rand value to FDI.

Although the residual value of the model was not found to be normally distributed, the model is efficient and desirable because the null hypotheses that say there is no serial correlation and no arch effect in the model could not be rejected.

When the rand value was used as a dependable variable, C(1) which is a coefficient of ECM was found to be insignificant because the corresponding probability is 62.75% which is more than 5%. This means that there is no long run causality running from FDI to the rand value (see Table G).

Table G. Granger Non-Causality Tests in the long run

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.092564	0.187693	-0.493165	0.6275
C(2)	0.616579	0.256735	2.401614	0.0267
C(3)	-0.047600	0.274680	-0.173293	0.8643
C(4)	0.153791	0.294224	0.522699	0.6072
C(5)	-0.447898	0.185548	-2.413915	0.0260
C(6)	-0.098716	0.475306	-0.207689	0.8377
C(7)	-0.662107	0.379310	-1.745557	0.0970
C(8)	-0.414086	0.302213	-1.370176	0.1866
C(9)	-0.194059	0.208214	-0.932021	0.3630
C(10)	0.275055	0.132563	2.074902	0.0518

R-squared	0.735200	Mean dependent var	0.282069
Adjusted R-squared	0.609768	S.D. dependent var	0.924130
S.E. of regression	0.577291	Akaike info criterion	2.005858
Sum squared resid	6.332032	Schwarz criterion	2.477339
Log likelihood	-19.08493	Hannan-Quinn criter.	2.153520
F-statistic	5.861352	Durbin-Watson stat	1.734697
Prob(F-statistic)	0.000599		

The short run co-efficient proxied by c(6) to c(9) was found to be significant as its corresponding probability was less than 5%. We can reject the null hypothesis meaning that all the FDI variables jointly can influence the rand value. This shows that there is a short run causality running from FDI to the rand value (see Table H).

Table H. Granger Non-Causality Tests in the short run

Wald Test:

Test Statistic	Value	df	Probability
F-statistic	6.641470	(4, 19)	0.0016
Chi-square	26.56588	4	0.0000

Null Hypothesis: C(6)=C(7)=C(8)=C(9)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(6)	-0.098716	0.475306
C(7)	-0.662107	0.379310
C(8)	-0.414086	0.302213
C(9)	-0.194059	0.208214

The model when the rand value is a dependent variable was tested for its efficiency by checking whether there is (1) no serial correlation, (2) no arch effect and (3) whether the residual of the model is normally distributed. The null hypotheses that there is no serial correlation and arch effect in the model could not be rejected because the p-values were found to be greater than 5%. Moreover, the null hypothesis which states that the residual value of the model should be normally distributed could also not be rejected.

Table I shows a summary of the causality relationships between FDI and the rand value both in the long and short run.

Table I: Granger Causality Tests

Dependent Variable	Long run	Long run	Short run
FDI	RAND→ FDI	Yes	No
RAND	FDI → RAND	No	Yes

Table I show that the value of the South African rand Granger-causes FDI in the long run and not in the short run when FDI is the dependent variable. On the other hand, there is a causality running from FDI to the rand value in the short run and not in the long run if the rand value is the dependent variable in the model.

5 Conclusion

The exchange rate led foreign direct investment (FDI), FDI led exchange rates and feedback effect hypotheses summarise the literature around the nature of the relationship between FDI and exchange rates. So many authors on this subject over a long period have been found to generally side with one of the above-mentioned hypotheses or another without a consensus. Despite this lack of consensus with regard to the exact nature of the causal relation between these two variables, what is coming out clearly from the literature is that there indeed exist a relationship between FDI and exchange rates. The lack of consensus has prompted this current study that used the ARDL (Autoregressive distributed lag)-bounds testing approach. The study revealed the existence of causality from (1) the rand value to FDI in the long run and (2) FDI to the rand value only in the short run in South Africa. The author recommends that policies which strengthen the value of the rand should be put in place in order to attract FDI in the long run. The flow of FDI into South Africa will in turn stabilises the value of the rand.

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