THE EFFECTS OF PUBLIC DEBT ON FOREIGN DIRECT INVESTMENT IN SOUTH AFRICA (1983-2013): AN EMPIRICAL ANALYSIS

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Abstract

The political move in South Africa occurred against a setting of high government deficits. Efforts have been made over the years by the government to reduce fiscal deficit and inflation, liberalize the capital account and the financial system as well as reduce tariffs. The main objective of this study, therefore, is to empirically investigate the effect of public debt on foreign direct investment in South African for the period 1983 – 2013. The study employs a Vector Error Correction Model, which provides both the long run and short run relationships among the variables. The long run results indicate that the relationship between public debt and foreign direct investment, as well as interest rate and foreign direct investment, is positive and statistically significant, while there is an insignificant negative relationship between exchange rate and foreign direct investment. Based on the long run results, the study, thus, recommend that the level of public debt and interest rate should increase so that the level of foreign direct investment can increase in the country. However, the policy of depreciation of rand is considered inappropriate for the economy if the desire is to increase the level of foreign direct investment in the country.

Keywords: Foreign Direct Investment, Public Debt, Vector Error Correction Model, Variance Decomposition, Impulse Response

1. INTRODUCTION

The political move in South Africa occurred against a setting of high government deficits. The deficit as at 2014 was 5.4% of GDP while the public debt burden; that is, national government debt was 47.8 % of GDP in 1994 and it stood at 47.1% of GDP in 2014. This percentage is high compared to the government deficit of 7.3% of GDP in 1992/93 and a public debt burden which rose from 36.4% to its apex of 49.5% of GDP between 31 March 1989 and on 31 March 1996 respectively. During that period, and in subsequent years, economists dread the inception of debt trap; for example, Van der Merwe (1993) and Cronje (1998). Fourie and Burger (2003) raised concern which state that this was due to "weak" "aggregate fiscal discipline", hence Ajam and Aron (2007) felt that this also calls for attention on how this could be reduced.

A group that lobbied for debt cancellation (jubilee South Africa), observed that debt is the new form of slavery and no debt is more repulsive than that inherited by the elected government of South Africa from the apartheid regime (Anon, 2000). According to the group, the apartheid debt stood at $14 billion at current exchange rate. This amounted for about 86.7billion Rand but their figure is not totally convincing as they added some liabilities that are normally not included in sovereign debt. They were of the opinion that the money used to service this debt could be spent on the poor.

At the end of 2007 the South African government debt amounted to R542billion according to the South Africa Reserve Bank quarterly bulletin. This had a crippling impact on the economy and most especially the poor. Consequently the interest payment on loan which summed up to nearly R40 billion yearly is the second most expensive item on the national budget of South Africa after the biggest expensive element (education). Although more than a fifth of the budget is used to finance this debt, the burden is not unbearable compared to other African countries (Albert, 2009).

South Africa's debt situation is slightly different from that of other less developing countries since the country has made little use of foreign finance while a larger portion is owed internally to South African companies and the pension fund (Black et al, 2008). The reason for this is that the debt was incurred by the apartheid regime during the last 10years of its rule and at the time international bodies such as World Bank and International Monetary Fund (IMF) were unwilling to lend South Africa money. The other reason was that the apartheid government close to the end of its regime put huge amount of money into its own pension fund so that there will be enough money for their payouts and pensions if the civil servants and the politicians will have to resign at the same time. This money was borrowed from the same pension fund.

Foreign direct investment (FDI), as noted by Crespo and Fontoura (2007) is a direct lasting

investment made by investors of foreign nationals in a business entity located in another economy. This kind of investment is perceived to enrich the host economy with streams of benefits among which are foreign exchange, competition, technology, foreign capital, as well as enhancing her access to foreign markets.

FDI is vital for economic development, precisely for developing countries which are known for inadequate capital resource to meet the investment need of the economy. Jenkins and Thomas (2002) saw FDI as capable of providing foreign capital as well as crowding in domestic investment. On a general note, it brings to the recipient country not only financial assistance but also capital, technology, new jobs, skill management and expertise. Obviously, by increasing investment in developmental projects, more employment opportunities would be generated. FDI is considered as the most important source of private external inflows for developing countries almost in all over the world. The developing countries like South Africa, intended to bridge savings-investment gap through this essential tool. FDI has solved the over accumulated debt problem of developing countries, helped to finance their development needs and also to boost up per capita income.

Gelb and Black (2004) observed that FDI has a long and intricate history in South Africa. Its existence can be traced back to early 19th century with the establishment of British colony when the economy was engaged in the exportation of agricultural product until 1870s and the financial system was filled with London-based banks. The discovery of some minerals such as gold and diamond which require huge capital investment prompted industrial development. This capital need was met with both portfolio and direct investment flows from London. The investment flow from Europe, US and UK brought about economic growth. The profit from the mining was ploughed back and this boosted manufacturing development in the 20th century.

Efforts have been made over the years by the government to reduce fiscal deficit and inflation, liberalized the capital account and the financial system as well as reducing tariffs. To this effect, the policy regime have been much more liberal and outward-oriented, with the sole target of pulling new foreign investment. The Growth, Employment and Redistribution (GEAR) policy was introduced in June 1996 to show that policymakers give preference to direct investment as the key to improve growth. Since domestic savings was a constraint on growth, net capital inflow could help to reduce this problem. GEAR reacted to the capital account stun shock by saying that FDI is preferred to unsteady portfolio flow and also a route to addressing shortages in savings.

The development of South Africa's economy has been greatly enhanced via the inflow of FDI. This notwithstanding, inflow of FDI into the economy in recent time has been low compared to other emerging market countries. Although there has been improvement in overall macroeconomic conditions in addition to the country's advantages in terms of market size and natural resource, the interest to acquire, create or expand domestic enterprises by foreign investors has been low. Thus, the inflows of FDI into the economy from 1994-2002 averaged less than 1.5 percent of GDP as compared to 2–5 percent in a group of comparator countries (Arvanitis, 2005).

Furthermore, given the low savings rate of South Africa which impede domestic or private investment, the inflow of FDI into the economy can bridge the gap between the low savings rate and the level of investment necessary to boost economic growth and as observed by the Government of SA (1996), FDI is preferred to volatile portfolio flows as a way of addressing savings shortages. Hence, the low inflow of FDI is not an ideal situation for the economy because this leads to fall in gross domestic product (GDP).

This study springs from the need to contribute to academic literatures and to draw attentions to the fact that despite the benefits of public finance it must be handled with care because if debt is high, its cost becomes higher than its benefits and this will ultimately affect the GDP.

Also, public debt as a main macroeconomic indicator, depicts the picture of a country in the international markets and it is also a major determinant of inflow of foreign direct investment. This study will reveal the level of the national government debt and a careful look at this debt will provide knowledge on the link between the various components of public finance and how the monetary and fiscal policy interaction impact on the economy. Since sound policies and stability are the preconditions for FDI to increase GDP growth, this study will provide firsthand information for the institutions charged with the responsibility of policy formulation.

Unlike studies such as that done by (Khan and Khan, 2011), (Shamsuddin, 1994), (Flexner, 2000), (Nunnenkam et al., 1999) all which employed the ordinary least square techniques except that of (Mah et al., 2011) which employed the vector autoregression granger causality model alongside the vector error correction model, this study is quite unique as it modified the (Khan and Khan, 2011) model by including two more variables and although it employed the Vector Error Correction Model as an econometric technique to investigate the impact of public debt on the level of the FDI inflow into the country, it went further to use the variance decomposition techniques and the impulse response function to analyze the effect further.

2. LITERATURE REVIEW

Keynes (1936) in his work, 'The General Theory of Employment, Interest and Money', advocate for deficit financing (spending more when tax revenue is low) as a way of stimulating the level of economic activity during recession. He argued that to solve the issue of great recession a combination of two approaches can be used to boost the economy. These approaches includes: Government investment in infrastructure and a reduction in the rate of interest.

The theory thus advocates for the use of both monetary and fiscal policies in stimulating the economy. The expansionary fiscal policy whereby government spending is more than her income or revenue is advocated for in the case of recession but if the economy is experiencing boom, the contractionary fiscal measure will help to stabilize

the economy. When government spending is more than her revenue, one way of financing this difference is to embark on borrowing from either internal or external bodies. An increase in government spending without a corresponding increase in tax or reduction in tax without corresponding cut in expenditure will boost total demand. An adverse effect of increase in government borrowing is that interest rate will rise and this will increase the cost of fund to investors therefore resulting in what is known as crowd out effect. On the other hand, the interest rate can be manipulated by the reserve bank to stimulate economic activities in the country. A reduction in the rate of interest will reduce the cost of fund to investors and this will lead to increase in investment but if the interest rate is high, there will be less investment and this will contract the economy the more.

Nunnenkamp et al. (1991) surveyed developing countries' attractiveness for FDI focusing on debt overhang and sovereign risk as major hindrance to inflow of FDI wherein the empirical investigation focused in the 1980s. Regression analysis were run for 35 host developing countries and for various subgroups. The study explained that higher debt burden creates constraints on new private lending as well as in terms of FDI inflows but the empirical result showed that the impact of this variable on FDI in Germany was not as expected since it's not too strong.

An econometric analysis done by (Mah et al., 2013) from 1976 to 2011 uses the vector autoregression Granger causality model alongside the vector error correction model to determine the direction of causality and the estimation of the model respectively. They found that there is a significant negative relationship between gross government debt and net FDI.

Also, Shamsuddin (1994) investigated the economic determinants of FDI in less developed countries (LDCs) for the year 1983. The study aimed at empirical analysis of the determinant of FDI and it made use of cross-section data for 36 developing countries. This study seeks to address the question of why some less developed countries attract more private FDI than others. It employed single equation econometric model for 36 LDCs and the ordinary least square technique was used to estimate the variable. The study thus, found the coefficient of the per capita debt statistically significant with expected sign. Despite the fact that the single equation econometric model was able to explain the changes in the inflow of FDI in the LDCs, there is need to view this result with caution as there could be simultaneity problem.

Nnadozie (2000) used a cross sectional econometric analysis of 22 African countries to investigate the factors affecting US direct investment in Africa and the change in American investment is regressed on economic, political, and other variables. He found that political and economic variables are significant in determining the level of direct investment from US to Africa. In particular, the study estimate three models and one of the models employed economic variables such as Gross National Product (GNP) Growth, per capita GNP, inflation and debt burden. It was found that debt burden have the expected sign and it significantly affect US direct investment in Africa. Also, the inflation rate was found to have negative effect on US direct investment though its coefficient is statistically insignificant.

In the same vein, Flexner (2000) embarked on a study on FDI and economic growth in Bolivia. Flexner employed the ordinary least squares (OLS) techniques to survey the determinants of FDI and its effects on per capita GDP growth in Bolivia. The study observed that the inflow of FDI into the country is dependent on the ratio of external debt to GDP, multilateral exchange rate and the dummy representing capitalization inflows. It however found that removing the capitalization inflow from the model made only but little impact on the result.

Khan and Khan (2011) surveyed the impact of public debt on FDI in Pakistan using the time series data from the period 1981 to 2007 sourced from Economic Survey of the country. The study employed a simple log linear regression model and applied the analytical tool known as OLS techniques to investigate the impact of public debt on FDI. The data was transformed into natural log and Eviews statistical package was used for computation analysis. The result of the study showed that public debt was statistically significant implying that public debt has negative effect on the inflow of FDI in Pakistan. They therefore, concluded that public debt should be managed, via active and proper debt management policy so as to gain the full benefit of FDI in the country. This study adopt the model of Khan and Khan (2011) and modified it to include two other variables as independent variables. Unlike Khan and Khan who used OLS, this study will employ the Vector Error Correction Model (VECM) to carry out the analysis.

3. DATA AND METHODOLOGY

This study acquired yearly time arrangement information spreading over from 1983-2013 sourced from various sources. FDI (Foreign Direct Investment) and PDEBT (Public Debt) measured in millions of Rand were gotten from the South Africa Reserve Bank (SARB). The Exchange Rate (EXCH) and Interest Rate (INT) were acquired from the World Bank. EXCH is measured in index while INT is measured in percentage.

The econometric analysis was carried out to examine the effect of the independent variables (PDEBT, EXCH and INT) on the dependent variable (FDI) by estimating the model which is expressed as follows:

$$FDI = f(PDEBT, EXCH, INT) \quad (1)$$

This model is further translated into logarithmic form to ensure uniformity and as well avoid some problems of misspecification during the econometric analysis. It equally enable the interpretation of result in terms of the elasticities (Asteriou and Hall, 2007).The log form of the equation is stated as below:

$$LNFDI = \beta 0 + \beta_1 LNPDEBT + \beta_2 LNEXCH + \beta_3 lnINT + e \quad (2)$$

This study employs the VECM approach due to the nonstationary feature of most macroeconomic variables. This approach is used because it is most

suitable for managing multivariate time series data. Since numerous macroeconomic time series are nonstationary in nature which have a tendency to be overwhelmed by stochastic patterns (Dickey and Fuller, 1979, 1981; Phillips and Perron, 1988; Kwiatkowski et al., 1992), estimating a relationship of this kind of series will amounts to biased and inefficient results. The Augmented Dickey–fuller test and Phillip-Perron (PP) test are used to investigate the presence of unit roots in the time series.

Upon discovery of the stationarity of the data, the cointegration test will be performed to examine if the variables move together on the long run, that is, if they have long run equilibrium relationship. When variables have long run relationship, it means they are cointegrated. To perform the cointegration test, the appropriate lag length must be selected as suggested by the various information criteria according to (Meng et al., 2011; Liu, 2007; Philbrick and Gustafsson, 2010) cited by Meniago et al. (2013). These criteria include the Schwarz information criterion (SIC) (Schwarz, 1978), Akaike information criterion (AIC) (Akaike, 1973), and the Hannan–Quinn information criterion (HQ) (Hannan and Quinn, 1978).

Cointegration is confirmed with the Johansen cointegration test in which two statistics are used to confirm the number of cointegrating vectors among variables. These statistics includes the Trace statistics and the max-eigenvalue as illustrated in equations x and y respectively.

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{n}\ln\left(1-\hat{\lambda}_i\right) \quad (3)$$

$$\lambda_{\max}(r, r+1) = -T\sum_{i=r+1}^{n}\ln\left(1-\hat{\lambda}_{r+1}\right) \quad (4)$$

From the above equations, T stands for sample size, while λs are the evaluated eigenvalues of the characteristic equations and r is the rank of the long-run matrix (π). The number of cointegrating vectors (r) must be lesser or the same as the number of dependent variables (k). Based on the trace test, the null hypothesis (H0) is that there are r cointegrating vectors while the H1 (alternative hypothesis) is of n cointegrating vectors and on the other hand, the maximum eigenvalue test examines the null and alternative hypothesis of r and r + 1 cointegrating vectors respectively. The VECM is a restricted form of VAR which is applied with nonstationary data set that are found to be cointergrated. It identifies both the long and the short run relationship in the model. According to Hassan (2003) VECM is defined as a way in which the system is correcting in each time period towards its long run equilibrium state. The cointegration term is called the error correction term (ECT) and as concluded by Hassan (2003), its coefficient shows the proportion of the long-run disequilibrium in the dependent variables corrected in each period. The ECT is expected to be negative and statistically significant in order to explain the disequilibrium in FDI that is corrected in the next period.The model was also be examined for goodness of fit by performing both diagnostics and stability test.

In addition, the variance decomposition approach was also employed to examine the contributions of each type of shocks to the variation in the dependent variable. This techniques helps in understanding the relevance of the variables in the equation. It splits the variation in the independent variable into the component shocks to the VAR/VECM. This technique has the capability of informing us whether the variables in the model have long or short term effect on a variable under consideration. Thus, it is used to show the variation in the dependent variable caused by independent variable in a model.

The last techniques used in this study is the Impulse Response Function which according to Brooks (2008) is capable of revealing the extent to which the dependent variable respond to shocks or innovations in each variable. As noted by Lutkepohl (1993), this approach account fully for historical patterns of correlations amongst the various shocks. This will reveal if the response of FDI to shocks in PDEBT, EXCH and INT is positive or negative over the period.

4. PRESENTATION AND DISCUSSION OF RESULTS

This section focuses on the presentation and discussion of results obtained from steps presented in the previous section. The decision to either accept or reject the null hypothesis is based on the probability value and 5% significance level is chosen for this decision. The unit root tests performed are presented in tables 1 and 2 for ADF-Test and PP-Test respectively. From these tables, it is clear that the probability values of the t-statistics are higher than 5% significant level for all the variable except LNPDEBT at level. Given these p-values, we say it is insignificant and we fail to reject the null hypothesis and conclude that the series has unit root. However, the p-values at first difference indicate that all the variables are stationary except LNPDEBT which is only stationary at second difference.

Table 1. ADF Test Result

Variables	Level of test	Model specification	Lags	ADF t-Value	Critical value (5%)	P-value	Conclusion
LNFDI	Level	Intercept	0	0.0630	-2.9540	0.9578	Non-stationary I(0)
		Trend & intercept	0	-2.0097	-3.5530	0.5748	
		None	0	3.5626	-1.9513	0.9998	
	Difference	Intercept	2	-3.7162	-2.9640	0.0089***	Stationary I(1)
		Trend & intercept	0	-5.9463	-3.5578	0.0001***	
		None	1	-2.2266	-1.9521	0.0272**	
LNPDEBT	Level	Intercept	1	-1.0837	-2.9571	0.71	Non-stationary I(0)
		Trend & intercept	1	-2.1592	-3.5578	0.4949	
		None	1	1.7687	-1.9517	0.9791	
	1st Difference	Intercept	0	-2.2631	-2.9571	0.1895	Non-stationary I(0)
		Trend & intercept	0	-2.3064	-3.5578	0.4187	
		None	0	-1.0196	-1.9517	0.2703	
	2nd Difference	Intercept	0	-6.2192	-2.9604	0***	Stationary I(2)
		Trend & Intercept	0	-6.1092	-3.5629	0***	
		None	0	-6.3167	-1.9521	0***	
LNEXCH	Level	Intercept	0	-1.7138	-2.9540	0.4152	Non-stationary I(0)
		Trend & intercept	1	-3.4611	-3.5578	0.0611	
		None	0	-1.1424	-1.9513	0.2253	
	Difference	Intercept	1	-4.7883	-2.9604	0.0005***	Stationary I(1)
		Trend & intercept	0	-4.8677	-3.5578	0.0023***	
		None	0	-4.7931	-1.9517	0***	
LNINT	Level	Intercept	7	-0.1068	-2.9810	0.9387	Non-stationary I(0)
		Trend & intercept	7	-2.8121	-3.5950	0.2057	
		None	7	1.9831	-1.9544	0.9862	
	Difference	Intercept	6	-11.4769	-2.9810	0***	Stationary I(1)
		Trend & intercept	6	-4.7157	-3.5950	0.0045***	
		None	6	-14.4028	-1.9544	0***	

Table 2. Result of Phillip –Perron unit root test

Variables	Level of test	Model specification	Bandwidth	PP test statistics	5% critical value	p-value	Conclusion
LNFDI	Level	Intercept	7	0.1237	-2.9540	0.9628	Non-stationary
		Trend & intercept	4	-2.0038	-3.5530	0.5779	
		None	7	3.9409	-1.9513	0.9999	
	1st Difference	Intercept	5	-5.9847	-2.9571	0***	Stationary I(1)
		Trend & intercept	6	-5.9580	-3.5578	0.0001***	
		None	1	-4.4105	-1.9517	0.0001***	
LNPDEBT	Level	Intercept	4	-1.2419	-2.9540	0.6442	Non-stationary
		Trend & intercept	4	-1.4591	-3.5530	0.8234	
		None	4	4.7456	-1.9513	1	
	1st Difference	Intercept	0	-2.2631	-2.9571	0.1895	Non-stationary
		Trend & intercept	1	-2.3188	-3.5578	0.4125	
		None	3	-0.8697	-1.9517	0.3315	
	2nd Difference	Intercept	5	-6.3954	-2.9604	0***	Stationary I(2)
		Trend & intercept	5	-6.2690	-3.5629	0.0001***	
		None	5	-6.5068	-1.9521	0***	
LNEXCH	Level	Intercept	13	-1.4406	-2.9540	0.5505	Non-Stationary
		Trend & intercept	6	-2.2952	-3.5530	0.4248	
		None	14	-2.5863	-1.9513	0.0114	
	1st Difference	Intercept	14	-5.8504	-2.9571	0***	Stationary I(1)
		Trend & intercept	22	-7.0033	-3.5578	0***	
		None	8	-4.7200	-1.9517	0***	
LNINT	Level	Intercept	4	-1.3286	-2.9540	0.6045	Non-stationary
		Trend & intercept	1	-1.6077	-3.5530	0.7682	
		None	1	0.1045	-1.9513	0.709	
	1st Difference	Intercept	4	-4.2225	-2.9571	0.0024***	Stationary I(1)
		Trend & intercept	6	-4.1569	-3.5578	0.0132**	
		None	1	-4.1634	-1.9517	0.0001**	

Table 3 shows the Lag Length Determination Criteria Results and it indicates that the appropriate number of lag that will suit this model is Lag 2. The selection of this lag is based on the lag order identified by likelihood ratio (LR), final p Final prediction error (FPE), Akaike information criterion (AIC), and Hannan-Quinn information criterion (HQ) Misspecification error such as autocorrelation, can be avoided if the appropriate lag is selected.

Table 3. Lag selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-90.59133	NA	0.004342	5.911958	6.095175	5.972689
1	59.69159	253.6024	9.94e-07	-2.480724	-1.564639*	-2.177068
2	85.06254	36.47074*	5.83e-07*	-3.066409*	-1.417456	-2.519828*

Note: indicates lag order selected by the criterion*

The trace test indicates one cointegrating vector while Max-Eigen value do not identify any cointegrating equation at the 5% significant level as shown in Table 4. Lutkepohl et al (2001) observed that the trace test is superior to the maximum eigenvalue hence, this study relies on the result of the trace test and concludes that there is one cointegrating equation. Thus, at 5% significant level we reject the null hypothesis of no cointegrating equation and failed to reject the alternative hypothesis of at most one cointegrating equation since the p-value is more than 5% significant level. This implies that there is long run relationship among the variables.

Table 4. Johansen Cointegration Test (Trace and Maximum Eigen value)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.559554	52.76794	47.85613	0.0161	25.41900	27.58434	0.0923
At most 1	0.413902	27.34894	29.79707	0.0934	16.56230	21.13162	0.1937
At most 2	0.250764	10.78664	15.49471	0.2250	8.949735	14.26460	0.2904
At most 3	0.057534	1.836907	3.841466	0.1753	1.836907	3.841466	0.1753

The summary of VECM results are presented in Table 5 and Table 6 showing the long run and short run equation respectively. Table 5 presents all the variables on one side, hence to transform it to an equation, LNFDI is kept on the left-hand side while all other variables are transferred to the right-hand side of the long equation which is presented as:

$$LNFDI = 9.049102 + 2.534lnPDEBT - 1.776lnEXCH + 0.802lnINT \quad (5)$$

This result indicates that both LNPDEBT and LNINT are statistically significant given the absolute t-values of 7.62993 and 5.34488 respectively while LNEXCH is not statistically significant since the absolute t-value is less than 2. The result indicates that, a 1% increase in LNPDEBT will cause FDI to rise by 2.534%, a 1% rise in LNEXCH will result in 1.776% fall in LNFDI and a 1% increase in LNINT will cause FDI to rise by 0.802%. It is also clear from this result that only LNEXCH has the expected sign while LNPDEBT and LNINT do not comply with the apriori expectation. Table 6 on the other hand shows that the coefficient of the ECT (Δ (LNFDI)) is approximately -0.256. This coefficient is negative and statistically significant and this is in line with theory given the absolute t-value of 2.56965. This coefficient indicates how fast disequilibrium is corrected in the economy as a result of shock. By implication, the speed of adjustment from any disequilibrium of the past year to equilibrium will be at 74%.

Table 5. Long run cointegration equation result

Variables	CONSTANT	LNFDI	LNPDEBT	LNEXCH	LNINT
Long run	9.049102	1	-2.534	1.776	-0.802
Standard error	-	-	0.332	1.398	0.15
T-statistics	-	-	-7.630	1.270	-5.345

Table 6. Result of Error Correction Model (Short Run Result)

Variables	Δ(LNFDI)	Δ(LNPDEBT)	Δ(LNEXCH)	Δ(LNINT)
Short run	-0.256	0.054	-0.010	0.339
Standard error	0.099	0.024	0.043	0.229
T-statistics	-2.569	2.209	-0.235	1.485

Table 7 and figure 1 present the diagnostic and stability test performed to ensure that the estimated model do not violate the OLS Assumptions.

This table shows that the estimated model pass both the serial correlation test and Heteroscedasticity test although it shows that the series is not normally distributed.

Table 7. Residual Diagnostic Test Result

TEST	NULL HYPOTHESIS	T-STAT	P-VALUE
Normality Test	Series is normally distributed	126.3045	0.0000
Heteroscedasticity Test	No heteroscedasticity	160.7926	0.4675
Serial correlation Test	No serial correlation	12.91735	0.6788

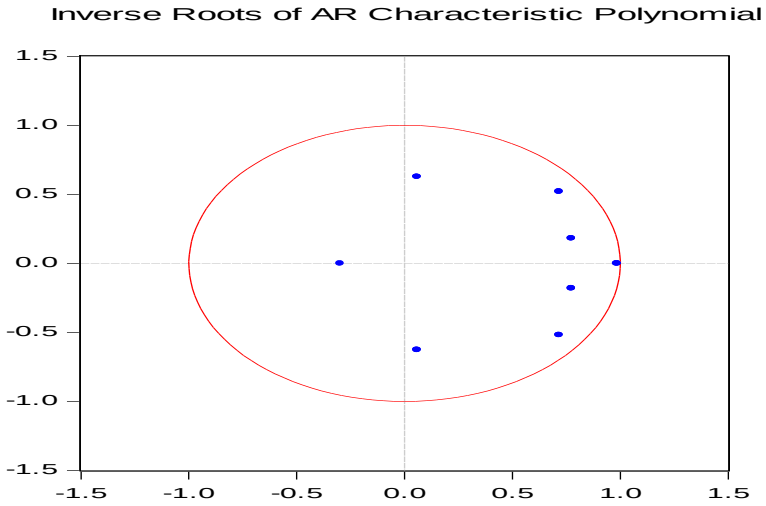
On the other hand, Figure 1 depicts that the model is stable because all the inverse roots falls within the circle.

The next step is the variance decomposition analysis which provides a means of determining the relative relevance of shocks to public debt in explaining variation in FDI in South Africa. This is shown in Table 8 which reveals that in the first period, fluctuation in FDI is completely explained by its own shock. This is in accordance with the view of Brooks (2008). In the second year, innovations (shock) in FDI accounts for 94.07% variation in FDI while the rest 5.3% is contributed by the remaining variables. In six years ahead as seen from Table 8, FDI explains about 82.7% variation of itself while the remaining 17.3% is contributed by the other independent variables of which PDEBT account for 2.41%, EXCH account for 13.9% and INT accounts for 0.96%.

It is obvious from table 8 that over the period of 10 years, shock in FDI explains most of the variations in the forecast error (variation in itself),

followed by PDEBT then EXCH and lastly INT. It can be seen that although interest rate is significant, it does not contribute much to the variation in FDI.

Figure 1. Stability Test Result



This result reveals that PDEBT is vital in explaining FDI in South Africa over the period of the study. This also implies that in the short run, shock to the variables accounts for less fluctuation in the FDI but on the long run, the shock to PDEBT and EXCH contribute to great extent in the fluctuation of the forecast error while shock to INT does not contribute much to the fluctuation in FDI either in the short run or the long run.

Table 8. Variance Decomposition of FDI

PERIOD	S.E	LNFDI	LNPDEBT	LNEXCH	LNINT
1	0.230979	100.0000	0.000000	0.000000	0.000000
2	0.285361	94.07508	1.635929	3.491390	0.797605
3	0.334917	89.79890	1.635164	7.521735	1.044199
4	0.367782	86.26991	1.366102	11.29543	1.068560
5	0.389090	84.19670	1.478521	13.36039	0.964389
6	0.402457	82.71576	2.413239	13.91195	0.959052
7	0.412560	80.95026	4.355166	13.56826	1.126311
8	0.422487	78.40696	7.311341	12.94391	1.337791
9	0.433936	75.00363	11.21584	12.32556	1.454967
10	0.447651	70.88953	15.94809	11.70882	1.453555

The impulse response analysis was also perform to examine the dynamic response of FDI to a positive shock on the variables. It also reveals the direction and persistence of the response to the individual shock over 10 years. The Figure 2 shows that the response of FDI to a one standard deviation shock on the variables is positive for FDI, EXCH and INT throughout the period of 10 years while one standard deviation shock to PDEBT have a positive effect on FDI from year 1-3. It becomes zero in year 4 but later changes to negative from year 5- 6 and from year seven becomes positive. This result implies that the shock to the variables is persistent and statistically significant.

Figure 2. Response to Generalized one S.D Innovations (shock)

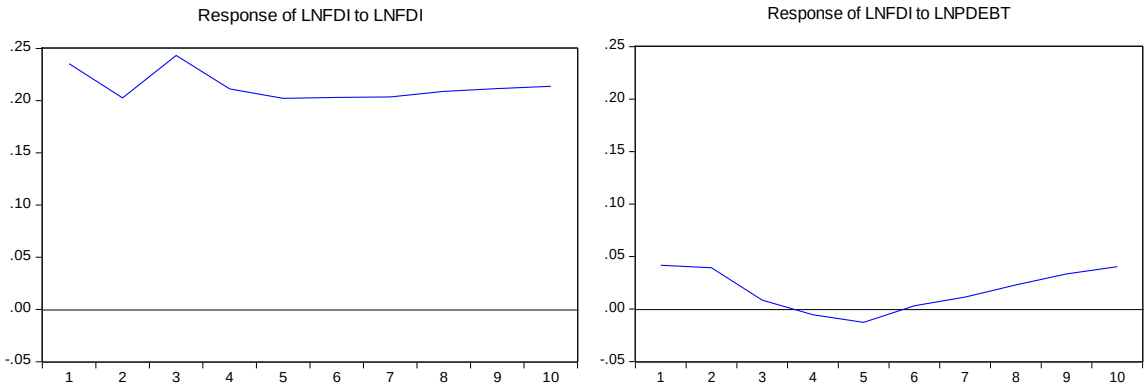
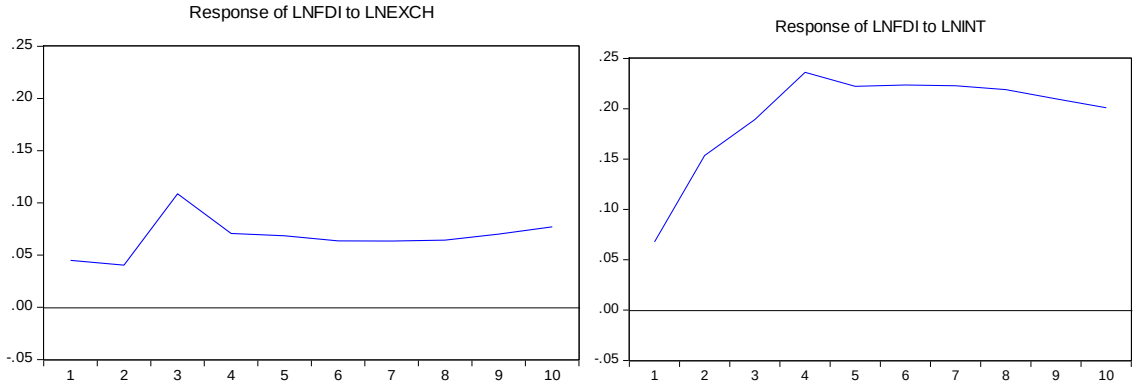


Figure 2 Continued



5. CONCLUSIONS

This study set out to empirically investigate the effect of public debt on the inflow of FDI in South Africa during the period 1983 – 2013. The VECM, variance decomposition and impulse response approaches were employed for this investigation. The estimated VECM provides both the long run and short run relationships among the variables. The long run results indicate a significant positive relationship between LNPDEBT and FDI as well as LNINT and FDI. This implies that a 1% increase in LNPDEBT and LNINT will cause FDI to increase by 2.53% and 0.80% respectively. On the other hand, it shows insignificant negative relationship between EXCH and FDI meaning that a 1% increase in EXCH will cause FDI to fall by 1.78%. From the short run result, the ECT was found to be negative and statistically significant.

The variance decomposition showed that over the period of 10 years, shock in FDI explains most of the variations in the forecast error (variation in itself), followed by PDEBT then EXCH and lastly, INT. This implies that PDEBT is vital in explaining FDI in South Africa over the period of the study. The impulse response on the other hand showed that the response of the FDI to shock in the variables are positive for FDI, EXCH and INT while PDEBT exhibits fluctuating behaviour.

The policy recommendation is that measure should be taken that will increase the level of Government debt and interest rate so as to increase the level of FDI. Also, the policy of devaluation /depreciation of the rand is not ideal for South Africa as a further devaluation of the rand will reduce the level of FDI into the country.

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