CTSMSR Vol. 1. No. 1. (June. 2022)

e-ISSN: 2814-1687

Current Trends in Social and Management Sciences Research

The Official Publication of the College of Postgraduate Studies
Babcock University, Ilishan-Remo, Ogun State, Nigeria.

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RESEARCH ARTICLE

CAPITAL INFLOWS AND MONETARY POLICY IN NIGERIA

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ABSTRACT

This study examined the relationship between capital inflows and monetary policy in Nigeria using data from 1985 to 2020. Employing the Vector Autoregression (VAR) analysis and the granger causality test, the study examined the causal relationship between capital inflow measured as foreign direct investment (FDI) and the nominal interest rate. Other control variables include the real gross domestic products (GDP), domestic savings and unemployment. The results showed evidence of a causal relationship between the nominal interest rate and foreign direct investment. A unidirectional causality was found running from FDI to nominal interest rate. There was a joint significant causality from all the variables to foreign direct investment. There was a unidirectional causality running from FDI to domestic savings. Employing a variance decomposition analysis and an impulse response function, the result showed that innovations in FDI caused changes in the nominal interest rate and vice versa. Policy strategies towards increasing foreign direct investment should include low nominal interest rate.

Key words: Capital Inflows, Monetary Policy, VAR Model, Foreign Direct Investment

1. Introduction

Monetary policy refers to the actions taken by the apex bank (for instance the Central Bank of Nigeria) to regulate the value, supply and cost of money with a view to achieving macroeconomic objectives in an economy (CBN, 2019). The objectives of monetary policy vary from country to country depending on the macroeconomic objective and the prevailing economic condition, it helps to achieve price stability, reduce inflation, adjustment of interest rate, control money supply and achievement of economic growth and other macroeconomic objectives. The Central Bank of Nigeria

regulates the interest rates through an expansionary monetary or contractionary scheme, when the cost of borrowing is low; investors borrow more and invest thereby stimulating the economy and vice versa (IMF 2021). The vision 20:2020 was aimed at transforming the Nigerian economy into one of the largest economy in the world within the shortest possible time as well as achieving a sound, stable and globally competitive economy, with GDP of not less than US$900 billion and per capita income of $4,000 per annum (CBN, 2009; Eneh, 2011). The aspiration was to become one of the twentieth largest economies in the world by 2020 and the 12th largest economy by 2050 Central Bank of Nigeria (2009). This should not have been possible if the economy was to be closed for external/ international business relation. Therefore, international business activities help to grow an economy through the capital inflows. In Sub-Saharan Africa, capital inflows play an important role in aggregate demand determination and have remained a crucial in high loanable interest rate issue for economic development. Foreign capital inflow is one of the surest ways to achieve economic goals in Nigeria and other developing countries (Ebele & Jonathan, 2017). The contributions of capital inflows for economic sustainability have been on the increase over the years and Nigeria has experienced the ripple effects.

Developing countries are faced with diverse macroeconomic problems. One of such macroeconomic problems is the unabated increase in the high loanable interest rate. The rate of interest determines money demand and the supply of loanable funds. The existence of high interest rates acts as an obstacle to the growth of investment in an economy. For the past years, interest rates on loans have maintained a steady increase from 1985 to 2020 (WDI, 2021). There were only few years where declines were recorded, while highest was 29.8% in 1992, 26.8% in 1989 and has maintained a double digit throughout the period (WDI, 2021). In this wise, high interest rate discourages investment thereby leading to low national income and poor economic sustainability. An increase in capital inflows such as foreign direct investment (FDI) may increase sources of funds available to investors; and may have direct or indirect effect on interest on loanable fund in the economy. Several studies have examined the relationship between capital inflows and monetary policy. Most of the studies focused on the effect of monetary policy on capital inflows. Several studies focused on the effect of monetary policy on capital inflows. Few studies have examined the effect of capital inflows on monetary policy (Banerjee, 2020; Cobham and Song, 2020). This shows the possible interrelationship between both variables. Therefore, this study examines the relationship between capital inflows (foreign direct investment) and monetary policy in Nigeria. This study also examines the dynamic interactions among the variables and the effect of shocks.

2. Literature Review

2.1 The Effect of Monetary Policy on Capital Inflows

Cerutti, Claessens and Rose (2019) quantified the importance of a global financial cycle for driving capital flows using panel data for 85 countries between 1990Q1 and 2015Q4. They found that global financial cycle explained only some of the variations in capital flows it rarely explained more than a quarter of the variation for most types of capital flows, in most countries. The capital flow variables used were: foreign direct investment, portfolio equity investment, portfolio debt investments and bank credit. Avdjiev and Hale (2019) examined the effect of monetary policy on cross-border lending in the United States. Estimating both a time series regression and a panel regression, the study found that the tightening of the monetary policy stance led to a decline in bank lending to emerging markets during a stagnation regime. However, under a boom regime, a positive relationship was found to exist between macro fundamentals component of federal funds rate and bank flows in the United States. Albagli, Ceballos, Claro, & Romero, (2019) provided evidence of significant spillover

effects of United States monetary policy on a group of 12 developed countries and 12 emerging market economies. They also found that while movement in risk neutral rates account for around two thirds of the overall movement in long term yields in the developed country samples, more than 85% of the spillovers into emerging market economies work through changes in term premium.

Getko and Rey (2017) also showed that monetary policy in the United State and the United Kingdom has spillover effect in international financial market using an instrumental proxy VAR approach. Ayodele, Afolabi and Olaoye (2017) examined the effect of interest rate on both long and short term portfolio investment in Nigeria. Using data from 1985 to 2014 and estimating an error correction model, they found that in the long run interest rate (precisely prime lending rate) significantly explained changes in portfolio management negatively both on long and short term basis but it was not significant in short run. The saving rate had both a long and short term significant positive effect on portfolio investment. The study did not consider foreign direct investment and external debt.

2.2 The Effect of Capital Inflows on Monetary Policy

Using a multinomial logit model, Cobham and Song (2020) examined the impact of capital account openness, financial market development, central bank independence and political institutions on the choice of monetary policy for Euro Area Countries. The monetary policy choices used in the study include exchange rate target (the base category), discretion, mixed target and Inflation target. Capital account openness had significant negative effect on the use of discretion and mixed target but was insignificance for inflation target therefore countries with a high level of capital account openness were less likely to use discretion and mixed target.

Examining the effect of external factors including international bank financing, and the exchange rate, Mihaljek (2011) emphasized that international bank financing of emerging markets economies in the form of external debt influence the monetary policy of such economies. Mihaljek (2011) also explained that the volatility of exchange rate may affect financial markets as well as the activities of the real sector. Davis (2017) investigated the effect of net external liability position on central bank's choice of whether to pursue a monetary policy based solely on domestic concerns like the output gap or inflation or adopt de facto exchange rate peg in an attempt to manage their external accounts. Using panel data for 96 countries over the period from 1992–2011,the results showed that central banks in countries with a worsening external liability position are likely to move their interest rate in concert with a base country interest rate, and thus adopt some sort of de facto currency peg in an attempt to manage the external account. This is because current account deficits are usually financed by a positive net inflow of capital. Therefore, central banks in countries with a cur-rent account deficit usually raise their interest rate in order to retain foreign capital that would otherwise flee. Banerjee (2020) examined the pattern and composition of Capital inflows over the study period (2000 Q2 to 2018 Q3) and the exchange rate Indices. It also examined the causal relationship between Capital inflows and the exchange rate using the granger causality test. The result showed that capital inflow through foreign direct investment and foreign portfolio investment granger caused both export and trade based real effective exchange rate (REER) but not vice versa. However, there was no causal relationship between exchange rate and capital inflows through non – resident Indians (NRI) deposits and external commercial borrowings. Yousfani, Khowaja & Yousfani (2019) showed that foreign direct investment impacts on monetary policy decisions and financial development. Thus, foreign direct investment is influenced by the domestic interest rate because investors consider the cost of borrowing with respect to whether the interest rate is high. It is important that monetary policy decisions improve welfare levels and this was emphasized by Mehrotra and Yetman (2014), which examined the implication of different degrees of financial inclusion on monetary policy. It focused on the consequences of limited financial inclusion on output

and inflation volatility when monetary policy maximizes social welfare. Alstadheim and Blandhol (2018) also expalined that global shocks could have a large impact on gross capital flows.

Theoretical Review

Taylor's Rule (1993) examines how the interest rates respond to changes in the price level (inflation) or changes in the income (RGDP). The monetary authorities are assumed to adjust their interest rate in response either to first, deviations of the money supply from the target, secondly, deviations of the exchange rate from some target, or thirdly, weighted deviations of the inflation rate (or the price level) and real output from some target. Taylor (1993) posits that monetary authorities will increase the short-term interest rate when the price level and real income rise beyond a particular target level and the interest rate is again reduced if otherwise. However, what is still uncertain is the amount by which the interest rate should change.

According to Keynes (1936), individuals would often like to hold their asset in the form of cash in order for them to be liquid. Thus, the interest rate is a reward to individuals for agreeing to trade off their liquidity in order to save. Individuals who wish to be liquid will charge a higher interest to be able to trade off their cash. Therefore, what is the degree of the individual's liquidity preference? This is important for determining the interest rate.

3. Methodology.

3.1 Model Specification

The model for this study is based on Taylor (1993) (Taylor's rule) which examined how the interest rate responds to changes in the price level (inflation) or changes in the income (RGDP). Taylor (1993) posits that monetary authorities will increase the short-term interest rate when the price level and real income rise beyond a particular target level and the interest rate is again reduced if otherwise. However, what is still uncertain is the amount by which the interest rate should change. The interest rate model in equation (1) therefore specifies the interest rate as a function of the income level (real GDP), the model is extended to include capital inflow and other control variables such as domestic savings and unemployment.

$$\mathrm{NIR_t} = \beta_o + \beta_1 \mathrm{CI_t} + \beta_2 \mathrm{DS_t} + \beta_3 \mathrm{RGDP_t} + + \beta_4 \mathrm{UNE_{t-1}} + \mathrm{u_t} \ldots\ldots\ldots\ldots\ldots (1)$$

The vector auto regression (VAR) model specification, each variable, beginning with the interest rate is presented as a function of its lag and the lag of other explanatory variables.

The interest rate was adopted as a proxy for monetary policy while the proxy for capital inflows is foreign direct investment. Other control variables used are the real GDP, domestic savings and unemployment.

The VAR model is presented below.

$$\mathrm{NIR_t} = \gamma_1 + \sum_{\mathrm{i=1}}^{\mathrm{k}} \delta_{1i}\, \mathrm{NIR_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \eta_{1\mathrm{i}}\, \mathrm{CI_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \mathrm{d}_{1\mathrm{i}}\, \mathrm{DS_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \alpha_{1\mathrm{i}}\, \mathrm{RGDP_{t-i}} \sum_{\mathrm{i=1}}^{\mathrm{k}} \beta_{1\mathrm{i}}\, \mathrm{UNE_{t-i}} + \mathrm{U_{1t}} \qquad (2)$$

$$\mathrm{CI_t} = \gamma_2 + \sum_{\mathrm{i=1}}^{\mathrm{k}} \delta_{2\mathrm{i}}\, \mathrm{CI_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \eta_{2i}\, \mathrm{NIR_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \mathrm{d}_{2\mathrm{i}}\, \mathrm{DS_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \alpha_{2\mathrm{i}}\, \mathrm{RGDP_{t-i}} \sum_{\mathrm{i=1}}^{\mathrm{k}} \beta_{2\mathrm{i}}\, \mathrm{UNE_{t-i}} + \mathrm{U_{2t}} \qquad (3)$$

$$\mathrm{RGDP_t} = \gamma_3 + \sum_{i=1}^{\mathrm{k}} \delta_{3i}\, \mathrm{RGDP_{t-i}} + \sum_{i=1}^{\mathrm{k}} \eta_{3\mathrm{i}}\, \mathrm{CI_{t-i}} + \sum_{i=1}^{\mathrm{k}} \mathrm{d}_{3\mathrm{i}}\, \mathrm{DS_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \alpha_{3i}\, \mathrm{UNE_{t-i}} \sum_{\mathrm{i=1}}^{\mathrm{k}} \beta_{3i}\, \mathrm{NIR_{t-i}} + \mathrm{U_{3t}} \qquad (4)$$

$$\mathrm{DS_t} = \gamma_4 + \sum_{\mathrm{i=1}}^{\mathrm{k}} \delta_{4i}\, \mathrm{DS_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \eta_{4\mathrm{i}}\, \mathrm{CI_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \mathrm{d}_{4i}\, \mathrm{NIR_{t-i}} + \sum_{\mathrm{ji=1}}^{\mathrm{k}} \alpha_{4i}\, \mathrm{RGDP_{t-i}} \sum_{\mathrm{i=1}}^{\mathrm{k}} \beta_{4i}\, \mathrm{UNE_{t-i}} + \mathrm{U_{4t}} \qquad (5)$$

$$\mathrm{UNE_t} = \gamma_5 + \sum_{\mathrm{i=1}}^{\mathrm{k}} \delta_{5\mathrm{i}}\, \mathrm{UNE_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \eta_{5\mathrm{i}}\, \mathrm{CI_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \mathrm{d}_{5i}\, \mathrm{DS_{t-i}} + \sum_{\mathrm{i=1}}^{\mathrm{k}} \alpha_{5i}\, \mathrm{RGDP_{t-i}} \sum_{\mathrm{i=1}}^{\mathrm{k}} \beta_{5i}\, \mathrm{NIR_{t-i}} + \mathrm{U_{5t}} \qquad (6)$$

Where:

NIR = nominal interest rate, CI = Capital inflows (measured as foreign direct investment), RGDP = real gross domestic product, DS = domestic savings, UNE = unemployment rate, $y_1 - y_{5=\text{ intercept,}}$ $u_{1t} - u_{5t}$ = error terms, $(\delta, \eta, \mathrm{d}, \alpha, \beta)$ = coefficients.

From the nominal interest rate model, capital inflows, the real GDP and external debt are expected to have a positive causal effect while domestic saving and unemployment rate are expected to have negative causal effect. In the capital inflows model (equation 3), the real GDP and domestic savings are expected to have a positive causal effect while the nominal interest rate and unemployment rate are expected to have negative causal effect. In the real GDP model, capital inflows and domestic savings are expected to have a positive causal effect while the nominal interest rate and unemployment rate are expected to have negative causal effect.

3.2 Data and Source

Data was obtained from the Central Bank of Nigeria Statistical Bulletin (2021) and National Bureau of Statistics (2021) from 1985 to 2020. The data include the nominal interest rate, foreign direct investment, real gross domestic products, domestic savings and the unemployment rate.

4. Results and Discussion

4. 1 Descriptive Statistics

The descriptive statistics of the variables are shown in Table 1. The average nominal interest rate value for the period was 18.27% with a maximum value of 29.8% and minimum value of 9.25%. The maximum unemployment rate was 27.4% while the minimum was 1.8%.

The nominal interest rate, foreign direct investment, real GDP and unemployment had a positive skewness, while domestic savings were negatively skewed.

Table 1 Descriptive Statistics

	NIRR	FDI	RGDP	DS	UNE
Mean	18.26861	3600744.	4.541042	2.826115	11.38167
Median	17.77000	6.511982	4.507656	2.794561	11.15000
Maximum	29.80000	64834014	4.857899	4.318937	27.40000
Minimum	9.250000	0.130476	4.234772	1.097666	1.800000
Std. Dev.	4.058012	15056817	0.221131	1.062100	7.665762
Skewness	0.559292	3.880571	0.186465	-0.115620	0.544479
Kurtosis	4.337746	16.05883	1.470649	1.615336	2.142996
Observations	36	36	36	36	36

Source: Author's Computation (2022)

4.2 Stationarity Test Results.

The estimation process began with a unit root test for the stationarity of variables. The Phillip Perron test method was used and the results showed that some variables were stationary at levels while others were stationary at first difference. There was a mixed order of integration. Thus, the cointegration test was conducted using the ARDL Bounds test. The results are presented in Table 2 below.

TABLE 2 UNIT ROOT TEST (PHILLIPS –PERRON)

Variables	**Level t- statistic(prob)**	**FIRST DIFFERENCE t- statistic(prob)**	**ORDER OF INTEGRATION**
LOG (RGDP)	-0.285971 (0.9171)	-3.519 (0.0135)**	I(1)
UNEMPLOYMENT RATE	-1.672621 (0.4359)	-6.287 (0.0000)*	I(1)
NOMINAL INTEREST RATE	-4.062 (0.0033)*	-	I(0)
LOG FOREIGN DIRECT INVESTMENT	-6.101 (0.0000)*	-	I(0)

LOG DOMESTIC SAVINGS	-1.155442 (0.6823)	-4.002 (0.0040)*	I(1)

- denote significance at 1%, and ** denote significance at 5%

4.3 Cointegration Test

The results showed that the F-statistics were greater than the lower bounds critical values and upper bounds critical values at the 1% significance level. Therefore there is cointegration among the variables. The results are shown in Table 3.

Table 3 Cointegration Test Results

VARIABLE	F-STATISTIC	LOWER BOUND CRITiCAL VALUE I(0)	UPPER BOUND CRITiCAL VALUE I(1)	Significance level
NIRR	6.124	2.27	3.28	5%
		2.88	3.99	1%

Source: Author's Computation (2022)

4.4 Vector Autoregression Analysis

The vector autoregression (VAR) model provides a framework for examining the granger causality between each set of variables. The VAR model estimation examined causal relationship between capital inflows and monetary policy. However, other control variables were included in the model. Results from the granger causality test or the block exogeneity wald test were obtained after estimating a VAR model. The study also conducted the variance decomposition analysis and the impulse response function to investigate the temporary dynamic effects that shocks to capital inflows have on monetary policy (interest rate) and vice versa.

Lag Length Selection

The lag length for the VAR model was selected using five criteria. The optimal lag length is four as indicated by the sequential modified LR test statistic (LR), Final prediction error (FPE), Akaike information criterion (AIC) and Hannan-Quinn information criterion (HQ) criterion as shown in Table.4. Selecting the appropriate lag length is important to ensure a correct specification of the VAR model. A mis-specification of the VAR model would make the variance decomposition analysis and the impulse response function inconsistent.

Table 4 VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-166.3304	NA	0.030772	10.70815	10.93717	10.78406
1	-3.951516	263.8657	5.87e-06	2.121970	3.496097*	2.577454
2	16.13113	26.35847	9.04e-06	2.429304	4.948538	3.264359
3	55.06346	38.93233	5.35e-06	1.558534	5.222873	2.773159
4	117.4747	42.90770*	1.16e-06*	-0.779666*	4.029780	0.814529*

* indicates lag order selected by the criterion
LR (sequential modified LR test statistic (each test at 5% level), FPE (final prediction error), AIC (Akaike information criterion), SC (Schwartz information criterion), HQ (Hannan-Quinn information criterion)

VAR Granger Causality Test

The VAR granger causality estimates as shown in Table 5 revealed that FDI had a significant causal effect on the nominal interest rate but there was no significant causality from the nominal interest

rate to FDI. Therefore there was a unidirectional causality running from FDI to the nominal interest rate. This implies that although changes in FDI affected the nominal interest rate during the period, it was not the same case vice versa.

The real GDP also had a significant causal effect on the nominal interest rate but not vice versa. Thus, changes in the real GDP affected the nominal interest rate but not vice versa. Domestic savings and unemployment rate individually had no significant causality with the nominal interest rate. However all the variables including FDI, the real GDP, domestic savings, and unemployment rate had a joint significant causality on the nominal interest rate.

All the variables had no significant causality with FDI individually but all the variables had a joint significant causality with FDI. Domestic savings had a significant causal effect on the real GDP while all other variables had no individual significant causality. Thus, changes in the propensity to save ultimately lead to real GDP changes. However, there was a joint significant causality from all the variables to the real GDP. Thus, a change in all the variables would cause the real GDP to also change.

There was a significant causality from FDI to domestic savings. Each of the other variables did not granger cause domestic savings. However, all the variables jointly granger caused domestic savings and it was highly significant. There was no significant causality from the nominal interest rate to unemployment. This was also the case for each of the other variables. There was also no joint significant causality from all the variables to the unemployment rate.

In summary, there was a unidirectional causality running from FDI to the nominal interest rate and from the real GDP to the nominal interest rate. There was a unidirectional causality running from domestic savings to the real GDP. There was also a unidirectional causality running from FDI to domestic savings. There was a joint significant causality from all the variables to the nominal interest rate, FDI, real GDP, domestic savings. This was not the case for unemployment rate.

Table 5 Granger Causality Test

Dependent Variable: Nominal Interest Rate		
Excluded Variable	**Chi-Square**	**Probability**
FDI	13.28976	0.0099
RGDP	11.31510	0.0232
Domestic Savings	3.632724	0.4580
Unemployment rate	6.619976	0.1574
All	79.09130	0.0000
Dependent Variable: Foreign Direct Investment		
Nominal Interest Rate	6.145071	0.1886
RGDP	3.047620	0.5499
Domestic Savings	6.623246	0.1572
Unemployment rate	0.611821	0.9617
All	31.62740	0.0112
Dependent Variable: Real GDP		
Nominal Interest Rate	0.838034	0.9333
Foreign Direct Investment	6.359110	0.1739
Domestic Savings	10.10021	0.0388
Unemployment rate	8.262342	0.0824
All	31.07655	0.0132
Dependent Variable: Domestic Savings		
Nominal Interest Rate	6.410956	0.1705
Foreign Direct Investment	21.69794	0.0002
Real GDP	8.959874	0.0621
Unemployment rate	2.351311	0.6714
All	52.16976	0.0000
Dependent Variable: Unemployment Rate		

Nominal Interest Rate	2.117059	0.7142
Foreign Direct Investment	0.122406	0.9982
Real GDP	2.587817	0.6290
Domestic Savings	1.664789	0.7971
All	7.740735	0.9562

Post Estimation Tests

Post estimation tests were conducted after estimating the VAR model including the VAR residual serial correlation test and the VAR residual normality test using the Cholesky (Lutkepohl) orthogonalization. The statistics of the serial correlation test were not significant at 5% for all the five lags. There is therefore, no serial correlation in the model. The joint chi- sqi statistics for normality test were not significant at 5% which confirms the presence of normality in the model since the Jarque-Bera Statistic of 4.66 and a probability value of 0.9125 was not significant at 5%. The skewness and kurtosis of the residuals of the model are also presented in Table 6.

.**Table 6 Post Estimation Tests**

THE SERIAL CORRELATION LM TEST LAGS	**STATISTICS**	**PROBABILITIES**
1	2.171804	0.1138
2	0.888110	0.6185
3	1.856324	0.1687
4	1.001831	0.5337
5	0.960983	0.5632
Normality Test joint chi- sqi	**STATISTICS**	**PROBABILITIES**
	Skewness 2.042600	0.8432
	Kurtosis 2.620307	0.7583
	Jarque Bera 4.662908	0.9125

Variance Decomposition Analysis

As shown in Table.7, in the first year all the variations in nominal interest rate were due to its own shocks at 100 percent. However, there was an increase from zero to 34.73 percent of forecast error variance in foreign direct investment which explained variations in nominal interest rate over the ten year period. Despite the fact that none of the variance in the forecast error for domestic saving, real GDP and unemployment explained changes in the nominal interest rate in the first year we find that by the tenth year 7.69, 6.73 and 8.44 percentages of forecast error variance in domestic saving, real GDP and unemployment explained variation in the nominal interest rate. Forecast error variance decompositions for the foreign direct investment presented in Table 8 showed that in the first year, 16.71 percent of forecast error variance in the nominal interest rate explained changes in the foreign direct investment. However, by the tenth year, there was an increase to 24.26 percent. Therefore, monetary policy decision with respect to interest rate contributed to attracting more foreign direct investment into the country.

Table 7 Variance Decomposition of Nominal Interest Rate

Period	S.E.	NIRR	LOG(FDI)	LOG(DS)	LOG(RGDP)	UNE
1	1.893411	100.0000	0.000000	0.000000	0.000000	0.000000
2	2.284805	73.28010	18.14595	2.454746	0.031501	6.087702
3	2.609562	56.77594	34.07789	1.992598	2.423095	4.730482
4	2.830019	51.63399	29.14372	6.298791	8.876608	4.046896
5	2.914085	49.10646	28.53903	7.279755	8.372132	6.702621
6	3.080674	46.06151	30.76356	7.201877	7.509520	8.463527
7	3.306833	41.95667	35.95400	7.518655	6.641489	7.929185

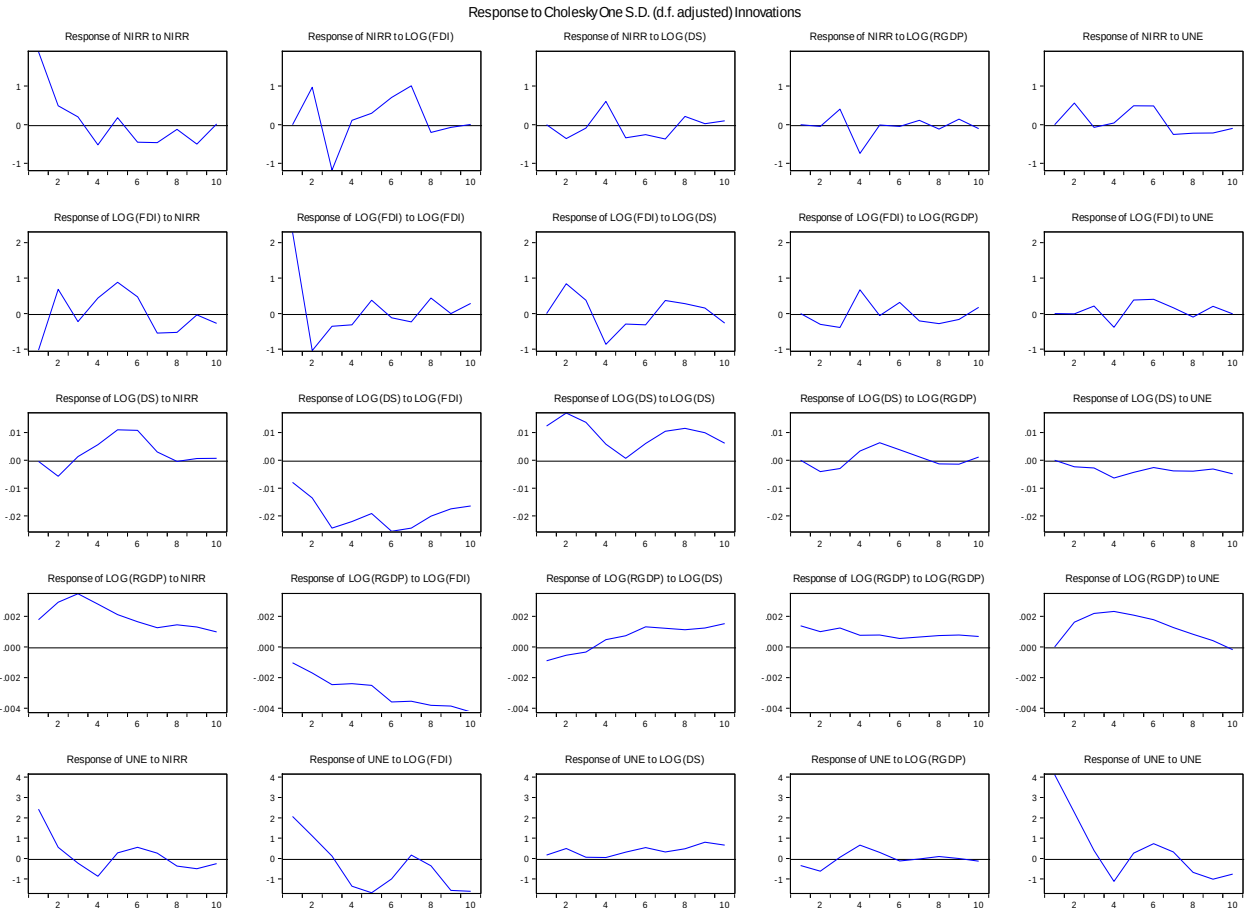
8	3.330940	41.47888	35.79409	7.832988	6.659603	8.234437
9	3.378946	42.50409	34.82034	7.618839	6.667298	8.389434
10	3.383311	42.39807	34.73115	7.693446	6.734124	8.443211

Table 8 Variance Decomposition of Foreign Direct Investment

Period	S.E.	NIRR	LOG(FDI)	LOG(DS)	LOG(RGDP)	UNE
1	2.513085	16.70718	83.29282	0.000000	0.000000	0.000000
2	2.944869	17.59583	73.18454	8.206980	1.011940	0.000709
3	3.031382	17.15411	70.42716	9.290495	2.614619	0.513616
4	3.290342	16.37006	60.68703	14.71410	6.438285	1.790521
5	3.462950	21.37224	55.97228	13.98203	5.833031	2.840415
6	3.549083	22.13332	53.39362	14.10495	6.365202	4.002908
7	3.626964	23.44157	51.53602	14.57584	6.402781	4.043787
8	3.713039	24.34532	50.58289	14.47795	6.667530	3.926305
9	3.725809	24.18544	50.23678	14.55593	6.810912	4.210940
10	3.760472	24.26054	49.89910	14.79165	6.914974	4.133745

Impulse Response Function

In order to further investigate the interactions among nominal interest rate, foreign direct investment, the real GDP, domestic savings and unemployment the study generated impulse response functions which allow us to trace temporal responses of a variable to own shocks and shocks in other variables. Using the Cholesky decomposition, both long term and short term response of nominal interest rate to innovations in foreign direct investment and other variables were shown. The response of foreign direct investment to shocks from the nominal interest rate and other variables were also examined. A one standard deviation shock in foreign direct investment had a positive impact on the nominal interest rate initially but the effect becomes negative by the third year. Thereafter, the response becomes positive with a peak by the seventh year before a drastic decline is seen from the eighth year to the tenth year. However, a standard deviation shock in the nominal interest rate caused a sharp increase in foreign direct investment initially and thereafter declined slightly before maintaining a positive impact until the fifth year when a decline is sustained to the tenth year.



4.5 Discussion of Findings

The results of the study provided evidence of a causal relationship between the nominal interest rate and foreign direct investment. Foreign direct investment granger caused the nominal interest rate. However, the nominal interest rate did not granger cause foreign direct investment. Therefore, there was a unidirectional causality running from foreign direct investment to the nominal interest rate. This is similar to Cobham and Song (2020), which found capital inflows to significantly explained monetary policy choice. It is also similar to Yousfani, Khowaja & Yousfani (2019), which showed that foreign direct investment impacts on monetary policy decisions and financial development. Therefore, foreign direct investment is influenced by the domestic interest rate because investors consider the cost of borrowing with respect to whether the interest rate is high.

The unidirectional causality running from foreign direct investment to the nominal interest rate is however contrary to Cerutti, Claessens and Rose (2019), Avdjiev and Hale (2019) and Albagli *et al.* (2019), which found that monetary policy decisions influence capital inflows including the foreign direct investment. Blanchard and Acalin (2016) also found a strong effect of the interest rate on foreign direct investment. It is also contrary to Yousfani, Khowaja & Yousfani *et al.* (2019) that showed evidence of a two-way causality between capital inflow and monetary policy. There was a unidirectional causality running from foreign direct investment to domestic savings. Real GDP shocks contributed to variations in the nominal interest rate and this conforms to theory as posited by Taylor's rule (1993).

5. Conclusion and Policy Implications

The study concluded that a causal relationship exists between capital inflows and monetary policy. The causal relationship was unidirectional with respect to the nominal interest rate and foreign direct investment, which were used as measures of monetary policy and capital inflows respectively. Therefore, monetary policy should respond in favour of implementing low nominal interest rates in order to attract more foreign direct investors into the country. There was a unidirectional causality running from domestic savings to the real GDP. There was also a unidirectional causality running from FDI to domestic savings. Therefore policies that successfully increase FDI into the country will also improve the level of domestic savings, which ultimately brings about economic growth.

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