




# “Exchange rate volatility and foreign portfolio investment in Nigeria”

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# EXCHANGE RATE VOLATILITY AND FOREIGN PORTFOLIO INVESTMENT IN NIGERIA

## Abstract

The study examines the link between exchange rate volatility and foreign portfolio in Nigeria using data that covers the period 1996Q1 to 2016Q4. The theoretical framework used is the return and creditworthiness model, which is based on the push and pull factors theory. In achieving the objective, the study adopted the vector autoregressive model in ascertaining the dynamics between exchange rate volatility and foreign portfolio investment in Nigeria. Also, the study examines the impact of exchange rate innovations (shocks) on foreign portfolio investment and equally assesses how induced variations in foreign portfolio investment are decomposed among the variables in the model. It was also found that exchange rate volatility and market capitalization significantly and largely explain the variations in foreign portfolio investment. The impulse response analysis shows that foreign portfolio investment was more responsive to standard deviation shocks in market capitalization and exchange rate, implying that these variables were more responsible for the dynamism in FPI. As the horizons expand, shocks to market capitalization and exchange rate increase foreign portfolio investment, whereas shocks to GDP and inflation made foreign portfolio investment dwindle. In the same manner, in decomposing the induced variation in foreign portfolio investment, forecast error shocks in market capitalization, exchange rate and GDP explain more of the variation in foreign portfolio investment.

## Keywords

exchange rate, volatility, portfolio investment, vector  
autoregression

## JEL Classification

024, N1, G11, C22

## INTRODUCTION

In driving accelerated economic growth and development in any economy, there is a need for adequate financing. The existence of a savings-investment gap<sup>1</sup>, particularly in Nigeria as well as other developing countries, emphasizes the need for funding for growth (Adom & Elbahnasawy, 2014). The neoclassical theory of growth posits that capital is expected to flow from developed countries to developing countries. Foreign capital<sup>2</sup> flows from one country to another in order to enhance the economic productiveness and development of the recipient country (Lucas, 1990).

Foreign portfolio investment has become a popular concept in significant parts of the world economy over the past years and a crucial source of funding to support development and growth in developed and developing countries alike (Michael et al., 2014). There are various determinants of foreign portfolio investment that vary according

- 1 Due to the underdeveloped financial system and low access to basic financial products.
- 2 Foreign capital includes: official development assistance (ODA), export credits and foreign private flows – foreign direct investment and foreign portfolio investment. FDI is a flow of capital that provides an organization with control over foreign subsidiaries, while FPI typically comprises securities such as stocks, bonds and other financial assets passively held by foreign investors (Okewuchukwu, 2015).

to the geographical location as well as the structure of any economy. The push and pull factors theory discusses the determinants of international flows to be categorized into those factors that push international flows from the giving economy and those other factors that pull (attract) flows into the receiving economy. Exchange rate is a very important macroeconomic variable to both advanced and developing countries and hence plays a significant role in affecting general economic activity. It is the price of one country's currency in terms of another (Danladi & Uba, 2015).

There is a lack of consistent empirical finding on the nexus between exchange rate volatility and foreign portfolio investment in Nigeria, as the lingering question on the practical linkage between the two variables remains somewhat unanswered. This, therefore, necessitates the need for further research using more recent data. Most studies conclude that the real factors that may affect FPIs into the country are external hence preventing the government from adopting policies that directly connect exchange rate volatility and the inflow of portfolio investment into the country. The broad objective of this study is to evaluate the relationship between Exchange Rate Volatility and Foreign Portfolio Investment in Nigeria and also to ascertain the out of sample dynamics, especially as it relates to capturing the effect of exchange rate shocks on foreign portfolio investment in Nigeria (Asaleye, Popoola, Lawal, Ogundipe, and Ezenwoke 2018).

This study distinguishes itself in two ways; first of all, it assesses the impact of exchange rate volatility on the overall level of portfolio inflows to Nigeria while also identifying the specific nature of the relationship between the variables. Secondly, it builds on previous studies and endeavors to fill the gap in the literature on the nexus between exchange rate volatility and foreign portfolio investments by narrowing the research to portfolio investment only and not foreign private investments (as a whole) in the country.

This study is significant in that most of the studies done majorly focused on the real component of foreign private investment, that is, FDI. Little or no attention is given to foreign portfolio investment to Nigeria, perhaps because foreign portfolio flows are a more recent development in the country's financial account. The findings of this study are also expected to provide useful information to policy makers in designing exchange rate policy and as tool for predicting and forecasting the level of foreign portfolio investment in the economy as well as its effects in order to ensure stability in the economy.

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## 1. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

A fundamental theory that was considered is the pull and push factors as they are two classes of theories that really explain the direction of private capital flows (Calvo et al., 1993). Taylor and Sarno (1997) suggest that there are global factors and country specific factors that explain FPI inflows in various regions. These global factors may be called the 'push' factors and the country specific factors are called the 'pull' factors.

According to economic literature, push factors are those, which account for the availability of capital flows into the recipient country. They highlight the effects of global changes on portfolio flows such as interest rates, low potential growth rate, risk aver-

sion and portfolio diversification. The focus is on economic conditions in home countries that affect the availability of capital that can flow into the recipient countries, these factors are essentially exogenous. The pull factors are those local economic forces that determine the receipt of capital inflows into a country such as low inflation, trade openness, high growth potential and high interest rates (Sarno, Tsiakas, & Ulloa, 2014). It deals with the economic developments in the receiving countries that affect their demand for capital inflows.

Some authors have taken into account the push and pull factors. The authors list includes Fernandez-Arias and Montiel (1996), Fedderke (2002), Bohn and Tesar (1996) and Haque et al. (1997), who proposed the Return Creditworthiness Model, Portfolio Allocation Model (PAM), International Capital Assets Pricing Model (ICAPM), and Money Demand and Productivity (MDP) Framework, re-

spectively. The Portfolio Allocation Model states that capital flows are determined majorly by rates of return and risk factors.

It states clearly that rates of return attract positive responses, whereas an adverse responses are associated with risks. It is a dynamic optimization model where the investors seek to derive maximum satisfaction value desirable from the expected return on his portfolio of financial assets. It emphasizes three components necessary to drive equilibrium of capital flows as the initial divergence effect, the impetus effect and the time path effect. The stronger the difference between the investors' initial asset holdings and their temporal equilibrium, the more the willingness to transfer funds into the destination.

The Money Demand and Productivity (MDP) Framework links the factors that determine capital flows to any changes in the money demand function, the viability of domestic factors and then other exterior factors such as interest rates (push factors). It shows that, if the money demand function shifts upwardly and domestic capital becomes more viable, there will be increased capital inflows and vice versa. The International Capital Assets Pricing Model (ICAPM) by Bohn and Tesar (1996) expatiates on the factors that determine capital flows from the perspectives of the return chasing motive and the portfolio rebalancing effect. The assumption is that investors actually purchase the market indices of domestic and foreign equities and so changes in his expected return and the portfolio rebalancing effect show the net purchases of an asset. Therefore, the ICAPM concludes that capital flows show what is necessary to maintain the portfolio weights and the degree to which investors adjust the portfolio weights in pursuit if returns. This model extends the concept of the Capital Assets Pricing Model (which was developed by a Nobel Prize winner William Sharpe in 1964) to international investments. It is based on the assumption that investors take decisions based on the risk and return in their home currency, since they also need to be concerned with exchange rate risk alongside market risks.

The Modern Portfolio Theory states that it is possible to perform an optimization that produces a risk/return efficient frontier given the estimates of

the returns, correlations of a set of investments as well as constraint on various investment options (Fabozzi, Gupta, & Markowitz, 2002). Markowitz established that under some conditions, an investor's portfolio selection can be reduced to balancing two critical dimensions, namely the expected return of the portfolio and the risk or variance of the portfolio.

There is a myriad of studies that have considered the nature of the relationship between exchange rate volatility and foreign portfolio investment. These studies are across various countries including Nigeria and also within and outside the continent. This section reviews the studies carried out in other countries within and outside Africa and then considers those undertaken on the Nigerian economy. A detailed study on the effect of exchange rate volatility on foreign private flows in Zambia by Funyina (2015) using the Johansen Cointegration Method showed that exchange rate volatility has a negative and significant effect on foreign portfolio flows to Zambia and that there is an overall negative effect of the kwacha exchange rate volatility on private capital flows to the country, particularly by depressing its inflows.

Also, a study on the determinants of FPI in China between the 1997 and 2014 showed that Gross Domestic Product (GDP) and External Debts are major determinants of FPI. Also, exchange rate and population have a significant and direct impact on the FPI. This result was derived from the use of multiple regression models on E-views (Khan et al., 2016). A study conducted in Kenya for the period 2006–2015 also showed a strong positive relationship between the foreign capital inflows and exchange rate (Munene, 2016). Ajayi, Akinbobola, Okposin, and Ola-David (2016) in their research work on the interactive effects of exchange rate volatility and foreign capital inflows on economic growth in Nigeria, which aimed at investigating the interaction of financial development with exchange rate volatility on one hand and of financial development with capital inflows on the other hand, found that exchange rate volatility has a positive but insignificant effect on foreign investment.

David, Dikko, and Gulumbe (2016) also examined the volatility of the naira exchange rate vis-a-vis

four other currencies: dollar, pounds, euro and yen. The GARCH model and its asymmetric variants were used to investigate the volatility of naira. The results proved the assumed persistence in the exchange rate of the Nigerian currency, as such the need for proactive measures such as reduction in the number of holidays and sustainable monetary policy to cushion the effect of a volatile currency on both the nation's economy and the citizenry.

Other studies that attempt to link the two variables also exist. The research work carried out by Ekeocha et al. (2012) in an effort to ascertain the long-run determinants of FPI in Nigeria from 1986 to 2010 using the finite distributed lag model found that market capitalization and trade openness exert a positive long-run effect on FPI. The authors highlighted the significant growth in FPI flows relative to other capital flows and attributed its importance to the effective role played by the Nigerian capital market in the recent past. Based on the results of this study, it was suggested that efforts are taken to sanitize the country's capital market.

Onuorah and Akinjobi (2013) examined the impact which macroeconomic variables had on FPI in Nigeria for the years 1980–2010 in order to examine the impact of macroeconomic variables and tended to also investigate long-run and short-run macroeconomic variables influencing Foreign Portfolio using the OLS model of estimation. It was shown that foreign investment in the country are driven primary by the size of the country's interest and exchange rates. It was also shown from the results that the interest, inflation and exchange rates directly impact FPI, while GDP and money supply negatively affect the FPI in the country. In order to examine the direction of causality between FDI, FPI and exchange rate using Granger causality, it was revealed that there was no causal link between the two phenomena. Also, based on the Error Correction Model, the short-run regression estimate indicated no impact of exchange rate on capital flows in Nigeria for the period 1986–2011. However, the long-run regression estimates that exchange rate significantly influences FDI (Ifeakachukwu & Ditimi, 2014).

Omorokunwa and Ikponmwsa (2014) using theories drawn from Duning (1993) and employing the

Error Correction Model for the period between 1980 to 2011 discovered that, though, the effect of exchange rate volatility on FPI is weak in the short run but in the long run, the effect is positive and strong. In the model used, emphasis was placed on the internal determinants of foreign investments, but the results showed that external factors have a more profound effect on FPI, especially in the long run. This study was targeted towards foreign private investment as a whole and so was more focused on the FDI aspect of foreign investments. This study, therefore, is aimed at filling the aforementioned gaps in literature by econometrically analyzing the relationship between exchange rate volatility and foreign portfolio investment in Nigeria with a focus on it as a part of foreign private flows.

## 2. METHODOLOGY

This study adopted the portfolio balance framework, also known as creditworthiness model in analyzing the effect of exchange rate volatility on foreign portfolio investment. This model, as discussed previously, analyzes the effects of push (universal) and pull (country specific) factors on capital flows. The study used quarterly data time series for the years 1996–2016. The justification for the use of this period is the availability of data.

The Return Creditworthiness Model was developed in 1996 and espoused by Funinya (2013) in his study of the relationship between exchange rate volatility and foreign private investment in Zambia. It considers the influence of domestic and global factors on capital flows. The domestic causes are divided into the project level and the country level. The project level return is assumed to be dependent on net inflows into all projects, while the creditworthiness of the country is the focus at the country level and hence it is assumed to be dependent on the end of period stocks and liabilities of all types.

The model summarizes foreign investments as a function of the domestic environment of the host country, creditworthiness of that host country as well as the financial and economic opportunities that exist in the home country. Hence, for the purpose of this study, variables adopted for the mod-

el include: exchange rate, domestic interest rate, inflation exchange rate, domestic output growth, volatility in exchange rate, openness of the economy, domestic market structure. The relevance of these variables have been justified by extant studies such as: Fernandez-Arias and Montiel (1996), Mody, Taylor, and Kim (2001), and Taylor, Sarno, and Funyina (2015).

The model for the analysis is specified as follows:

$$FPI = f(exchr, exchr, gdp, mcap, inf), \quad (1)$$

where  $f$  is a functional relationship,  $exchr$  represents volatility in exchange rate,  $exchr$  represents natural log of exchange rate,  $gdp$  represents gross domestic product,  $mcap$  represents stock market capitalization,  $inf$  represents rate of inflation, and  $tor$  represents turnover ratio

Equation (1) shows that  $FPI$  is dependent on exchange rate volatility, exchange rate, gross domestic product (size of the market), stock market capitalization, inflation rate and turnover ratio. The statistical form of the model (if linearity is assumed) is thus:

$$FPI = \alpha_0 + \alpha_1 FPI_{t-1} + \alpha_2 evol + \alpha_3 xrate + \alpha_4 gdp + \alpha_5 mcap + \alpha_6 inf + u, \quad (2)$$

where  $\alpha_0$  – the intercept of the  $FPI$  equation,  $\alpha_1$  to  $\alpha_6$  – the coefficients of the variables to be estimated in the  $FPI$  equation,  $u$  – is a random variable or error term.

The a priori expectations state the likely signs of the parameters in line with economic theory or empirical evidence. Based on the various theories of capital flows, the following relationships are

expected between the independent variables and foreign portfolio investment:  $\alpha_1 < 0$ ,  $\alpha_3 < 0$ ,  $\alpha_4 > 0$ ,  $\alpha_5 > 0$ ,  $\alpha_6 < 0$ .

The empirical analysis is conducted using quarterly data. The span covered is Q1 1996 till Q4 2016. Table 1 outlines the variables used in the model.

### 3. RESULT PRESENTATION AND DISCUSSION

#### 3.1. Test for multicollinearity

A test for the presence of multicollinearity was carried out using the pair-wise correlation matrix. The presence of multicollinearity among the explanatory variables suggests to an extent that they explain each other and this can produce poor regression results. The presence of strong correlation violates the classical assumption of ordinary least square regression. An overall consideration of the correlation coefficients suggests that multicollinearity is not seen as a problem in the model to be estimated (see Appendix A, Table A1).

This study examines the time-series data from the period of 1996Q1 to 2016Q4. The EViews 9.0 statistical software was used for the estimation. The study estimates the exchange rate volatility using Garch (1,1) approach and the Vector Autoregressive Model is employed to estimate the effect of exchange rate volatility on foreign portfolio investment thereby making all variables endogenous to observe how they all interact with one another. The impulse response functions (IRFs) and variance decomposition functions show the reaction of foreign portfolio investment to shocks from the independent variables.

**Table 1.** Data sources and measurement

Source: Authors' compilation.

Variable	Label	Source	Measurement
Exchange rate	EXCHR	World Development Indicators (WDI)	Naira per US dollars
Exchange rate volatility	EXCHR	Calculated using the Garch (1, 1) to generate the volatility series	Standard deviation estimation of exchange rate volatility
Gross domestic product	GDP	WDI	Constant US dollars
Market capitalization	MCAP	WDI	Nigerian stock exchange market capitalization in US dollars
Inflation rate	INF	WDI	Consumer price index
Foreign portfolio investment	FPI	WDI	Inflows in US dollars

### 3.2. Estimation of the vector autoregressive analysis

The study begins the VAR estimation by ascertaining the optimal model lag length. The optimal lag selection is essential as too few lags purge the model off its white-noise process and too many lags reduce the power of the test to detect a unit root process. In this model, an optimal model lag length 2 was attained (see Appendix A, Table A2).

From Table A2 of the Appendix, VAR lag order selection shows that lag 2 is the optimum lag required for model specified. This lag specification selected was used to check for the stability of the Vector Autoregressive Condition.

The study proceeds by affirming the stability condition of the VAR. The necessary and sufficient condition is that all roots lie within the circle of one. Table A3 in Appendix A shows that VAR is stable, and the model is stationary as no root lies outside the unit circle. The VAR model is proved to be stationary when all inverse roots are smaller than one and, therefore, the influence of the shock for some variables may not decrease over time. The evidence from Table A3 shows that the VAR satisfies the stability condition of lag specification as all modulus are less than 1 per cent hence confirming that no root lies outside the circle. In addition, further testing shows the model is void of heteroscedasticity and autocorrelation, hence the parameters estimated are suitable for drawing inferences.

Having established the stability of the model, the study proceeds to estimate the vector autoregression estimates (see Appendix A, Table A4). The result shows that all explanatory variables were significant at the 5% level. Foreign portfolio investment responds positively to changes in the one lag value of FDI, exchange rate and market capitalization, while exchange rate volatility, GDP and inflation exert an inverse effect on FPI. This suggests that FPI investment in the current period is significantly related to the immediate past period of FPI. The foreign portfolio investment responds negatively to exchange rate volatility, but the relation was positive for exchange rate. This implies that exchange rate fluctuations discourage foreign investment. The result

suggests that a unit change in the amplitude of fluctuations in exchange rate reduces FPI by 0.4 units. This explains the rationale for the weak inflow of private investment into the Nigerian capital market when compared to other emerging market economies. The unpredictable episodes of exchange rate trend experienced in the past decades would have dwindled the interest of foreign investors. This reality is based on the premise that incessant and unpredictable movement of exchange rate results in loss of capital gain. In the same manner, inflation and GDP exert a negative influence on FPI. The inverse relationship between FPI and GDP would not be unconnected to the fact that majority of the activities that drive the GDP growth are unconnected to publicly traded companies. For instance, a number of firms and multinationals in the energy and service industry are not listed on the stock market. Since the GDP growth might not be associated with the stock market dynamics, FPI could be unresponsive to changes in GDP.

Also, inflationary pressure beyond a tolerable threshold could pose a critical impediment to the inflow of FPI. Inflation erodes the value of money, hence, eroding the value of investment, especially when it gallops beyond the effective return rate on investment. Finally, market capitalization exerts a positive influence on FPI; a unit increase in market capitalization raises FPI by 2.4 units. This suggests that a well-capitalized market enhances the inflow of FPI; as it reflects the viability of the publicly traded companies and the potentials for capital gains in the market.

From these results, there are evidences that these results correlate with some previous studies. Michael and Thankgod (2014) also found that there is a positive correlation between FPI and market capitalization. Onuorah and Akinjobi (2013) found that exchange rates directly impact FPI, while GDP negatively affects the FPI in the country.

### 3.3. Impulse response analysis

This analysis explains the response of the dynamic system to external changes such as shocks. It describes the reaction of the endogenous variables to shock overtime. Figure 1 shows the accumulated

response of FPI to one standard deviation shock to each of the variables.

Figure 1 shows that starting from the 2nd to the 10th horizon, FPI was more responsive to shocks emanating from exchange rate and market capitalization. This implies that the willingness of portfolio investment by foreigners is determined by exchange rate and performance of the stock market. An unstable exchange rate discourages portfolio investment due to the fact that capital gain could be wiped off by falling exchange rate. In the same manner, the extent of capitalization reveals how developed and resilient the market is. A highly capitalized market shows the extent of economic productiveness and viability, which instil confidence in investors on the possibility of capital gains and stability of the publicly traded companies.

### 3.4. Variance decomposition analysis

The variance decomposition analysis shows the relative contributions of shocks in the independent variables to foreign portfolio investment (FPI). Table A5 (Appendix) shows the compiled variance decomposition analysis for the variables in the study. The variance decomposition of foreign portfolio investment has shown that in the first period, none of the independent variables could explain changes in foreign portfolio investment. The forecast error shocks to market capitalization (MCAP) and exchange rate are responsible for the variation in foreign portfolio investment, while other variable had only small changes in the same with turnover ratio having the smallest change. As seen in all through the horizons, forecast error shock to MCAP had the highest significant contribution to changes in FPI compared to all the other variables.

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## CONCLUSION AND POLICY RECOMMENDATION

The study examines the link between the exchange rate volatility and foreign portfolio in Nigeria using data that covers period of 1996Q1 to 2016Q4. The theoretical framework used is the return and credit-worthiness model, which is based on the push and pull factors theory. To achieve the objective, the study adopted the vector autoregressive model in ascertaining the dynamics between exchange rate volatility and foreign portfolio investment in Nigeria. Also, the study analyzed the impact of exchange rate innovations (shocks) on foreign portfolio investment and equally assessed how induced variations in foreign portfolio investment were decomposed among the variables in the model.

A review of existing literature revealed some gaps which indicate that the empirical focus has been unduly on the real component of foreign private investment, that is FDI, and FPI was neglected, which has now become a significant component of foreign capital flows. In view of the above, this present re-examination focuses on the nexus between exchange rate volatility and foreign portfolio investment using quarterly time series data. The explanatory variables used in this study are exchange rate, exchange rate volatility, market capitalization, GDP, inflation and turnover ratio.

It was also found that exchange rate volatility and market capitalization significantly and largely explain the variations in foreign portfolio investment. The impulse response analysis shows that foreign portfolio investment was more responsive to standard deviation shocks in market capitalization and exchange rate, implying that these variables were more responsible for the dynamism in FPI. As the horizons expand, shocks to market capitalization and exchange rate increase foreign portfolio investment, whereas shocks to GDP and inflation have led to a decline in foreign portfolio investment. In the same manner, in decomposing the induced variation in foreign portfolio investment, forecast error shocks in market capitalization, exchange rate and GDP explain more of the variation in foreign portfolio investment.

Based on the results obtained, some policy measures are recommended. Firstly, it is important that sound foreign exchange management policies are established to curb exchange rate volatility, since it can have a slight effect on foreign investment in the country. Another result recorded was that exchange rate volatility

has effects on the inflation level in the economy and this can potentially diminish the standard of living of individuals in the economy while also hindering growth.

Secondly, since the market capitalization and GDP of the host country explain changes in FPI, there is a need for sustained growth of the country's capital market and economic output (GDP). Foreign investors will then be attracted to invest when they are certain that the host country provides the desired market for their funds to grow. This can be achieved if government will put in place a conducive environment for economic activities to thrive in order to increase the GDP. This will create jobs for individuals and provide the necessary economic empowerment that can serve as a strong foundation for expanding FPI inflows in Nigeria.

Thirdly, continuous efforts should be made by the government to guide the inflation rate in the country, since it has effects on foreign portfolio investment in the country. Overall, this study, therefore, suggests that proper policies should be articulated to encourage foreign portfolio flows into the country.

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## APPENDIX A

**Table A1.** Correlation matrix

Source: Compiled using EViews 9.0.

Var	FPI	EXCHR	EXCHR	GDP	INF	MCAP	TOR
FPI	1.000000	–	–	–	–	–	–
EXCHR	0.152865	1.000000	–	–	–	–	–
EXCHR	–0.299128	0.390603	1.000000	–	–	–	–
GDP	–0.582954	0.027747	0.696829	1.000000	–	–	–
INF	0.102256	–0.110463	–0.133340	–0.218497	1.000000	–	–
MCAP	–0.471486	–0.214595	0.446321	0.760095	–0.345149	1.000000	–
TOR	0.155919	–0.165176	0.164894	0.150662	–0.226202	0.513700	1.000000

**Table A2.** Vector auto-regression lag order selection

Source: Compiled using EViews 9.0.

Lag	Log L	LR	FPE	AIC	SC	HQ
0	–7386.811	NA	4.92e+69	180.3368	180.5423	180.4193
1	–6557.794	1496.273	2.70e+61	161.3121	162.9557	161.9719
2	–6410.654	240.4493*	2.53e+60*	158.9184*	162.0002*	160.1557*

Note: \* significance at the 5% level.

**Table A3.** Vector auto-regression stability test

Source: Compiled using EViews 9.0.

Root	Modulus
0.995936	0.995936
0.983008 – 0.125610i	0.991001
0.983008 + 0.125610i	0.991001
0.850158 – 0.190100i	0.871153
0.850158 + 0.190100i	0.871153
0.758580 – 0.301325i	0.816235
0.758580 + 0.301325i	0.816235
0.611880 – 0.389969i	0.725584
0.611880 + 0.389969i	0.725584
0.543647 – 0.326627i	0.634222
0.543647 + 0.326627i	0.634222
0.286599 – 0.426223i	0.513619
0.286599 + 0.426223i	0.513619
0.411769	0.411769

**Table A4.** VAR estimates

Source: Compiled using EViews 9.0.

$$FPI = 6.90 + 0.406FPI_{t-1} - 4.467Exr_v + 1.210exr - 1.190GDP + 2.420mca - 2.380infl$$

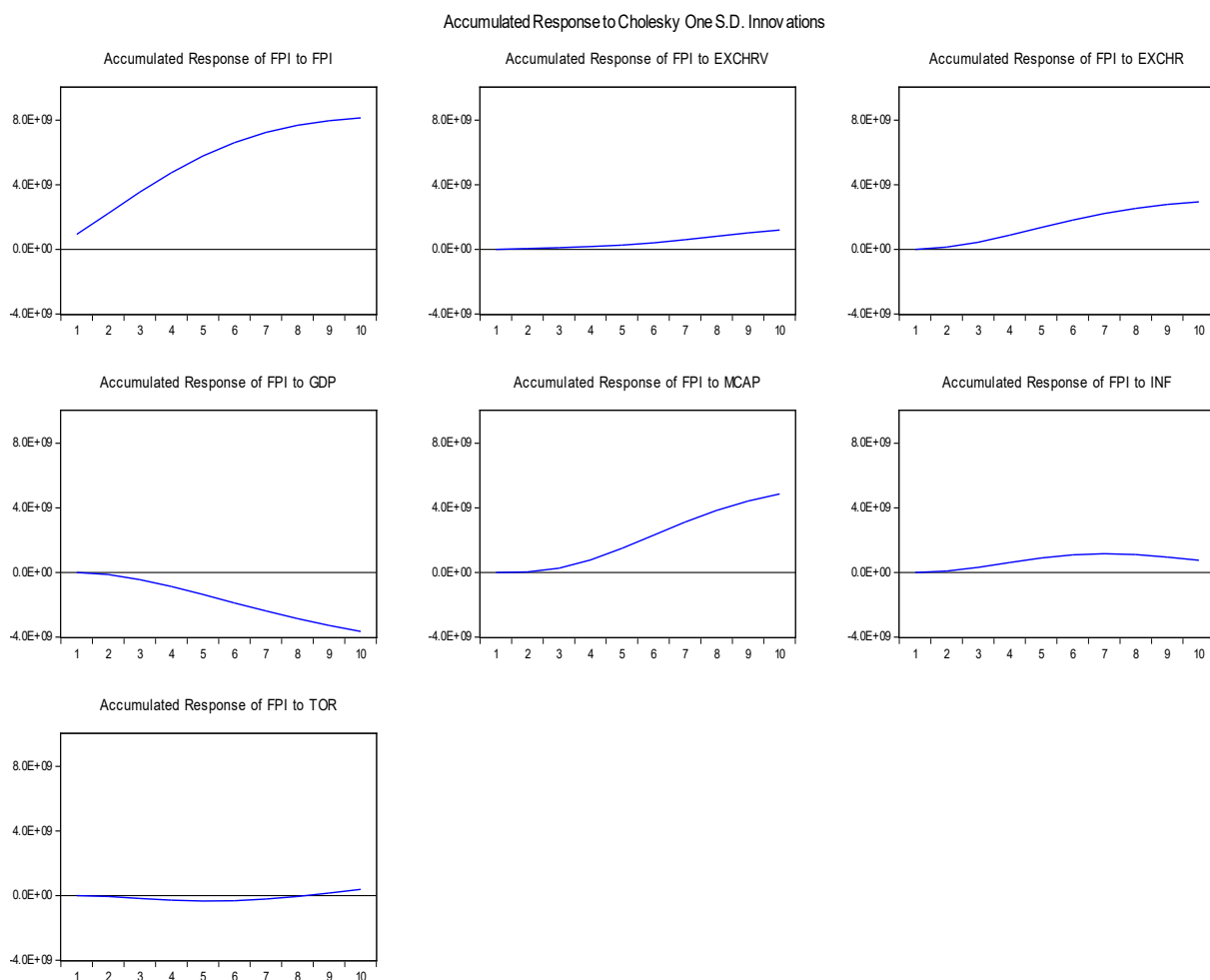
$$[1.92] \quad [2.43] \quad [1.98] \quad [3.02] \quad [3.80] \quad [1.84] \quad [1.93]$$

**Table A5.** Variance decomposition

Source: Compiled using EViews 9.0.

Period	S.E.	FPI	EXCHR	EXCHR	GDP	INF	MCAP	TOR
1	9.35E+08	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.61E+09	98.05639	0.070855	0.640984	0.734977	0.293414	0.036053	0.167324
3	2.15E+09	92.31917	0.107378	2.414207	2.371533	1.090792	1.336880	0.360036
4	2.61E+09	83.97263	0.130708	4.405576	4.289404	1.832648	4.960815	0.408217
5	2.99E+09	75.63681	0.196673	5.898886	6.034523	2.076138	9.811019	0.345946
6	3.30E+09	68.75566	0.355743	6.813115	7.481355	1.922225	14.38371	0.288195
7	3.52E+09	63.53930	0.613779	7.297510	8.645855	1.692066	17.88303	0.328458
8	3.67E+09	59.75809	0.910509	7.491993	9.567314	1.614669	20.15256	0.504864
9	3.78E+09	57.12297	1.162754	7.502012	10.28614	1.750928	21.38141	0.793789
10	3.84E+09	55.36294	1.320242	7.414887	10.84286	2.045827	21.88704	1.126207

Source: Compiled using EViews 9.0.



**Figure A1.** Accumulated response of FPI