

**GLOBAL FINANCIAL SHOCKS AND ASSET PRICES IN NIGERIA: THE ROLE OF
MACROECONOMIC FUNDAMENTALS**

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ABSTRACT

This study investigates the effects of global financial shocks on asset prices in Nigeria and the role of economic fundamentals in the transmission of those shocks. Using monthly data, we estimate a structural VAR model and a cross-section regression equation for the study. Our findings indicate that global financial shocks significantly influence asset prices in Nigeria. The global financial shocks have the most significant impact on equity prices than any other asset prices. Moreover, the global risk aversion is the most important global financial variable influencing asset prices in Nigeria and affects equity prices more than any other asset prices. The U.S monetary policy shocks and global interest rate shocks influence the short-term interest rates. However, the global financial shocks have limited impact on exchange rate movements. Lastly, macroeconomic fundamentals exacerbate the severity of global financial shocks on asset prices.

JEL classification: C32, G15, G32

Keyword: Structural VAR; Global risk aversion; US monetary policy; global interest rate; Macroeconomic fundamentals.

1. INTRODUCTION

The 2008 global financial crises have shown that the financial shock emanating from the developed economies can influence global investors' risk appetite and hence affect asset markets in emerging market economies (EMEs). For example, Ananchotikul and Zhang (2014) find that change in global risk aversion occasioned by portfolio flows during the global crisis affects volatility of assets in emerging markets. In particular, the U.S. unconventional monetary policy and the subsequent tapering have been found to influence capital flows, equity prices, sovereign bond yields and exchange rate in EMEs (see Ahmed, 2017). A strand of literature, however, has shown that the severity of the effects of global financial shocks on asset prices in EMEs depends on macroeconomic fundamentals. For instance, Chen et al. (2014) find that countries with stronger economic fundamentals such as higher GDP growth, stronger external current account, lower inflation and lower public debt experience less deterioration in asset prices following the US unconventional monetary policy. In contrast, Eichengreen and Gupta (2015) show that macroeconomic fundamentals play limited role in insulating EMEs from the impact of US tapering policy.

This study investigates the impact of global financial conditions on asset prices in Nigeria and the role played by macroeconomic fundamentals in the propagation of financial shocks. Due to

the country increasing financial integration with the rest of the world, Nigeria appears to be more vulnerable to external financial shocks. Studies have shown that countries with deeper financial markets are more vulnerable to global financial shocks. For example, Rejeb and Boughara (2015) find that financial liberalization amplifies the transmission of volatility and risk of contagion from the developed economies to the emerging markets. Similarly, Ahmed et al. (2017) show that emerging economies with higher financial integration deteriorate more during the global financial crisis. Moreover, global financial shocks can be transmitted to EMEs through the trade channel. Allen and Giovannetti (2011) show that the global financial crisis affects African economies through the trade channel.

The gap that this study seeks to fill is to evaluate the impacts of global financial shocks on asset markets in Nigeria and the role played by economic fundamentals. Our study is related to the growing literature on the effects of global financial shocks and U.S. unconventional monetary policy on asset prices in the EMEs (see Aizenman et al., 2016, Anaya et al., 2017; Sithole et al., 2017). Existing studies focusing on external shocks in Nigeria have largely examined the effects of oil price shocks on either the growth of the economy, the exchange rate or the stock markets. For example, Olomola and Adejumo (2006), Iwayemi and Fowowe (2011) and Oyelami and Olomola (2016) have examined the impact of oil price shocks on the Nigerian economy. Adeniyi et al. (2012) investigate the effects of oil price shocks on exchange rate. Babatunde et al. (2012) and Effiong (2014) examine the impact of oil price shocks on stock market in Nigeria. Our paper differs from the above studies by examining the impacts of global financial shocks on a broad range of asset prices which include equity prices, exchange rate and short-term interest rate in Nigeria.

The study is significant in many aspects. Given the increasing financial integration and financial openness in Nigeria, it is important for policy makers to identify how exogenous financial shocks in the advanced economies can influence asset markets in Nigeria. For example, Ananchotikul and Zhang (2014) and Yildirim (2016) show that global financial risk shocks affect movements in asset prices in EMEs. The study will also assist the policy-makers to identify the most important global financial shocks affecting asset prices in Nigeria. Studies have shown that change in investors' risk appetite is the most important factor affecting asset price movements in EMEs (see Ananchotikul and Zhang, 2014). Moreover, it will assist policy makers to formulate policies that will strengthen macroeconomic fundamentals, policy credibility and financial markets so as to mitigate the vulnerabilities of Nigerian economy to global financial shocks

Our study contributes to the existing literature on the spillover effects of global financial shocks and the U.S. unconventional monetary policy in EMEs and developing countries. First, we investigate the impact of global financial shocks on asset prices in Nigeria using monthly data. Second, we consider the impact of global financial shocks on a broader range of asset prices in Nigeria using structural VAR. To investigate the role of macroeconomic fundamentals in the transmission of global financial shocks, we estimate a cross-section regression equation.

Stylised facts

The 2008 global financial crisis affected the capital market, the banking sector, foreign exchange

market, balance of payments and the real sector of the Nigerian economy. More importantly, the Nigerian capital market recorded heavy losses during the global financial meltdown. For example, the market capitalisation declined from N13.3 trillion in 2007 to N9.5 trillion in 2008 and further to N7 trillion in 2009. This implies that the Nigerian stock exchange recorded a loss of 90% between 2007 to 2009 (CBN, 2009). The all share index fell from 66,371 points in March 2008 to 21,893 points in March 2009 corresponding to 67% loss (see Ajakaiye and Fakiyesi, 2009).

The crisis was transmitted to the Nigerian economy through a number of channels. First, through the trade channel where the fall in global output led to a decline in demand for Nigerian oil exports. Allen and Giovannetti (2011) find that financial crises were transmitted to Sub-Saharan Africa through the trade channel characterised by decline in demand for exports. The decrease in demand for oil led to a precipitous plunge in oil revenue and deterioration in government budget balances. For example, oil revenue fell from N6.53 trillion in 2008 to N3.19 trillion in 2009 representing 105% decline. Since Nigerian fiscal operations depend on oil revenue, this led to a rise in budget deficit. The budget deficit as a proportion of GDP deteriorated from -0.2% in 2008 to -3.3% in 2009 (CBN, 2009). Second, the global financial crisis impacted Nigerian economy through the reduction in foreign direct investment (FDI) and portfolio investment. This is in line with the findings by Ananchoticul and Zhang (2014). The decrease in oil price, FDI and portfolio investments aggravated the pressure on the foreign exchange market and hence the exchange rate for the Naira depreciated from N117/US\$ in 2007 to N181/US\$ in 2008 corresponding to 54.7% decline in the value of the domestic currency.

Table 1 presents mean statistics on asset prices and macroeconomic fundamentals for the periods 2000 - 2016. From the table, it can be observed that the Naira/US dollar exchange rate has increased over the periods. The exchange rate depreciated from N111.17/1\$ in period 2000-2002 to 131.13/1\$ in the period 2003 to 2005. The average exchange rate of the Naira depreciated more than 100% between 2000-2016 moving from N111.11/1\$ in 2000 - 2002 to 222.97/1\$ for 2015-2016. The depreciation in the value of the Naira can be attributed to decline in oil prices and fall in foreign direct investment and foreign portfolio (see Adeniyi et al., 2012; Ifeakachukwu and Ditimi, 2014). Moreover, the all share index representing capital market performance has been increasing over the years reaching its peak between 2006 to 2008. The decline afterwards may be attributed to the global financial crisis. Furthermore, the average short term interest rate declined from 17.34 for years 2000 to 2002 to 5.98% for the years 2009 to 2011 and later rose to 9.75% for the years 2015 to 2016.

Furthermore, the table shows the average values of key macroeconomic fundamentals. For the period 2000 to 2016, the budget balance as a percentage of GDP was in deficit. The deficit to GDP was at its peak in 2000 to 2002 representing -2.93% of the GDP. It declined to -0.55% for the year 2006 to 2008 but later rose to -1.67% for the year 2015 to 2016. The decline in the deficit to -0.55% for the year 2006 to 2008 coincided with the oil boom era. This indicates that oil prices influence fiscal outcome in Nigeria. This is in line with the findings by El Anshasy and Bradley (2012) for oil exporting countries. The reserve as a percentage of GDP has been falling since the years 2006 to 2008. It declined from 1.3% as a percentage of the GDP for the year 2006

to 2008 to 0.94% for the year 2016 to 2017. The current account as a percentage of GDP rose from 6.03% for the year 2000-2002 to 21.09% for the 2006-2008. But this deteriorated to -1.34 for the year 2015-2016. Growth declined from 11.44% in year 200-2002 to 5.91% in the year 2006 -2008 and fell further to 0.60% for the year 2015-2016. Lastly, the inflation rate has been around two-digit figure. The inflation rate declined from 14.75 in 2000-2002 to 11.38% in 2009-2011 and further rose to 11.56% in 2015-2016.

Table1: Asset prices and key macroeconomic fundamentals

Year	Exch Rate (N/\$)	All share Index (N'm)	Inte rate	Def/ GDP	Res/ GDP	CA/ GDP	GDP Growth	Inflat.
2000-2002	111.17	9731.8	17.34	-2.93	1.21	6.03	11.44	14.75
2003-2005	131.13	21171.91	12.52	-1.90	1.22	14.84	8.44	14.47
2006-2008	124.34	42919.57	8.35	-0.55	1.30	21.09	5.91	8.05
2009-2011	151.02	23290.18	5.78	-2.17	1.06	6.37	5.43	11.38
2012-2014	157.79	33421.26	11.66	-1.34	0.95	2.08	5.15	9.14
2015-2016	222.97	29396.96	9.75	-1.67	0.94	-1.34	0.60	11.56

2. LITERATURE REVIEW

Various studies have examined the impact of external shocks on economic fluctuations in emerging market economies and the developing countries. For instance, Kose and Riezman (2001) evaluate the influence of trade shocks on macroeconomic fluctuations in African countries. They find that external shocks account for significant output fluctuations in African countries. Sousa (2008) finds that external shocks explain significant variation of macroeconomic fluctuations in Mexico. Similarly, Sousa and Cashin (2009) conclude that external shocks play important role in output fluctuations in the Caribbean. Rasaki and Malikane (2015) find that external shocks account for larger macroeconomic fluctuations in African economies.

In contrast, other studies have concluded that external shocks play limited role in EMEs macroeconomic fluctuations. For example, Hoffmaister and Roldos (2001) show that external shocks only account for negligible role in output fluctuations for developing countries. Ahmed (2003) finds that external shocks play limited role in driving output fluctuations in Latin American countries. Dibooğlu and Aleisa (2004) find that terms of trade shocks explain limited fluctuations in output for Saudi Arabia. Moreso, Raddatz (2007) shows that external shocks only explain a small portion of output variation in low income countries.

Moreover, a number of studies have focussed on the impact of developed economies monetary

policies on the economic conditions in emerging market economies (EMEs) and developing countries. For instance, Canova (2005) finds that the U.S. monetary policy shocks significantly influence the Latin American economies through the interest rate channel. Similarly, Mackowiak (2007) shows that the U.S. monetary policy shocks exert strong impact on price and output variations in EMEs. Bi and Anwar (2017) conclude that the U.S. monetary policy shocks influence output variation in China.

The 2008 global financial crisis has led to the upsurge in literature examining the impacts of the global financial crisis and the subsequent unconventional monetary policies by the advanced economies on asset markets in EMEs and developing economies. For example, Anachotikul and Zhang (2014) show that portfolio flows and global risk aversion have strong influence on the volatility of asset prices in EMEs. Bowman et al. (2015) find that the U.S. unconventional monetary policy shocks significantly affect sovereign bond yields in EMEs but have insignificant effects on stock prices and exchange rate. Aizenman et al. (2016) find that monetary policy shocks in the centre countries influence policy rate and real exchange rate in the periphery countries. Anaya et al. (2017) find that the U.S. unconventional monetary policy affect real and financial conditions in the EMEs leading to real exchange rate appreciation, increase in equity returns, real output growth and a decrease in the lending rate

Relatively, few studies have also investigated the impact of global financial shocks on African economies. For example, Allen and Giovannetti (2011) find that financial shocks affect Sub-Saharan Africa through the trade channel. They also find that the global crisis affected the capacity of African countries to finance world trade. This is in contrast to Ncube et al. (2015) who find evidence of weak trade channel in South Africa. Ncube et al. (2015) find that the US monetary policy stimulus influence the exchange rate, monetary aggregates and real interest rate in South Africa via the financial channel. Giovannetti and Velucchi (2013) show that global financial shocks have strong influence in Sub-Saharan African countries. Furthermore, Sithole et al. (2017) examine the role of financial conditions in transmitting external shocks to South Africa. The results indicate that external financial condition shocks have a significant but short-lived impact on South African GDP growth.

A number of studies has investigated the role of macroeconomic fundamentals in the amplification or mitigation of the global financial shocks to the EMEs. For example, Chen et al. (2015) find that stronger economic fundamentals reduce the impact of U.S. unconventional monetary policy in emerging markets. Similarly, Mishra et al. (2014) find that greater financial depth and tighter macro-prudential policies minimize the effects of the US policy tapering in emerging markets. Moreover, Ahmed et al. (2017) find that countries with more robust economic fundamentals experienced less deterioration during the global financial crisis while countries that had earlier recorded much capital inflows deteriorated more. Eichengreen and Gupta (2015), however, find that macroeconomic fundamentals play limited role in insulating EMEs from the effects of U.S. Fed tapering.

3. DATA AND EMPIRICAL METHOD

3.1 Data

We use monthly data for the study. Data for the study were sourced from the IFS, FRED database, Bloomberg, and the Central Bank of Nigeria database. The data cover the period 2008:M1 to 2017:M07. We collect data on ten variables. The variables are global risk aversion proxied by the volatility index (VIX), the U.S monetary policy, global interest rate, equity prices, exchange rate, short-term rate, current account balances, foreign reserves, CPI and GDP growth. The volatility index (VIX) is from Chicago Board Options Exchange (CBOE) and was sourced from Bloomberg. Similar to Yildirim (2016), we proxy the U.S. monetary policy by the Fed funds rate. We proxy the global interest rate with London interbank offered rate (LIBOR). The exchange rates, current account balances, external reserves and CPI are from IMF's International Financial Statistics (IFS). The fed funds rate is from the FRED database.

3.2 Empirical methodology

To examine the impact of global financial conditions on asset prices in Nigeria, we employ the structural vector autoregression (SVAR) model with block exogeneity. This model has become standard in the study of the impact of external shocks on emerging and developing economies (see Mackowiak, 2007; Sousa, 2014; Yildirim, 2016). The model allows the division of the dynamic systems into domestic and external blocks and thus excluding the lag coefficient of domestic variables from external block equations. The block exogeneity assumptions also imply that the Nigeria financial markets do not influence the external variables either with lags or contemporaneously (see Mackowiak, 2007) This implies that Nigeria has a small financial market. This is line with the various studies on the depth of financial markets in Africa (IMF, 2016). Also, the block exogeneity assumption removes the impacts of spurious financial effects, thus we are able to quantitatively assess the impact of global financial shocks on equity prices, exchange rate, and short term interest rates for the country. Moreover, the assumption decreases the number of estimated parameters and improves the efficiency of the estimation (see Yildirim, 2017).

3.3 The SVAR model

In line with the previous related studies (see Mackowiak, 2007; Yildirim, 2016), we consider the following SVAR model with block exogeneity:

$$\sum_{p=0}^n \begin{bmatrix} C_{11}(s) & C_{12}(s) \\ C_{21}(s) & C_{22}(s) \end{bmatrix} \begin{bmatrix} y_t^a \\ y_t^f \end{bmatrix} = \begin{bmatrix} \varepsilon_t^a \\ \varepsilon_t^f \end{bmatrix}$$

Where C_{ij} represents a coefficient matrix, $y_t = [y_t^a, y_t^f]^t$ is a vector of variables. $\varepsilon_t = [\varepsilon_t^a, \varepsilon_t^f]^t$ denotes a vector of structural disturbances that satisfies $E[\varepsilon_t | y_{t-s}, s > 0] = 0$ and $E[\varepsilon_t \varepsilon_t^a | y_{t-s}, s > 0] = I$. The vector of structural shocks of the domestic origin is represented by ε_t^a while that of global or external origin is represented by ε_t^f . y_t^a is a vector of financial variables in Nigeria and y_t^f is the vector global financial variables exogenous to Nigeria. Our vector of domestic financial variables include equity prices, exchange rate, and the short-term interest rate. The vector of global financial condition variables include the global risk aversion proxied by the volatility index (VIX), the US monetary policy proxied by the Fed funds rate and

the global interest rate proxied by LIBOR.

4. ESTIMATION RESULTS

4.1 Forecast error decomposition

Table 2 presents the variance decomposition of asset prices in Nigeria to global financial conditions. The results show that global financial conditions influence asset prices in Nigeria. Global financial conditions account for more than 60% variation in asset prices in Nigeria. Disaggregating the global financial shocks indicates that change in global risk aversion has the strongest impact on equity prices. This indicates the increasing participation of foreign investors and the effects of portfolio withdrawal on the Nigerian capital markets. However, the global interest rate has the minimal influence on equity prices in Nigeria. Furthermore, the results suggest that global financial shocks have limited impact on the exchange rate in Nigeria. This may be attributed to the fact that exchange rate in oil exporting countries depend on oil price shocks. For example, Adeniyi et al. (2012) and Ogundipe et al. (2014) show that exchange rate volatility depends on oil price shocks in Nigeria. Moreover, the estimates suggest that global financial shocks explain more than 50% variation in short-term interest rate. In particular, change in US monetary policy significantly affects short-term rate in Nigeria.

Table1: Variance decomposition of asset prices

Variables	Hor.	Global risk aversion	US monetary policy	Global interest rate
Equity price	5	8.31	6.46	0.40
	10	14.56	9.26	1.35
	20	15.41	8.74	1.52
Exchange rate	5	0.25	5.01	0.07
	10	0.24	7.18	0.10
	20	0.17	6.89	0.09
Short-term interest rate	5	0.62	9.15	0.15
	10	2.67	17.72	0.67
	20	3.81	19.85	1.03

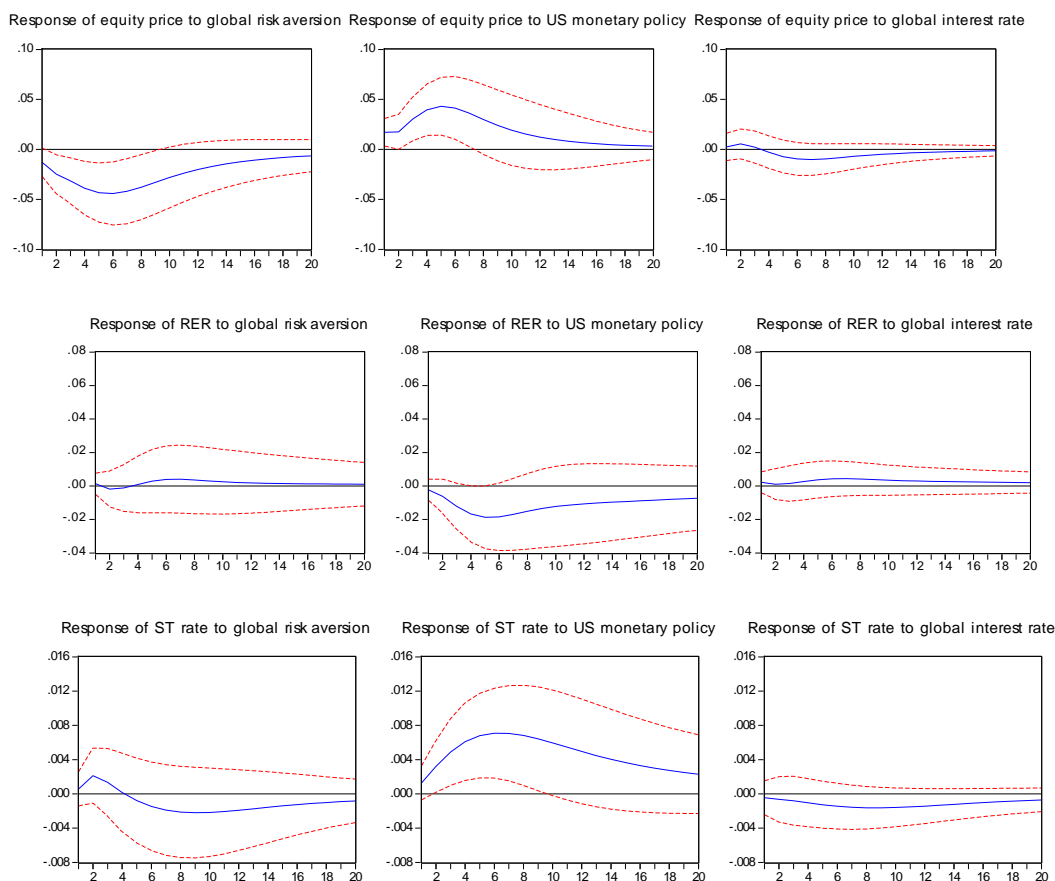
4.2 Impulse response functions

Figure 1 illustrates the responses of asset prices to change in global financial conditions. Positive shocks to global risk aversion leads to decline in equity prices. This implies that a rise in global risk aversion leads to an increase in portfolio outflow and hence a fall in equity prices. This is in line with the findings by Ahmed et al. (2017). Moreover, positive shocks to the US monetary policy result in a rise in equity price. This suggests that an expansionary monetary policy by the Fed will lead to increase in capital inflow and a rise in equity prices in Nigeria. This reinforces the results by Anaya et al. (2017). Also, the results indicate that a rise in global interest rate leads

to a rise in short-term interest rate on the spot but it later declines.

The figure also displays the responses of exchange rate to change in global financial conditions. Generally, global financial conditions have limited impact on exchange rate movements in Nigeria. Change in global risk aversion and change in global interest rate have muted impacts on the exchange rate. This is similar to the findings by Bowman et al. (2015). Only the US expansionary monetary policy leads to a fall in exchange rate (appreciation). This implies that positive to US monetary policy shocks leads to inflow of capital to developing countries thereby resulting in exchange rate appreciation. This is line with the conclusion by Anaya et al. (2017). Lastly, the figure shows the impact of global financial conditions on short-term interest rate in Nigeria. A positive shock to global risk aversion initially leads to a rise in short-term interest rate but it later declines. However, a rise in US monetary policy leads to an increase in the short-term interest rate in Nigeria.

Figure 1: Impulse response functions of the impact of global financial shocks on asset prices



4.3 Regression analysis

To evaluate the role of economic fundamentals in the transmission of global financial shocks to the Nigerian economy, we estimate a cross-section regression equation. This allows us to quantify the variables that can amplify or mitigate the effects of global financial shocks. Similar to Yildirim (2016). The cross-section regression equation is written as:

$$\Delta Y_{i,t,m}^{NA} = \vartheta_1 + (\gamma_1 + \gamma_2 * X_{i,t,m-1}) * \Delta Y_{VIX,t,m}^{for} + (\alpha_1 + \alpha_2 * X_{i,t,m-1}) * \Delta Y_{fdr}^{for} + (\theta_1 + \theta_2 * X_{i,t,m-1}) * \Delta Y_{gr}^{for} + \mu_t$$

Where $\Delta Y_{i,t,m}^{NA}$ is the monthly change in either equity prices, exchange rate or short-term interest rate in Nigeria. $X_{i,t,m-1}$ includes macroeconomic fundamentals such as reserve/GDP ratio, current account/GDP, budget deficit/GDP, and financial depth. $\Delta Y_{VIX,t,m}^{for}$ indicates the monthly change in global risk aversion; ΔY_{fdr}^{for} is change in US monetary policy; and ΔY_{gr}^{for} is the global interest rate.

Table 3 presents the results for the role of macroeconomic fundamentals in the transmission of global financial shocks to asset markets in Nigeria. The estimates suggest that macroeconomic variables are important determinants of the impacts of global financial conditions on asset prices in Nigeria. We find that external balances such as foreign reserves as a proportion of GDP and current account as a percentage of GDP determine the responses of asset prices to global risk aversion. This implies that lower external reserves and higher current account deficit amplify the effects of global risk aversion on equity prices in Nigeria. This is in line with the findings by Yildirim (2016).

Furthermore, the results indicate that the impact of US monetary policy shocks and foreign interest rate shocks on the exchange rate depend on the GDP growth rate, external reserves, current account and inflation. However, the estimates show that macroeconomic fundamentals have no influence on the effects of global risk aversion on the exchange rate. Moreover, the results suggest that current account, GDP growth and inflation significantly determine the impact of global financial conditions on asset prices in Nigeria.

Generally, the results show that macroeconomic fundamentals can either mitigate or amplify the effects of global financial conditions on equity prices, exchange rate and short-term interest rates. More importantly, asset price movements in Nigeria seem to be more sensitive to external balances- current account and external reserves- and the GDP growth. This is similar to the findings by Chen et al. (2014) and Ahmed et al.(2017) on the impact of global financial conditions on asset prices in emerging economies.

Table 3: Regression results for asset prices and macroeconomic fundamentals

	Equity price			Exchange rate			Short-term interest rate		
	VIX	USMP	For. interest	VIX	USMP	For. interest	VIX	USMP	For. interest
Economic Fundam.									
Res/GDP	0.01 (0.87)	0.58* (0.00)	8.26* (0.01)	-0.02 (0.29)	-0.11* (0.00)	-0.68 (0.63)	0.01 (0.64)	2.59* (0.00)	-0.15 (0.73)
CA/GDP	-0.04* (0.00)	0.51 (0.65)	-3.67* (0.00)	0.01 (0.65)	-0.27 (0.62)	1.20* (0.04)	0.01* (0.01)	-0.18 (0.27)	-0.54* (0.00)
Growth	0.01 (0.87)	0.17 (0.23)	-0.18* (0.00)	0.03 (0.17)	1.83* (0.01)	0.14* (0.00)	-0.01 (0.72)	-0.11* (0.00)	-1.98* (0.03)
Inflation	-1.22 (0.42)	-1.45* (0.00)	2.07 (0.16)	-0.33 (0.6)	3.49* (0.00)	-6.4 (3.5)	-0.67* (0.00)	-0.21 (0.58)	0.64* (0.00)

5. CONCLUSION

Recent studies have shown the spill-over effects of global financial conditions on asset markets in emerging economies. However, there has been no empirical studies focusing on Nigeria. This paper fills this gap by investigating the influence of global financial conditions on asset prices in Nigeria.

The findings reveal that global financial shocks have significant impact on asset prices- equity prices, exchange rate and short-term interest rate in Nigeria. The impact of the components of global financial differs on asset classes. Change in global risk aversion has more impact on asset prices than other components of global financial variables. We also find that the global financial shocks have more impact on equity prices than any other assets and limited effects on exchange rate. Given these findings, the Nigerian government should formulate and implement policies that would strengthen their economic fundamentals and promote policy credibility so as to dampen the harmful impacts of global financial shocks on asset markets.

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