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**Article**

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West African Journal of Monetary and Economic Integration

**Provided in Cooperation with:**

West African Monetary Institute (WAMI), Accra

*Suggested Citation:* Audu, N.; Tule, J. M.; Omolehinwa, L. (2019) : Push and pull factors for capital flows: SVAR evidence from the Nigerian economy, West African Journal of Monetary and Economic Integration, ISSN 0855-594X, West African Monetary Institute (WAMI), Accra, Vol. 19, Iss. 2, pp. 21-44

This Version is available at:

<https://hdl.handle.net/10419/264261>

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# PUSH AND PULL FACTORS FOR CAPITAL FLOWS: SVAR EVIDENCE FROM THE NIGERIAN ECONOMY

*Audu<sup>1</sup>, N.; Tule<sup>2</sup>, J. M. and Omolehinwa<sup>3</sup>, L.*

## **Abstract**

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*This study examined the determinants of capital flows in Nigeria, using quarterly data that covered the period, 2006 to 2018. The capital flows data include Foreign Direct Investment (FDI), Portfolio Investment (POI) and Other Investment (OTI) Flows. A structural VAR model was used to empirically assess the impact of push (global) and pull (domestic) factors shocks on FDI, POI and OTI inflows to Nigeria. Our results revealed that push factors, in particular, the US GDP growth rate and US interest rate, significantly affect capital inflows to Nigeria. The pull factors, Nigeria GDP growth rate and money supply had mild shocks; the domestic output growth rate had positive effects while money supply had negative effects on capital flows. The forecast error variance decomposition (FEVD) analyses showed that the impact of the push and pull factors vary differently across time horizon. In particular, the role of internal factors increases and decreases over time. Our empirical evidence indicated that portfolio investment is more sensitive to internal and external economic environments, compared to foreign direct investment and other investments. Based on the findings, we recommend that policies should focus on developing mitigants to external vulnerabilities and promoting sound macroeconomic environment.*

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**Keywords:** *Nigeria, Foreign direct, portfolio and other investments, push and pull factors.*

**JEL Classification:** *F21, F32, F34, F36*

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*The views expressed in this paper are those of the authors' and do not in any way represent the views of WAMI or the CBN*

## 1.0 INTRODUCTION

International financial flows play a crucial role in the world economy. It is intently tied to a nation's economic and financial circumstances. Therefore, the impact of capital inflows on a host country's macroeconomic policymaking exposes the receiving countries to different benefits and uncertainties (Koepke, 2019; Obstfeld, 2012; Cardarelli et al., 2010). In real terms, the developed world largely determines capital flows in developing economies (DEs) like Nigeria's, thus making these economies susceptible to fluctuations from foreign capital inflows and financial stability (Ibhagui, 2019; Byrne and Fiess, 2016; Alley and Poloamina, 2015; Obstfeld, 2012). In the light of this, fathoming the drivers of international financial flows to DEs becomes significant in the determination of macroeconomic policy decisions, and this has unsurprisingly generated enormous scholarly interest (Milesi-Ferretti and Tille, 2011; Rice, 2003; Calvo et al., 1996; Fernández-Arias, 1996).

Free movement of capital through national borders is useful to all countries because such capital flows lead to efficient allocation of scarce resources that will promote output and economic growth in any country. This notwithstanding, there are pieces of evidence that suggest that large and volatile capital flows into a country can create economic spins and policy challenges for example the 2008/2009 Global Financial Crisis (GFC). Nieminen (2017); Akyuz (2011) and Rice (2003) found that during and after the GFC, capital flows into developing countries (DCs) swelled and have been unstable since then, thus, raising anxieties in the recipient DCs' economies.

This sharp increase in capital flows to sub-Saharan African countries (SSA) like Nigeria in the twenty-first centuries, has motivated an all-encompassing discussion in the literature on the contributing factors to such inflows (see Mudyazvivi, 2018; Hwa et al., 2017 and 2016; Benigno et al., 2015; Rice, 2003). The remarkable growth in capital flows is attributed to several factors, which include fluctuations in the economic fundamentals of SSA countries, liberalization of capital control policies and trade, alterations in global economic conditions; development of the capital market; herd investors' behaviour; and banking supervision (Calderon et al., 2019; Mudyazvivi, 2018; Alley, 2017; Alley and Poloamina, 2015).

There exists abundant literature on the contributing factors to capital inflows to SSA, that concentrates on the dualistic sets of dynamics, known as "the push and pull factors" (Calderon et al., 2019; Alley, 2017; Cerutti et al., 2015; Brafu-Insaidoo and Biekpe, 2014; De Vita and Kyaw, 2009). The push factors are external and are traceable to economic fluctuations in advanced economies that impact on the supply of capital inflows into SSA. These may include foreign interest rates and foreign output growth, which have been proven to be the key push factors (Ibhagui, 2019; Koepke, 2019; Alley and Polomina, 2015; Fratzcher, 2012). Other push factors commonly referred to in the advanced economies literature are volatility index (VIX), foreign output, exchange rate volatility, stock market index and global risk aversion (Koepke, 2019; Mudyazvivi, 2018; Ahmed et al., 2017; Bruno and Shin, (2015); Cerutti et al., 2015; Ahmed and Zlate, 2014; Fratzcher, 2012).

Conversely, the pull factors, on the other hand, are country-specific core features that are related to the fundamentals of economic conditions in the receiving nations which affect international financial flows. The pull elements consist of domestic real and monetary sector variables, namely output, inflation rate, interest rate, interest rate differentials, capital market (stock market index, equity and bond), exchange rate volatility or exchange rate, tax, distance, human capital, institutions, and infrastructure, amongst others (see, Mudyazvivi, 2018; Oloko, 2018; Cerutti et al., 2015; Koepke, 2019; Odedokun, 2004).

Furthermore, the dominant question in current economic literature borders on how global conditions can drive capital flows. In other words, what drives capital flows (Push and Pull Factors)? Following the upsurge in financial liberalization in the early 19<sup>th</sup> century, developing countries experienced different

periods of large capital flows that are accompanied by benefits and risks to these economies (Milesi-Ferretti and Tille, 2011; Shin, 2012; Rey, 2015). The seminal work of Calvo et al., (1996) and Fernandez-Arias (1996), whilst deploying useful theoretical frameworks that helped to comprehend the drivers of capital flows, provided a distinction between foreign factors (push) and country-specific factors (pull).

Several scholars have examined how global and domestic economic and financial conditions, often known as push– and pull– factors, respectively, have attracted capital flows to developing and emerging markets (Milesi-Ferretti and Tille, 2011; Fratzscher, 2012; Forbes and Warnock, 2012; Ahmed and Zlate, 2014; Cerutti et al., 2015; Koepke, 2015; Rey, 2015). In explaining the surge in capital flows to developing and emerging markets like SSA, they identified the following as relevant push-factors: foreign output (global growth) and foreign interest rate (U.S. monetary policy rate or interest rate), the supply of global liquidity (especially in U.S. dollars) and global risk aversion (see, *inter alia* Milesi-Ferretti and Tille, 2011; Shin, 2012; Rey, 2015; amongst others). Stronger global growth increases portfolio flows, while higher global liquidity amplifies global leverage. Indeed, higher global liquidity, together with global risk aversion, which measures risk appetite and is stimulated by uncertainties, can cause unexpected shift in capital flows. Recent studies reveal that a drop in foreign interest rates, occasioned by slow-moving growth in developed economies, is the dominant (push) factor while the optimistic economic outlook in most emerging economies is seen as the main (pull) factor that drives capital flows (Garrido et al., 2013; Dahlhaus, and Vasishtha, 2014; Cerutti et al., 2015; Nieminen, 2017; Mudyazvivi, 2018; Tellez- Leon and Ibarra, 2019; Koepke, 2019).

Similarly, numerous studies strongly support the position that the US Federal Reserve’s tapering of its interest rates and other world conditions (push factors), are vital in directing international capital flows into the third world economies (TWEs) [see, Cerutti et al., 2015; Ikeda et al., 2015 and Dahlhaus and Vasishtha, 2014]. Several other scholars have unsuccessfully tried to provide concrete answers to this nexus; hence, the continued discourse on the causes of international financial flows to TWEs. To the best of the authors’ knowledge, no similar research has been conducted for Nigeria, as all the contributions to this debate have been based on total capital flows (aggregated) [Okpanachi, 2012; Oziegbe and Rufus, 2012; Oloko, 2018; Ehigiamusoe and Lean, 2019, among others] with no importance placed on capital inflows (foreign direct investment, portfolio and other investment inflows). Secondly, there is no previous study in the country that has examined the impact of the push versus pull factors across several time horizon. Therefore, there are clear gaps in the literature which this paper seeks to fill.

The existence of such literature gaps has grave implications, considering the arithmetic importance of the assessed factors, in relation to the duration of the analysis. Thus, the specific objectives of this study are: (i) to ascertain whether push shocks are the main factors driving capital flows into a small open economy like Nigeria (ii) to investigate whether pull shocks have any influence on capital flows in an open economy, and (iii) to examine how the push and pull factors vary across time horizons and capital flows (foreign direct investment, portfolio investment and other investment) in Nigeria.

Following the introduction, Section 2 reviews related theoretical and empirical literature. Section 3 evaluates trend analysis, methodology, data and estimation techniques. Section 4 discusses the empirical results between the push and pull factors in Nigeria. Finally, Section 5 concludes the paper.

## 2.0 LITERATURE REVIEW

Economic cooperation leads to economic integration resulting in massive flows of capital to emerging and developing economies. Increase in capital flows contributes to economic welfare of the receiving economy and ensures efficient allocation of capital to production units. Some scholars have argued that capital flows have negative impact on the domestic economy, especially, on portfolio investment which is volatile (Mudyazvivi, 2018; Oloko, 2018). With the Latin American debt crisis in the 1980s and the 2008 global GFC, and their impact on domestic economies, exchange rates, as well as financial asset prices, there were concerns as to whether domestic or external factors determine capital inflows (Rice, 2003; Koekpe, 2019).

There are many studies in the literature on the determinants of capital inflows, with different outcomes and the debate on the drivers of capital flows are inconclusive. While some aver that the drivers of capital inflows in the advanced, developing and emerging economies vary with country-specific factors, others maintain that there are global factors or commonalities in capital inflows across the world. For instance, the United States' monetary policy, supply of global liquidity and global risk aversion have been noted to be the common factors driving capital inflows to the emerging and developing economies (Cerutti et al., 2015; Niepmann, 2016; and Calderon et al., 2019), while many studies also acknowledge economic liberalisation, global economic and political changes as determinants of its capital flows (Brafu-Insaidoo and Biekpe, 2014; Davis et al., 2019).

Earlier studies focused on aggregated capital flows. By 1970 however, the focus shifted from FDI to cross-border international bank lending. Recently, Fratzscher (2012), Koekpe (2019), Mudyazvivi, (2018) and Tellez-Leon and Ibarra, (2019), identified push and pull factors as determinants of capital flows, owing to global dynamics. Other studies found that rapid expansion in international trade, country risk, quality of domestic institutions and macroeconomic fundamentals of the domestic economy are forces behind capital inflows in emerging and developing economies. For instance, countries with high public debts, large reserves and flexible exchange rate policies as well as higher trade openness and more flexible foreign exchange regimes are likely to respond to global push factors (Korap, 2010; Hwa et al., 2016). Garrido et al., (2013) submitted that the degree of trade openness, domestic growth and public debt were the major drivers of capital flow.

Barrot and Serven (2018) identified financial openness and exchange rate regime as being significant to capital inflow. Mudyazvivi (2018) employed some of these variables and found that SSA's FDI and FPI were mainly driven by a push factor – foreign output growth while the pull factors were infrastructure and human resources. Studies on the ascendancy of push factors in driving capital inflows to third world economies (TWE) reported mixed findings. Brana and Lahet (2010), established that pull factors are more vital factors in explaining capital inflows to Asian countries than push factors (see, also Kim et al., 2013), while Hernandez et al., (2001) opined that the private capital inflows that are driven principally by country-specific features of the recipient country are the main important factors. In recent decades, scholars have emphasized the possibility of balancing both the push and pull influences in attracting international financial inflows into LDCs. Lipovina-Bozovic and Ivanovic, (2018), assessed the push and pull determinants of capital flows (foreign direct investment and portfolio investment) for a small and open economies, like Montenegro's using SVAR and found that the push factors (foreign output and interest rates) significantly explain the variation of capital flows while the pull factors were found to play little role for capital flows developments in the country (see Abiad et al., 2008; Friedrich and Guerin, 2016; Fratzcher, 2012).

Studies have shown that the push factors influence capital flows. Therefore, when the environment is perceived to have low global risks, developing economies, like Nigeria, have more external funding

access than other countries, given the higher returns on investment on capital in LDCs. Conversely, when foreign investors perceive the existence of high risk, they redirect their funds to safer destinations, to make it safer and more liquid (see, Jevcak et al., 2010; Fratzscher 2012, Ahmed and Zlate, 2014). However, Milesi-Ferretti and Tille (2011), contended that the key factor responsible for the fall in capital flows to developing economies during the recent crisis was the shock to push factors, as investors' confidence diminished sharply, following fears about the quality of financial assets and the solvency of the banks. Scholars have empirically shown that interest rate (push factor) are a key determining factor in international capital flows (Calvo, 1998; Gibson and Tsakalotos, 2004; Hadiwibowo and Komatsu, 2011).

Several studies have revealed that the pull factors (domestic output growth, money supply and other institutional factors, etc.) in a developing country, are expected to influence the demand for capital flows. Hence, the importance of domestic output in influencing capital flows cannot be over looked, as studies have shown the positive relationships between GDP growth, money supply and capital flows variables (Akyuz, 2011; Ahmed and Zlate, 2014; Ahmed et al., 2017; Lipovina-Bozovic and Ivanovic, 2018; Mudyazvivi, 2018). It has been empirically proven that the push factors, such as the U.S.' output growth, interest rates and global cyclical conditions, play vital roles in influencing capital flows into developing countries (see, Fernandez-Arias, 1996; Chuhan et al., 1998; Mohsin and Khan, 1998; Carlson and Hernandez, 2002; Nunnenkamp and Spatz, 2003; Rice, 2003; Chakraborty and Nunnenkamp, 2006; Prasad et al., 2006; De Vita and Kyaw, 2009). However, recent studies have failed to confirm this relationship, thus, leaving the discourse on the determinants of capital flows to developing countries unanswered (Korap, 2010; Fratzscher, 2012; Brafu-Insaidoo and Biekpe, 2014; Cerutti et al., 2015; Niepmann, 2016).

Kim et al., (2013) examined the pull and push factors that spur capital flows and the direction in Korea, and found the U.S. interest rate, low returns in the developed economies and GDP growth rate in the developed economies, are the push factors of capital flows. They also found that macroeconomic conditions of the receiving economies (pull factors), such as credit worthiness, domestic interest rate, financial strength, inflation rate, exchange rate stability, per capita income, GDP growth rate, the current account balance and policies on financial account liberalization attract capital flows. On the whole, their findings revealed that the push factors, particularly, world interest rate (proxied by U.S. interest rate), significantly affected capital flows into Korea while the pull factors (foreign reserves and GDP growth) had a negative but significant impact on capital flows (see Mercado and Noviantie, 2019; Du and Rousse, 2018). Oziegbe and Rufus (2012) evaluated the effect of FDI inflows (equity capital, reinvested earnings and intra-company loans) on economic growth in Nigeria using annual time series and found that FDI inflow to the agricultural, mining and extractive sectors had a positive but insignificant impact on growth, whereas; FDI inflow to the manufacturing, transport and commerce sectors, had positive and significant effects on economic growth.

There are a plethora of studies on the above subject matter on Nigeria such as those that x-rayed the transmission of external shocks on domestic output growth (Onakoya, 2012; Oziegbe and Rufus, 2012; Ihum et al., 2018; Onyinye et al., 2018; Ehigiamusoe and Lean, 2019). Others focused on portfolio diversification, monetary policy, the structure of capital flows and exchange rate (Ekeocha et al., 2012; Okpanachi, 2012; Oloko, 2018) with diverse empirical findings. The review also shows that most of the studies focused mainly on the aggregate or each of the components of capital flows rather than all the capital flow components.

This present study differs from the previous studies because it takes a holistic approach in its investigation of the push and pull factors of capital flows in a single framework. Hence, this study attempts to contribute to the extant literature on the nexus between the push and pull factors of capital

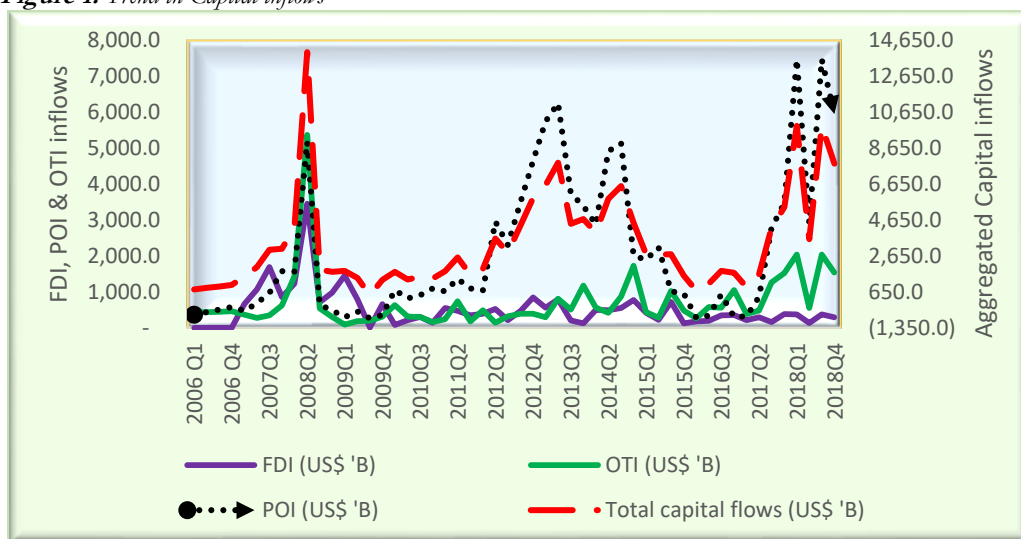
inflows and all its components in Nigeria. However, our investigation might be linked to other strands of existing empirical research (such as Culha, 2006; Korap, 2010; Fredrich and Guerin, 2016; Hwa et al., 2016, 2017; Alley, 2017; Lipovina-Bozovic and Ivanovic, 2018; Kunovac et al., 2018).

### **3.0 TREND ANALYSIS, DATA, METHODOLOGY AND STRUCTURAL VECTOR AUTOREGRESSIVE (SVAR)**

#### **3.1 Trend Analysis**

The trends in international financial inflows to Nigeria, namely, aggregated (capital flows) and its components [FDI, POI and OTI], are presented in Figure 1. The strong co-movements between aggregated capital inflows and its components as well as their fluctuations, have been variously highlighted in the literature (Culha, 2006; Raghavan et al., 2014; Calderon et al., 2019; Ibhagui, 2019). This may be the first attempt at disaggregating capital inflows (FDI, POI and OTI) in Nigeria. In Figure 1, the growth in the aggregated capital inflows between 2006Q1 and 2008Q2, were driven by all the three components of capital flows, with the POI and OTI contributing much more than the FDI, occasioned by current, capital and financial account liberalization, banking sector reforms, exchange rate stability, high external reserves and political stability.

However, following the outbreak of the 2008/2009 global financial crisis, investors' confidence in emerging economies such as Nigeria's fell, thus, leading to a sharp decline in all the components of capital inflows, especially, OTI and POI. The OTI and POI, which rose from US\$0.42 billion and US\$0.35 billion in 2006Q1 to US\$5.4 billion and US\$5.2 billion, respectively, in 2008Q2, then fell precipitously to US\$0.19 billion and US\$0.26 billion, respectively, by 2009Q3. During the same period, FDI rose from US\$0.2 billion in 2006Q1 to US\$3.5 billion in 2008Q2, then declined to US\$4.1 billion in 2009Q3. These developments led to volatility in the movement of aggregate capital inflows, which rose from US\$0.78 billion in 2006Q1 to US\$14.00 billion in 2008Q2 before dropping steeply to US\$0.46 billion in 2009Q3. Conversely, from 2009Q4, the country experienced a marginal increase in the capital inflows. For instance, FDI, OTI and POI, which stood at US\$0.41 billion, US\$0.19 billion and US\$0.26 billion, respectively, in 2009Q3, surged to US\$0.79 billion, US\$0.80 billion and US\$6.3 billion, respectively, in 2013Q2; thus, growing the aggregate capital inflows from US\$0.46 billion to US\$7.853 billion, attributable to the sharp increase in POI within the period driven mainly by high interest rate and financial deepening.

**Figure 1: Trend in Capital inflows**

Thereafter, all components of capital inflows maintained a volatile downward trend, and by 2017Q1, they stood at US\$0.21 billion, US\$0.38 billion, US\$0.31 billion. Respectively from 2017Q2 to date, the country continued to witness volatile capital inflows, attributed largely to the spikes in POI inflows. With about 95 percent of Nigeria's revenue accruing from crude oil sales, the plunge in oil price in the international market in recent years, have negatively impacted on the country's foreign reserves, as it has maintained a steady downward decline. For instance, Nigeria's foreign reserves plummeted from US\$59.2 billion in 2008Q2 to US\$26.5 billion in 2016Q2, thus, leading the country into a recession in 2016Q2. This drastic drop in the country's external reserves within the highlighted period, which culminated in episodes of exchange rate shocks (July 2008, January, 2009, October 2014, March 2015 as well as in May and June 2016), were all accompanied by 2008/2009 global financial crisis, episodes of high inflation rate and low interest rate, tepid global economic growth as well as weak industrial base. These factors were responsible for capital outflows from Nigeria, as investors' confidence dwindled, and this further resulted in, their unidirectional co-movement.

### 3.2 Data

Quarterly time series data covering the period 2006Q1 to 2018Q4 were utilized to analyze capital flows in Nigeria using the SVAR approach. The sets of data were obtained from the IMF International Financial Statistics (IFS) and CBN Statistical Bulletin. The study includes both foreign and domestic factors; they are four in total (two foreign and two domestic factors, respectively). The two global factors are US' gross domestic product growth rate (USGDPGR [%]) and US' interest rate (USINTR [%]) were employed as global factors (Push). The USGDPGR represents global economic activities and the USINTR represents foreign interest rate, which indicates the cost of borrowing for the recipient country as well as an alternative rate of return for the investors in capital exporting countries. Therefore, an increase in this variable is expected to have negative impact of capital inflows into Nigeria.

The domestic variables are Nigeria's gross domestic product growth rate (NGDPGR [%]) and Nigeria's money supply (NMS) in local currency, respectively, were used as domestic factors (Pull). The NGDPGR was used as a measure of domestic aggregate demand while the domestic money supply (NMS) was proxied by the sum of currency outside bank; demand deposits other than those of central



government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveler's checks; and other securities such as certificates of deposit and commercial paper. It worth noting that there is no consensus in the literature with regard to the identification of the most appropriate measure to capture monetary policy stance (money supply, inflation rate and interest rate – see Nunnenkamp and Spatz, 2003; Odedokun, 2004; Culha, 2006; Prasad, et al. 2006; Nieminen, 2007; De Vita and Kyaw, 2009; Jevcak, et al. 2010, Korap, 2010; Raghavan et al. 2014; Javasuiriya and Leu, 2017; Tuzemen and Tuzemen, 2018; Ibhagui, 2019; Tellez—con and Ibarra, 2019 and Turnovsky, 2019). Furthermore, since Nigeria is a monetary targeting country, NMS is most appropriate variable to mimic monetary policy stance

The FDI symbolizes the real net inflows of direct capital investment into the recipient economy. The aggregated FDI inflows include equity investment and other investment flows. Portfolio flows are real portfolio investment liabilities (i.e. equities, bonds, etc.). Other investments are the share of investors' undistributed earnings. All variables except the USGDPGR, NGDPGR and United States' interest rate are in logarithms.

### 3.3 Methodology

To discuss the identified gaps and examine the possible effects of push and pull factors on (FDI), (POI) and (OTI) inflows in Nigeria. We employed the structural identification framework of the structural vector autoregression (SVAR) model proposed by Amisano and Giannini (1997) and Blanchard and Quah (1989). The merit of the SVAR approach against the unrestricted vector autoregressive models, is that it enables the researchers to make theoretical assumptions in the empirical model by imposing explicit restrictions for the structural relationships. These are applied by introducing theoretical and auxiliary restrictions to achieve econometric identification issues to explain the extent of the deviations in (FDI), (POI) and (OTI) inflows that are driven by the various push and pull factors in Nigeria. The choice and application of SVAR methodology is to help gain an understanding into the factors of interest for Nigeria, by assessing its use in other climes and in other related topics (see for example Boero et al., 2019; Mudyazavivi, 2018; Hwa et al., 2017; Hwa et al., 2016; Friedrich and Guerin, 2016; and Korap, 2010).

#### 3.3.1 SVAR

Our SVAR will start with the general specification thus:

$$A_0 Y_t = A_1 Y_{t-1} + \dots + A_p Y_{t-p} + \varepsilon_t \tag{1}$$

where  $Y_t$  is a  $(n \times 1)$  vector of the selected variables such that  $Y_t = [\Delta USGDPGR_t, \Delta USINTR_t, \Delta NGDP_t, \Delta NMS_t, \Delta FDI_t, \text{etc}]$ ,  $A_i$  stands for a  $5 \times 5$  matrix of coefficients, for instance,  $i = 0, 1, \dots, p$  and  $\varepsilon_t$  represents the structural shocks which can be represented as

$\varepsilon_t^{USGDPGR}, \varepsilon_t^{USINTR}, \varepsilon_t^{NGDP}, \varepsilon_t^{NMS}, \varepsilon_t^{FDI}, \text{etc}$ . These shocks are identically and independently distributed.

The error  $\varepsilon_t$  is a serially uncorrelated vector,  $[E(\varepsilon_t) = 0]$  and  $[\sum_{\varepsilon} = E[\varepsilon_t \varepsilon_t'] = 1]$ . Hence, we present our reduced form SVAR as shown in equation (2).

$$\left. \begin{aligned} Y_t &= A_0^{-1} A_1 Y_{t-1} + \dots + A_0^{-1} A_p Y_{t-p} + A_0^{-1} \varepsilon_t \\ Y_t &= B(L) Y_t + \mu_t \\ B(L) Y_t &= A_0^{-1} A_1(L) \\ \text{and } A_0^{-1} \mu_t &= \varepsilon_t \end{aligned} \right\} \tag{2}$$

where  $u_t$  are the novelty in the reduced form VAR that are deemed to be identically and independently distributed while  $A_1(L)$  represents the polynomial matrix in the lag operator  $L$ .

## 3.2.1 Identification and restrictions

For the purposes of identification, restrictions are imposed in our SVAR model based on economic theory. Specifically, in this study we employed the short-run restrictions on the concomitant associations among the variables of interest. The current response is controlled by the short-run restrictions so that the exogenous nature of the capital flows and effects are determined as shown in equations 3a to 3c.

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{bmatrix} \begin{bmatrix} \mu_{USGDPGR_t} \\ \mu_{USINTR_t} \\ \mu_{NGDPGR_t} \\ \mu_{NMS_t} \\ \mu_{FDI_t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{USGDPGR_t} \\ \varepsilon_{USINTR_t} \\ \varepsilon_{NGDPGR_t} \\ \varepsilon_{NMS_t} \\ \varepsilon_{FDI_t} \end{bmatrix} \quad (3a)$$

*Solving for the reduced form shocks for FDI model*

$$\begin{bmatrix} \mu_{USGDPGR_t} \\ \mu_{USINTR_t} \\ \mu_{NGDPGR_t} \\ \mu_{NMS_t} \\ \mu_{FDI_t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{bmatrix}^{-1} \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{USGDPGR_t} \\ \varepsilon_{USINTR_t} \\ \varepsilon_{NGDPGR_t} \\ \varepsilon_{NMS_t} \\ \varepsilon_{FDI_t} \end{bmatrix} \quad (3a')$$

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{bmatrix} \begin{bmatrix} \mu_{USGDPGR_t} \\ \mu_{USINTR_t} \\ \mu_{NGDPGR_t} \\ \mu_{NMS_t} \\ \mu_{POI_t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{USGDPGR_t} \\ \varepsilon_{USINTR_t} \\ \varepsilon_{NGDPGR_t} \\ \varepsilon_{NMS_t} \\ \varepsilon_{POI_t} \end{bmatrix} \quad (3b)$$

*Solving for the reduced form shocks for POI model*

$$\begin{bmatrix} \mu_{USGDPGR_t} \\ \mu_{USINTR_t} \\ \mu_{NGDPGR_t} \\ \mu_{NMS_t} \\ \mu_{POI_t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{bmatrix}^{-1} \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{USGDPGR_t} \\ \varepsilon_{USINTR_t} \\ \varepsilon_{NGDPGR_t} \\ \varepsilon_{NMS_t} \\ \varepsilon_{POI_t} \end{bmatrix} \quad (3b')$$

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{bmatrix} \begin{bmatrix} \mu_{USGDPGR_t} \\ \mu_{USINTR_t} \\ \mu_{NGDPGR_t} \\ \mu_{NMS_t} \\ \mu_{OTI_t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{USGDPGR_t} \\ \varepsilon_{USINTR_t} \\ \varepsilon_{NGDPGR_t} \\ \varepsilon_{NMS_t} \\ \varepsilon_{OTI_t} \end{bmatrix} \quad (3c)$$

*Solving for the reduced form shocks for OTI model*

$$\begin{bmatrix} \mu_{USGDPGR_t} \\ \mu_{USINTR_t} \\ \mu_{NGDPGR_t} \\ \mu_{NMS_t} \\ \mu_{OTI_t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{bmatrix}^{-1} \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{USGDPGR_t} \\ \varepsilon_{USINTR_t} \\ \varepsilon_{NGDPGR_t} \\ \varepsilon_{NMS_t} \\ \varepsilon_{OTI_t} \end{bmatrix} \quad (3c')$$

The restrictions identified in equations 3a to 3c are based on the economic theory that capital flows from rich capital-abundant countries to poor capital-scarce countries (Nieminen, 2017; Prasad et al., 2006). Thus, given its population, market and size of her economy, Nigeria is able to attract large capital inflows from developed countries. Therefore, due to the growth of its output (GDPGR), and money supply, it has enormous ability to attract large capital inflows, at least in the short-run (see, Turnovsky, 2019). However, capital reversal shocks in Nigeria would adversely impact on the country's economy in both the short- and long- run. Furthermore, given that we employed quarterly series spanning a period of thirteen years (52 quarters), the period is large enough to evaluate both long- and short- term impacts. Given that capital inflows shocks are exogenously determined, our reduced form innovations for capital flows (FDI, POI and OTI) shocks are equal to the structural innovations represented in equation (4) a, b and c.

**For FDI model:**

$$\begin{aligned}
 \mu_{USGDPGR} &= \varepsilon_{USGDPGR} \\
 \mu_{USINTR} &= \beta_{21}\varepsilon_{USGDPGR} + \varepsilon_{USINTR} \\
 \mu_{NGDPGR} &= \beta_{31}\varepsilon_{USGDPGR} + \beta_{32}\varepsilon_{USINTR} + \varepsilon_{NGDPGR} \\
 \mu_{NMS} &= \beta_{41}\varepsilon_{USGDPGR} + \beta_{42}\varepsilon_{USINTR} + \beta_{43}\varepsilon_{NGDPGR} + \varepsilon_{NMS} \\
 \mu_{FDI} &= \beta_{51}\varepsilon_{USGDPGR} + \beta_{52}\varepsilon_{USINTR} + \beta_{53}\varepsilon_{NGDPGR} + \beta_{54}\varepsilon_{NMS} + \varepsilon_{FDI}
 \end{aligned} \tag{4a}$$

**For POI model:**

$$\begin{aligned}
 \mu_{USGDPGR} &= \varepsilon_{USGDPGR} \\
 \mu_{USINTR} &= \beta_{21}\varepsilon_{USGDPGR} + \varepsilon_{USINTR} \\
 \mu_{NGDPGR} &= \beta_{31}\varepsilon_{USGDPGR} + \beta_{32}\varepsilon_{USINTR} + \varepsilon_{NGDPGR} \\
 \mu_{NMS} &= \beta_{41}\varepsilon_{USGDPGR} + \beta_{42}\varepsilon_{USINTR} + \beta_{43}\varepsilon_{NGDPGR} + \varepsilon_{NMS} \\
 \mu_{POI} &= \beta_{51}\varepsilon_{USGDPGR} + \beta_{52}\varepsilon_{USINTR} + \beta_{53}\varepsilon_{NGDPGR} + \beta_{54}\varepsilon_{NMS} + \varepsilon_{POI}
 \end{aligned} \tag{4b}$$

**For OTI model:**

$$\begin{aligned}
 \mu_{USGDPGR} &= \varepsilon_{USGDPGR} \\
 \mu_{USINTR} &= \beta_{21}\varepsilon_{USGDPGR} + \varepsilon_{USINTR} \\
 \mu_{NGDPGR} &= \beta_{31}\varepsilon_{USGDPGR} + \beta_{32}\varepsilon_{USINTR} + \varepsilon_{NGDPGR} \\
 \mu_{NMS} &= \beta_{41}\varepsilon_{USGDPGR} + \beta_{42}\varepsilon_{USINTR} + \beta_{43}\varepsilon_{NGDPGR} + \varepsilon_{NMS} \\
 \mu_{OTI} &= \beta_{51}\varepsilon_{USGDPGR} + \beta_{52}\varepsilon_{USINTR} + \beta_{53}\varepsilon_{NGDPGR} + \beta_{54}\varepsilon_{NMS} + \varepsilon_{OTI}
 \end{aligned} \tag{4c}$$

The implications of the functional form of equation (4) and the SVAR specification will be helpful to analyze the impact of shocks to push and pull factors on capital inflows in Nigeria.

#### 4.0 EMPIRICAL ANALYSIS AND FINDING

The descriptive statistics and correlations of the data used in the study spanning the period 2006Q1–2018Q4 are presented in Table 1. It indicates that the average Nigeria's money supply, Nigeria's real GDP growth rate, US real GDP growth rate and US interest rate were US\$14.457 billion, 4.93 percent, 1.74 percent and 1.45 percent, respectively. Regarding the components of aggregate capital inflows, the table reveals that the mean values for FDI, POI and OTI were US\$5.16 billion, US\$2.11 billion and US\$ 0.71 billion, respectively. However, the lower panel of Table 1, shows the correlation analysis between Nigeria's money supply, Nigeria's real GDP growth rate, US' real GDP growth rate, US' interest rate and capital flows variables. The Table reveals that the FDI has a negative relationship with

NMS, USGDPGR and USINTR, while POI and OTI are negatively associated with NGDPGR and USINTR. Whereas one of the pull variables, money supply, is negatively related to NGDPGR and USINTR, respectively. The result also indicates that NGDPGR is negatively related to USGDPGR. Similarly, a negative relationship exists between USGDPGR and USINTR. Apart from the foregoing, all other relationships showed positive correlation with each other. Furthermore, except the association between POI and OTI that was insignificant, all other association even though relatively low, had a strong and significant correlation, thus, justifying that they are good measure of capital in Nigeria (see, Javasuriya and leu, 2017; Ibhagui, 2019 and Oloko, 2018).

**Table 1:** Descriptive and correlations statistics

	FDI	POI	OTI	NMS	NGDPGR	USGDPGR	USINTR
Mean	5.156	2.111	0.709	14.457	4.926	1.737	1.446
Maximum	3.452	7.473	5.372	26.069	12.660	5.500	5.020
Minimum	0.152	0.261	0.085	4.110	-2.260	-8.400	0.160
Std. Dev.	0.555	2.023	0.816	6.517	3.383	2.415	1.658
Skewness	3.151	1.184	3.899	0.077	-0.488	-1.729	1.244
Kurtosis	16.434	3.329	21.802	1.887	2.729	7.846	3.045
POI	0.163** [2.924]						
OTI	0.599** [4.269]	0.496 [1.166]					
NMS	-0.284** [-35.702]	0.447** [2.809]	0.190** [4.733]				
NGDPGR	0.137** [3.198]	-0.030** [-5.493]	-0.157** [-4.275]	-0.629** [4.567]			
USGDPGR	-0.270** [-3.975]	0.235** [4.643]	0.093** [2.203]	0.226** [3.092]	-0.176** [5.439]		
USINTR	-0.019** [-4.777]	-0.196** [-3.966]	-0.246** [-11.683]	-0.369** [-5.526]	0.507** [5.189]	-0.047** [-6.583]	

Note: FDI = Foreign Direct Investment, POI = Portfolio Investment, OTI = Other Investment, NMS = Nigeria Money Supply, NGDPGR = Nigeria real GDP growth, USGDPGR = US real GDP growth, US interest rate, numbers in parenthesis are t-values, \*\* 5% significance

Table 2 presents the results of the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Ng-Perron (NP) unit root tests. The results show that the calculated values of all the variables are greater than their critical values at the 5 percent level for the ADF and the PP tests except LPOI and USINTR while for NP test, it was only LFDI. This shows that all other variables are stationary in levels at the 5 per cent significance level, which is consistent with some previous studies (Odedokun, 2004; Narayan et al., 2008; Cerutti et al., 2015; Mudyazvivi, 2018 and Calderon et al., 2019).

**Table 2:** Unit root test results

Variables	ADF		PP		NP		Decision
	Level	1 <sup>st</sup> Diff	Level	1 <sup>st</sup> Diff	Level	1 <sup>st</sup> Diff	
LFDI	-4.07	-5.57	-4.05	-9.36	-1.07	-3.48	I (0)
LPOI	-3.93	-3.85	-2.34	-8.40	-2.04	-2.88	I (0)
LOTI	-4.24	-9.82	-4.24	-10.9	-2.74	-4.43	I (0)
USGDPGR	-5.35	-10.2	-5.06	-11.2	-2.26	-1.08	I (0)
USINTR	-3.97	-5.12	-1.35	-5.25	-2.68	-2.19	I (0)
NGDPGR	-3.72	-10.7	-3.47	-4.28	-2.79	-0.45	I (0)
LNMS	-3.60	-4.72	-3.85	-7.82	-3.16	-4.30	I (0)

**Notes:** All the critical values are at 1, 5 and 10 percent significance level (ADF -4.14, **-3.50** and -3.18; PP -3.57, **-2.91** and -2.60; NP -2.58, **-1.98** and -1.62), respectively. The lag structure of each Phillip–Perron was conducted using the spectral estimation method Bartlett Kernel and NG–Perron was the spectral estimation method AR GLS detrended, respectively. L implies natural log.

**Source:** Authors' computation

Having ascertained the stationarity of the series, we performed the lag-length selection by employing different information criteria (Akaike information criterion, Schwarz information criterion, Hannan-Quinn information criterion). All the lag-selection criteria for the three models unanimously suggested one (1) as the optimal number of lags. Thus, it was incorporated into the analysis in each of the models.

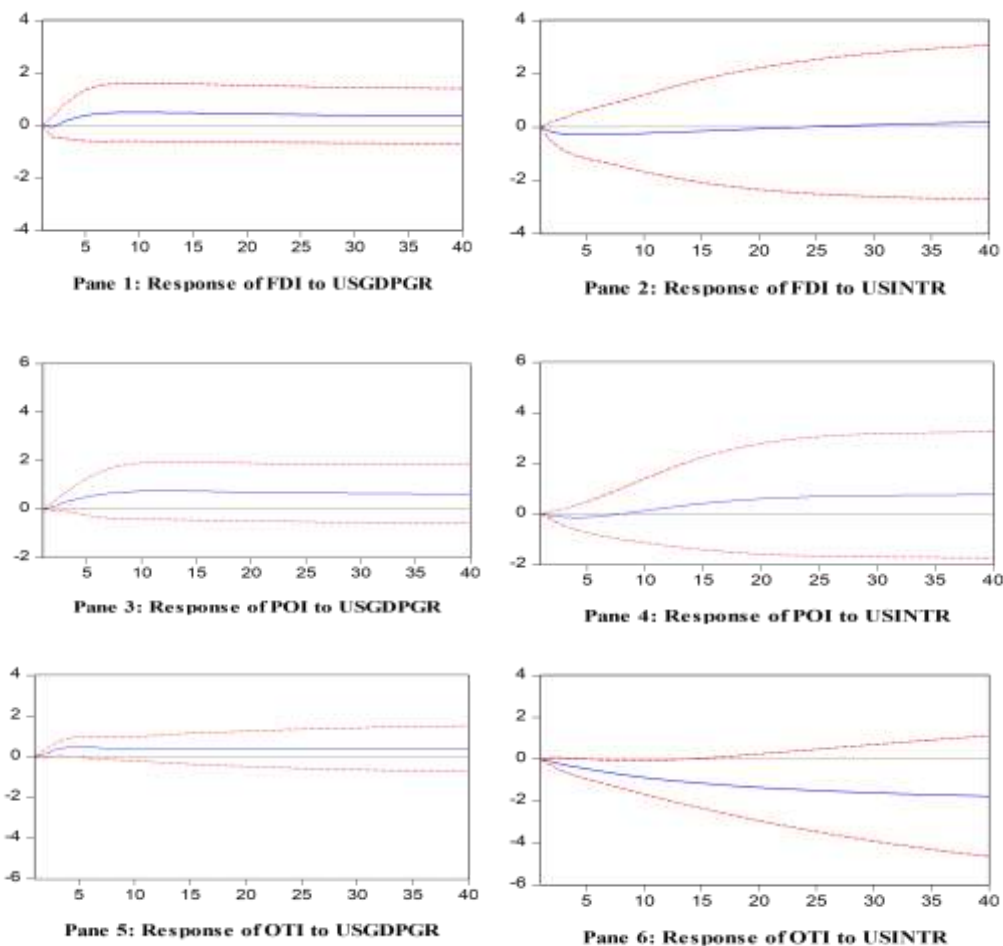
#### 4.2.1 Impulse response function (IRF) analysis

It does appear from the several impulse response functions as shown in Figures 2 and 3 that the initial response of FDI, POI and OTI variables to global and domestic shock is unnoticed with smaller forecast horizon but the impact of the shock becomes evident with higher forecast horizons. This seems to suggest the presence of delayed responses to shocks possibly owing to the adaptive nature of economic agents where greater weights are attached to past information in determining the future path of macro variables. By extension, the reaction of relevant policy authority to some shocks such as monetary, fiscal and external (oil) shocks tends to be anticipated by economic agents in the country and therefore the initial reaction may be slow when these shocks occur.

The effects of shocks to push and pull factors on capital (DCI) inflows to Nigeria spanning the period 2006Q1 to 2018Q4 are presented in Figures 2 and 3, respectively. The impulse response functions were evaluated over a period spanning a forty-quarter horizon. The response of capital inflows (FDI, POI and OTI) in Nigeria to a one standard deviation shock to US' GDP growth and interest rates are presented in Figure 2.

An open economy like Nigeria's is susceptible to global shocks.

**Figure 2: Impact of Push Factors: Response of FDI, POI and OTI to a Structural One S.D.**  
 The results of the IRF presented in Panes 1, 3 and 5 of Figure 2, confirms that the push factor of USGDPGR do affect capital flows into Nigeria. The impact of the shock is persistent throughout the



40-period (quarters) horizon for all the components of capital inflows. These findings are in line with De Vita and Kyaw (2009), Culha (2006) and Ghosh et al., (2012) but contrary to the study by Mudyazvivi (2018) for regional trading blocs (for SSA and regional level). The result, which was positively affected by the US' output growth, finds support in the empirical findings of Lipovina-Bezovic and Ivanovic (2018) for Montenegro, Ahmed and Zlate (2014) for emerging markets and Globan, (2015) for the European Union new member states that capital flows.

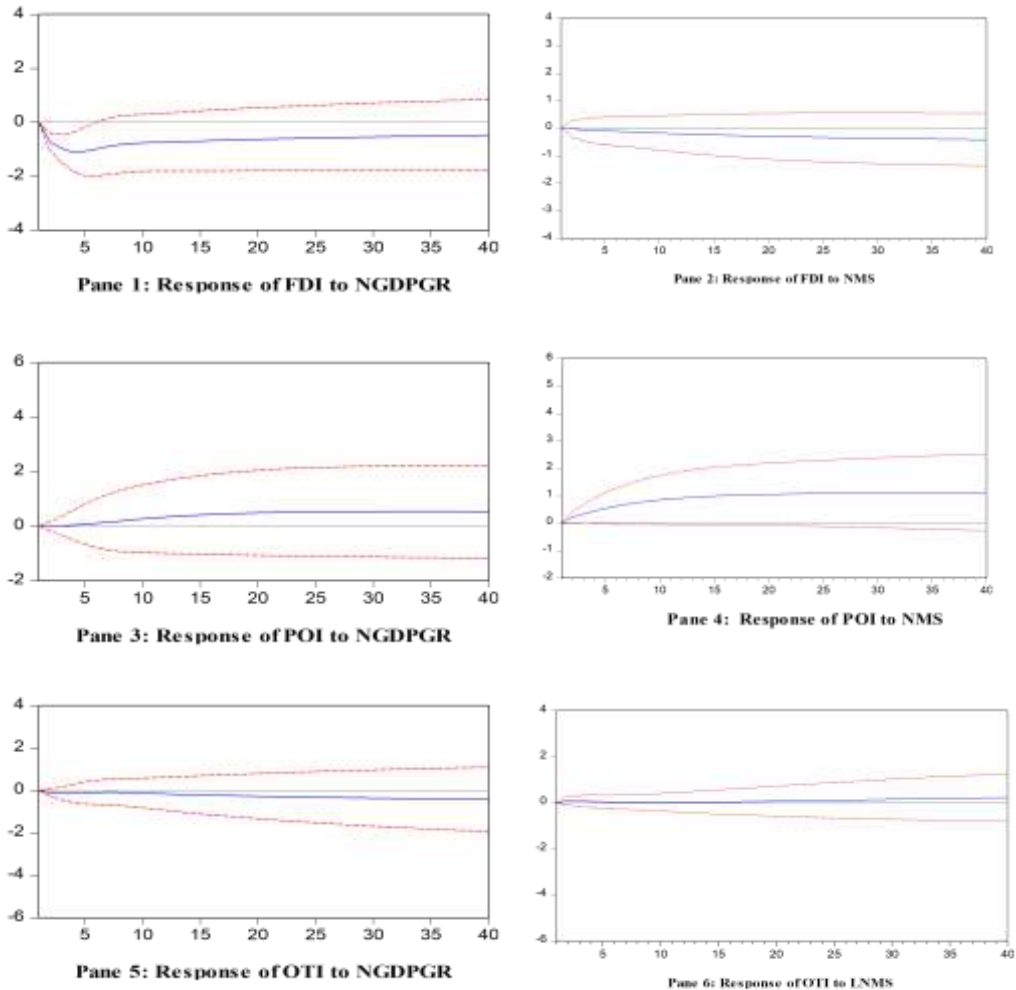
As shown in Panes 2, 4 and 6 of Figure 2, a positive shock to the US' interest rate, led to an intuitively negative response from the FDI, POI and OTI, respectively. This is occasioned by a tight monetary policy stance (resulting in rise in the US policy rate) by the FED leading to capital inflows into the US and outflows elsewhere. Be that as it may, capital inflows remains the main source of technology and enhancement of financial liquidity in the host developing economy, as it bridges the technology gap and makes funds available for productive investment that culminates into economic growth. The impact of the shock on USINTR persisted for about 23 quarters, 7 quarters and the entire 40 quarters for the

response of FDI, POI and OTI, respectively. However, from quarters 20 and 8 for FDI and POI, respectively the country started witnessing positive capital inflows. These findings are in line with De Vita and Kyaw (2009), Culha (2006) and Ghosh et al., (2012) but contrary to the results obtained by Mudyazvivi (2018) for regional trading blocs (for SSA and regional level). The result, which was positively affected by positive US' output growth, supported by the empirical findings of Lipovina-Bezovic and Ivanovic (2018) for Montenegro, Ahmed and Zlate (2014) for emerging markets and Globan, (2014) for the European Union new member states.

The response of capital inflows (FDI, POI and OTI) to Nigeria to a one standard deviation shock to the pull factors, namely, Nigeria's GDP growth (NGDPGR) and NMS are presented in Figure 3. Panes 1, 3 and 5 of Figure 3, reveals that the impact of NGDPGR shocks persisted positively for the entire 40 quarters horizon, to POI and negatively to FDI and OTI respectively. In the short-run, a negative aggregate demand shock, is associated with a decrease in FDI inflows by about 0.5% below the baseline for 4 periods (quarters) then oscillated upwards but remained negative by the same margin. However, it further increased marginally by about one percent in the 40<sup>th</sup> period. Conversely, the aggregate demand shock leads to increased inflow of POI for 19 periods and steadily maintained a decrease from the 20<sup>th</sup> to 40<sup>th</sup> period. From the 5<sup>th</sup> – 40<sup>th</sup> quarter, it maintained a steady increase in inflow of POI by about 0.1 percent. Response of OTI to domestic growth shock was negative all through the period. This reveals that the Nigerian economy depends on capital inflows, which implies that an increased growth in Nigerian output, will attract more FDI, POI and OTI inflows to the country. Our findings are in consonance with Gerrido, et al., (2013) and are supported by the empirical findings of Lipovina-Bezovic and Ivanovic, (2018) and Tellez-Leon and Ibarra (2019) who opined that growth in developing countries attracts capital inflows.

There seems to be a positive shock that leads to a rise in broad money, which shows the impact of a loosening monetary policy stance that can be traced by examining Panes 2, 4 and 6 in Figure 3. It is evident from the panes that a shock to money supply in Nigeria that remained stable for 13 periods and then started increasing for the remaining period, induced an immediate capital inflow and maintained a steady improvement all through the 40 horizon, except in the FDI and OTI models were it experienced outflows in all the 40<sup>th</sup> quarters. The outcome of this study conforms with the findings of De Vita and Kyaw (2009), Bryne and Fiess (2016), Barrot and Serven (2018), but is contrary to the studies by Culha (2006), Fratzscher, (2012) and Cerutti et al., (2015). However, the result is supported by the empirical findings of Mudyazvivi (2018), Davis, Valente and Wincoop (2019), Ehigiamusoe and Lean (2019), who observed that in times of economic and political stability, the enhanced risk premium is immediately reflected in the interest rate, which simultaneously triggers massive capital inflows and vice versa.

**Figure 3: Impact of Pull Factors: Response of FDI, POI and OTI to Structural One S.D. Innovation to NGDPGR and NMS**



**4.2.2 Variance Decomposition analysis**

To evaluate the transitory changes in FDI, POI and OTI inflows because of reactions from the push and pull factors, we conducted the variance decomposition analysis. Forecast error variance decomposition presented us with the clue on the significance of each unsystematic reaction impacting on the parameters. The results are presented for six different forecast periods: one quarter, two years, four years, six years, eight years and ten years as shown in Table 3. The variance decomposition analysis in Table 3 reveals that over a period of 40 quarters, nearly 64, 77 and 67 percent, respectively, of the forecast error variance of FDI, POI and OTI flows were accounted for by its own shocks.



**Table 3: Variance Decomposition of FDI, POI and OTI**

Horizon Quarter Period	S.E.	Push Factors		Pull Factors		DCI
		USGDPGR	USINTR	NGDPGR	LNMS	
<b>Percentage of variation in FDI flows</b>						
1	1.1460	0.0000	0.0000	0.0000	0.0000	100.0000
8	1.4665	3.7838	1.9199	29.2868	0.2076	64.8019
16	1.4691	3.7780	2.0001	29.3506	0.2847	64.5867
24	1.4706	3.7852	2.0954	29.3385	0.3170	64.4639
32	1.4715	3.7892	2.1566	29.3287	0.3321	64.3934
40	1.4720	3.7910	2.1930	29.3229	0.3393	64.3538
<b>Percentage of variation in POI flows</b>						
1	0.6152	0.0000	0.0000	0.0000	0.0000	100.0000
8	1.0236	7.6483	1.4557	0.6790	9.5961	80.6208
16	1.0506	7.3889	3.7357	1.3529	9.9428	77.5798
24	1.0597	7.3046	4.2486	1.4233	9.8442	77.1793
32	1.0608	7.2987	4.2926	1.4248	9.8328	77.1511
40	1.0609	7.2984	4.2936	1.4246	9.8351	77.1483
<b>Percentage of variation in OTI flows</b>						
1	0.6792	0.0000	0.0000	0.0000	0.0000	100.0000
8	0.8322	12.2995	11.5477	2.0496	2.2474	71.8558
16	0.8521	11.7629	14.8714	2.2905	2.1549	68.9203
24	0.8593	11.5684	15.9538	2.3886	2.1765	67.9128
32	0.8625	11.4808	16.3624	2.4414	2.2346	67.4808
40	0.8642	11.4366	16.5315	2.4705	2.2913	67.2702

**Source:** Authors' computation

The results reveal that the variable that best explains the forecast error variance of foreign direct investment is Nigeria's GDP growth rate. Shocks to the variable NGDPGR explains about 29 percent of the variation in the FDI flows. This is then, followed by the US' GDP growth rate, US' interest rate and Nigeria's interest and inflation rates, which accounted for nearly 4, 2 and 0.3 percent, respectively, for the FDI inflows. We also considered the overall effect of the "push and pull" factors on FDI, by estimating the pull factors jointly; the result revealed that it accounted for about 30 percent of the variation, while the push factors explained only 6 percent, over the 40 quarter forecasts. These results suggest that, in terms of the pull factors, the domestic growth rate, rather than the domestic interest and inflation rates shocks have been more effective in attracting FDI inflows to Nigeria during the sample period.

Shocks to the “pull” factor of interest and inflation rates explains nearly one-tenth of the forecast error variance in portfolio investment inflows while NGDPGR accounts for 1.4 percent. The shocks to the “push” factor of US’ GDP growth and US’ interest rates, on the order hand, explain only about 7 and 4 percents, respectively of the variation in POI. We, therefore, conclude that domestic money supply is the main drivers of POI into the country. However, at the 40–quarters, the push factors increase marginally to reach 12 percent, as pull factors remain almost at the same level (11 percent). This finding implies that shocks to pull factors, especially shocks to domestic interest and inflation rates, affect portfolio investment in the short–term, whereas the effect of the push factors dominate push factors beginning from the twenty–fourth quarter.

A striking finding arising from the variance decomposition analysis of the other investment flows model is that the push factors of US growth and interest rates jointly explain a significant amount of the forecast error variance of OTI, which ranges from 23 percent to 26 percent in the medium term and 28 percent in the long–term. This confirms the importance of push factors in driving other investment inflow movements across the globe as found in Fratzscher, (2012). However, from the pull factors, domestic growth rate, as well as domestic interest and inflation rates, explains it the most 2 percent over the 40–quarter forecasts horizon.

## 5.0 CONCLUSIONS

In this paper, we investigated the influence of the push and pull factors on capital flows into Nigeria using Structural Vector Autoregression (SVAR) on quarterly data spanning the period 2006Q1 to 2018Q4. The SVAR model was employed to detect the dynamic effects of push and pull based factors on FDI, POI and OTI capital inflows into the Nigerian economy. The main aim of our paper has been to: (i) evaluate whether push shocks are the main factors driving capital flows into a small open economy like Nigeria; (ii) investigate whether pull shocks have any influence on capital flows in an open economy; and (iii) determine how the push and pull impacts vary across time horizons and capital flows FDI, POI and OTI in Nigeria.

The study presented a trend analysis of capital flows to Nigeria, which was found to be either increasing or decreasing proportionately with the economic policy cum climate of the country. However, the dwindling overall capital inflows and the component inflows into Nigeria after the 2017 recession, suggests that investors’ confidence in Nigeria is yet to be restored. Our graphical illustrations show the co-movement in total capital inflows in Nigeria vis-à-vis the FDI, POI and OTI inflows over the period under consideration. Careful observation of the inflows patterns provides a basis for push and pull factors analysis.

We have scrutinized the magnitude of the fluctuations in FDI, POI and OTI inflows into Nigeria, by attributing it to different push and pull variables over the forty–quarter time horizon. To the best of our knowledge, this is the first attempt to investigate the determinants of capital flows into Nigeria in the context of push–pull factor approach. Our econometric evidence is consistent with the findings of Culha (2006), Alley et al., (2017) and Mudyazvivi (2018), in that an increase in money supply (interest rate) has a positive relationship with capital inflows. The finding that one of the core pull factors (domestic GDP growth rate) was found to have negative dynamic correlation with capital inflows into Nigeria, clearly points to the significance of how macroeconomic instability would increase the risk premium. In this regards, sound fiscal and monetary policies that would ensure sustainable budget and current account balances are vital.

Our empirical findings reveal that capital flows response have profound implication for the Nigerian economy because the push factors ((USGDPGR and USINTR – external developments) have played a dominant role in explaining their dynamics. However, it must be noted that capital inflows component of POI are most volatile and in quick reverse direction as external condition changes. This unexpected sharp reversal of capital flows may precipitate the risk of an exchange rate crisis. The empirical evidence shows that the push and pull factors significantly had time-varying effects in the country over our sample period. Summarily, the push factors were dominant for the OTI, pull factors were dominant for the FDI and both the push and pull factors seem to be mutually important in driving the inflows into Nigeria.

From our empirical exercise, we can draw some policy implications. First and foremost, given that the push factors are the key drivers of capital flows into Nigeria, the government is constrained in implementing different robust policies that would affect the direction, volume, and composition of capital flows. Therefore, we urge the fiscal authority to implement more long-term policies that will bring about sound macroeconomic stability to the country and guide against external shocks. Second, if the drivers of capital inflows to Nigeria are pull factors, then the government has ample windows for policy manipulation. Policies should be directed at improving the volume of capital inflows, such as eliminating or reducing capital market restrictions, and favourable tax policies for foreign investment, amongst others are key in attracting capital flows.

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