

Empirical Analysis of Determinants of Capital Flows to Nigeria during Post COVID 19 Pandemic Era

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Abstract

This study investigated the determinants of capital flows to Nigeria for the period 1980 to 2020. The determinants of capital flows were categorized into push, that is, global factors such as international liquidity, global real GDP growth rate, global risk aversion, and global interest rate and pull factors, that is, domestic factors such as Nigeria's real GDP growth rate, Naira-Dollar exchange rate, monetary policy rate, and inflation. Using the Augmented Dickey-Fuller unit root test approach, the data collated for the study were found to be of mixed integration, (that is at levels and first difference) which necessitated the application of the Autoregressive Distributed Lag (ARDL) for the long and short run relationships among the variables. The ARDL bounds tests showed that capital flows and its components were cointegrated with the push and pull factors that were used as the independent variables. In the long run, it was found that aggregate capital flows

were negatively and significantly affected by push factors such as global real GDP growth rate, volatility index and interest rate; and pull factors such as domestic real GDP growth rate, exchange rate and inflation rate were found to be negative and significant determinants of capital flows. In the short run, all the push factors had a significant and negative effect on capital flows except the global interest rate which turned out with a positive coefficient. Overall, the interactions between push and pull factors were found to be more dominant in capital flows determination following the high coefficient of determination observed in the error correction mechanism. The error correction mechanism (ECM) for the models showed a significant adjustment of aggregate capital flows from short run shocks to long run equilibrium following the dynamics and interactions of the push–pull factors. These results suggested that in efforts geared towards attracting capital flows to Nigeria, policymakers should take cognizance of both push and pull factors in policy formulation.

Key words: Capital flow, push and pull factors, foreign investors, ARDL and Nigeria.

1.0 Introduction

1.1 Background to the Study

All things being equal, it is reasonable to allow lump sums to financial flows from resource-abundant economies to resource-scarce economies where they would be utilized most efficiently. However, a closer look at the pattern of global capital movements reveals a puzzle. For instance, based on the assumption of free capital markets and diminishing returns, the standard neoclassical theory asserted that capital should flow from resource-rich economies to resource-scarce economies (Al-Smadi, 2018). Contrarily, Lucas (1990), observed that the direction of capital flows based on the neoclassical theory was impeded by macroeconomic instability occasioned by inadequate human capital, capital market imperfection, and political risk in less developed and developing economies. Similarly, Joffe (2017) affirmed that capital flows to developing countries could be hindered due to swings in major macroeconomic variables amidst global economic imbalances and divergences in monetary policy across countries, especially the United States monetary policy adjustments.

Building on the Lucas paradox, earlier studies like Fernandez-Arias (1996), Calvo, Leiderman and Reinhart (1993), had provided evidence that though domestic macroeconomic fundamentals (pull factors) mattered, global factors (push factors) like changes in U.S. monetary policy, recession in the U.S., sharp swings in the U.S. balance of payments, and regulation changes in international financial markets were basic determinants of capital flows to developing countries. It is worthy of note that push factors are exogenous to countries receiving the flows, while pull factors are endogenous to the recipient countries. Recent studies have continued to provide empirical evidence that international capital flows are driven by both pull and push factors (Tellez-Leon and Ibarra, 2019; Lipovina-Božović and Ivanovic, 2018).

The foremost interpretation to push factors was that, if low U.S. yield on investments suggested a volatile economic environment in the U.S., it would be expected that a lower rate of returns would push capital from the United States to developing and emerging economies of the world where higher returns could be attained (Siddiqui, 2020). Also, the poor economic outlook in the United States would be viewed by investors as a signal of an unstable world economy, that is, evidence of rising global risk, hence the massive flow of capital from the U.S. to developing and emerging economies, a situation known as global risk aversion. Also, increased liquidity in the U.S. due to quantitative easing (expansionary monetary policy) would cause interest rate to fall in the United States; hence investors would channel their investments to developing countries experiencing capital scarcity for higher returns. This scenario implies that shocks to the push effects could

propagate spillovers or contagion of financial crisis across economies that are interconnected or integrated. For instance, a financial shock could begin with a foreign bank which is then transmitted to other economies through global bank lending as experienced in 2008 when banks in industrialized countries pulled back from lending to developing economies after sustaining huge losses from the U.S. real estate bubble burst (Cheung, Tam and Szeto, 2009).

Even though push factors could influence the direction of international capital flows, the attraction of such flows by domestic economies is, to a large extent dependent on the degree of economic and financial stability in the recipient economies. Consequently, the macroeconomic environment of the recipient economy must be less volatile to attract foreign capital. As such, pull factors, that is, domestic macroeconomic variables such as exchange rate, inflation rate, monetary policy, vulnerability to external shocks, low economic growth rate, etc. have been identified as core determinants of foreign capital flows (Belke and Volz, 2018). For instance, interest rate differences could influence foreign capital inflow as investors are always in search of investment opportunities in countries with higher returns. This shows that if a country desires to lower its policy rate, it should be prepared to experience exchange rate depreciation, if not, demand for assets denominated in the local currency would fall. Generally, however, if the expected uncertainty on the domestic macroeconomic environment is high, foreign investors are discouraged from taking up investment opportunities in such countries. As such, countries must be conscious of both pull-push factors in formulating policies that will boost foreign capital inflow.

In all, it is glaring that Nigeria embraces foreign capital inflows as a factor for economic growth. The Nigerian economy is open to the global investment environment and this is yet to enhance better resource allocation, greater competition, innovation, and the transfer of technology (Ogbechie and Anetor, 2016). However, integration of the Nigerian economy into the global system has attracted foreign capital to the country, but these capital resources are withdrawn by foreign investors when domestic macroeconomic conditions become volatile and better investment opportunities are found in other countries as witnessed during the economic recession of 2016. Due to economic uncertainties in Nigeria, foreign investors are discouraged since they are faced with high exchange rate risks and low investment returns. Based on this premise, this study analyzes the determinants of disaggregated capital flows to Nigeria.

1.2 Statement of the Problem

It is a well-known fact that developing countries, Nigeria inclusive, have experienced greater macroeconomic downturn than industrial economies, and this problem is widely perceived to have worsened in recent years. Countries with macroeconomic stability and favourable investment climate attract more foreign capital than those with an unstable macroeconomic environment (Kamber and Wong, 2020). For instance, the growing integration of global capital markets has created major changes in monetary policy, broadening the range of policies that need to be considered in the decision concerning the choice of exchange rate regime, thus making international policy co-ordination more complex and important. Similarly, the real value of domestic assets in Nigeria has been drastically eroded by rising inflation and depreciating exchange rate (₦/USD) of Nigeria which discouraged foreigners from holding assets denominated in Naira (₦), hence low capital flows to Nigeria (Emefiele, 2017). Again, deficits incurred by the Nigerian government have resulted in increased public debts which might have impeded capital flows as foreign investors are aware of risks arising from exchange rate devaluation, foreign reserves depletion, and fiscal crisis arising from such debt burden.

Indeed, capital flows to Nigeria have met some roadblocks due to fluctuations of both domestic and global booms and bust cycles, leading to a loss of monetary control in Nigeria. However, there have been no specific factor(s) identified in the literature as being the most important determinant of capital flow as these factors varied for different countries. For instance, Nigerian studies had identified pull factors such as exchange rate, inflation, interest rates, among others, as core determinants of capital inflows to Nigeria, but only Nwosa and Adeleke (2017) considered the possible effect of global real GDP growth rate on capital flows to Nigeria. However, since studies such as Tellez-Leon and Ibarra (2019); Mudyazvivi (2016); Andreou, Matsi and Savvides (2015), had earlier trumpeted the significance of push factors in capital flow determination for diverse developing countries, the present study considers both pull and push factors in explaining the direction of international capital flows to Nigeria.

Hence, the present study is set to investigate the determinants of capital flows to Nigeria. In particular, it will analyse effects of global liquidity and global real GDP growth rate on capital flows to Nigeria; ascertain the global risk aversion, foreign interest rate fluctuations, domestic inflation rate, and how monetary policy rate affects capital flows to Nigeria

2.0 Literature Review

2.1 Conceptual Framework

The pull factors generally refer to improvements in the domestic economy's prospects, associated notably with inflation stabilization and structural reform. It has been noted, for instance, that in several countries, downward shifts in inflationary expectations (associated with improved credibility of stabilization policies or the liberalization of domestic financial markets) have led to domestic macroeconomic stability, which has accelerated capital inflows (Tellez-Leon and Ibarra, 2019). Also, a positive growth rate of the domestic economy which reflects improved efficiency in the use of domestic capital stock is considered as a prime example of a 'pull' factor in the determination of capital inflows to developing countries (Al-Smadi, 2018).

The push factors underlying the surge in capital inflows refers mostly to external shocks and other regulatory changes in the world economy. Among these 'push' factors, a prominent role has been attributed to the cyclical reduction in interest rates and asset returns in the U.S. and other industrial countries in the early 1990s. Calvo, Leiderman and Reinhart (1993), provided econometric evidence suggesting that the low interest rate prevailing in the U.S. in the early 1990s had a very significant effect on capital inflows to developing countries. Fernandez-Arias (1996) also argued that improvements in the creditworthiness of some highly-indebted countries, driven mainly by reductions in international interest rates, have played a significant role in explaining the surge in capital inflows towards middle-income developing economies between 1989 and 1993.

By considering the impact of the push and pull factors in capital flows determination, as stated above, the following justification warranting the need for the study could be advanced: First, capital flows are affected by global factors that affect both source and recipient countries. In this case, the Bank of International Settlement (BIS) as well as the European Central Bank (ECB) recognize the United States as a major force in international policy making, affecting global financial markets and controlling over 70 per cent of global investments due to its strong currency (Mercado, 2020; ECB, 2018). This shows that economic policies and financial crisis in the US is rapidly transmitted to the world due to the common use of the dollar in international transactions and thus, might hamper or promote capital flows to developing countries. Second, this has extreme policy implications as it brings another dimension to local policy levers. Consider a situation of a developing country pursuing or operating an open economy, the push-pull framework points to the potency of structural reforms and economic fundamentals that would enhance macroeconomic and financial stability both in the domestic and global economy.

2.2 Theoretical Framework

This study is anchored on the theoretical postulations of the neoclassical and Lucas paradox as discussed hereafter:

2.2.1 Neoclassical theory

The theoretical underpinning of capital flows and their determinants is traced to the implications of the open-economy perception of the Solow (1956) growth model which constitutes the basis for subsequent empirical investigations. In the context of economic growth, assuming a small open economy operating with explicit production factors such as capital (K), and labour (L), through a constant return to scale production function of the form:

$$y_t = A_t f(k_t l_t) \quad \text{Eqn. (2.1)}$$

Where,

A_t = technology parameter

y_t = output per worker

k_t = capital per worker; and

l_t = Labour

Perfect competition in the production of homogenous goods entails that each factor is paid the value of its marginal product. Therefore, at the steady-state, it is also the case that the capital market equilibrium condition has to be satisfied:

$$A_t f'(k_t) = r_t^{neo} \quad \text{Eqn. (2.2)}$$

Where,

r_t^{neo} = is the domestic interest rate associated with capital per worker ratio

$A_t f'(k_t)$ = is the net depreciation of marginal product of capital per worker.

Now, suppose that capital is perfectly mobile across countries such that investment is not constrained by domestic savings as firms gain access to foreign savings. Here, the case of a small open economy that faces an infinitely elastic supply of capital on the international market at the world interest rate (r^w) is considered. If the rate of return on capital associated with the initial level of capital stock to labour ratio is greater than the global interest rate, foreign capital would flow into the country. According to the neoclassical theory, based on liberal capital flows, large capital flows from developed (capital-abundant) to developing (capital-scarce) countries should be observed due to diminishing returns to capital (Solow, 1956). It then implies that capital flows are influenced by return differentials among countries. Hence, if there are no restrictions, capital would flow into economies where returns are higher, that is, where capital is relatively scarce (Schumpeter, 1954). This situation allows countries to improve their pattern of inter-temporal consumption, by either lending money to finance more profitable projects abroad, or borrowing money more cheaply than what could be borrowed domestically to finance more investments.

2.2.2 Lucas paradox

As noted, the neoclassical prediction is not observed; giving rise to the Lucas paradox. Theoretical approaches to account for this paradox would be categorized as cross-country variations in economic fundamentals versus international capital market imperfections. The Lucas paradox entails the observation of rich-to-poor capital flows falling far short of the flows predicted by the neoclassical growth theory (Lucas, 1990). In his seminal paper, Robert Lucas commenced with a rhetorical question regarding why the capital was not flowing from rich countries to poor countries (Lucas, 1990). Lucas questioned the neoclassical prediction on the direction of capital flows based on marginal analysis of capital productivity. He further demonstrated an aspect of the paradox using the Cob-Douglas production function (Lucas, 1988). In his analysis, Lucas found that capital flows to less developed countries were hindered by macroeconomic instability occasioned by high political risk and growth rate differentials. He concluded by emphasizing the need to reduce political risk, increase human capital mobility, macroeconomic stability and openness to foreign investment in competitive terms.

Lucas' assertions attracted a lot of attention from diverse scholars with significant empirical research being done on the capital flow allocation puzzle. Notwithstanding the inherent differences in their methodological framework, definition and components of capital flow, the following findings seemed to be robust across studies: macroeconomic fundamentals, institutional quality, human capital development and globalization had significantly affected capital flows to poor countries (Koekpe, 2015). Other factors identified by researchers based on Lucas' framework included technological innovation, infrastructural development and return on investments.

2.3 Empirical Framework

Tellez-Leon and Ibarra (2019) ascertained whether different types of capital flows were affected by the same factors. Hence, the study analyzed impact of shocks to pull-push factors on each component of capital flows to Mexico. To this end, impulse response functions from vector autoregressive (VAR) for the period 1995–2018 were estimated. It was found that increases in the U.S. interest rate diminished FPI flows to Mexico. An increase in global risk aversion generated lower portfolio investments, particularly in private sector securities. Foreign investors responded significantly to U.S. interest rate and liquidity shocks compared to domestic investors.

In a similar study carried out in Jordan, Al-Smadi (2018) investigated determinants of foreign portfolio investment (FPI) using yearly time series data spanning from 2000 to 2016. Eight (8) explanatory variables such as economic growth rate, inflation rate, interest rate differentials, and the performance of the stock market, risk diversification, country's creditworthiness, governance, and corruption were duly considered. The regression output showed that a stable macroeconomic environment attracted foreign investors to Jordan. In addition, opportunities for risk diversification significantly explained foreign investors' preference to invest in the Jordanian capital market. Also, sufficient liquidity and good governance played a prominent role in attracting FPI to Jordan. The results of the study exposed factors that significantly determined the flow of foreign portfolio investments to Jordan which could be emphasized when formulating policies by economic authorities who were seeking to attract more portfolio investments.

Again, with a focus on selected developing economies, Belke and Volz (2018), investigated the significance of push- and pull factors to FDI, portfolio and "others" (including loans). Based on a quarterly panel for thirty-two (32) countries observed from 2009 to 2017, the empirical models for capital inflows were tested with parsimonious final models. Concerning push factors, the study focused on global liquidity and economic uncertainty alongside country-specific macroeconomic factors. The study found that global liquidity, economic uncertainty and other risk components, such as the U.S. yield spread sufficiently explained the direction of international portfolio flows to developing economies. The findings from the study re-

emphasized the need for policymakers to continuously take cognizance of vulnerabilities associated with external financing and maintaining financial stability in the domestic economy.

In Montenegro, Lipovina-Božović and Ivanovic (2018) looked into the dynamics of push-pull factors as determinants of capital flows. Specifically, the study assessed how global shocks affected capital flows into Montenegro. Structural vector autoregressive (SVAR) model estimates of the determinants of foreign direct investments and portfolio investments were applied using quarterly data from 2005 to 2017. Evidence was provided that push factors, such as foreign output, interest rate differentials and Euro area risk sentiment significantly explained variations in FDI and FPI. Also, domestic factors, such as domestic output and domestic risks were insignificant in explaining the changes in FDI and FPI to Montenegro.

Similarly, in Mauritius, Kisto (2017) focused on determinants and impact of FDI using annual time series data spanning from 1975 through 2015. Vector error correction model (VECM) used for the analysis revealed that domestic macroeconomic variables, namely, inflation rate and exchange rate were the most significant factors that affected FDI flows to Mauritius over the study period. The exchange rate exhibited a negative and significant influence on FDI flows while the interest rate affected FDI positively. It was recommended that government should continue to diversify the export and tourism markets, ensure stability in macroeconomic policies, implement economic reforms, accelerate expenditures in the area of infrastructure and redirect FDI in productive sectors of the economy as ways to accelerate the economic growth of Mauritius.

With a sample of nineteen (19) developed and developing countries for the period of 10 years (2004–2013), Singhania and Saini (2017) identified determinants of foreign portfolio investment in developed and developing economies using fixed and random effects and panel generalized method of moments (GMM) approaches to panel data analysis. In the case of developed countries, it was observed that interest rate differentials, trade openness, host country stock market performance and U.S. stock market returns, were significant determinants of FPI flows, while in developing countries, freedom index, interest rate differentials, host country stock market performance, trade openness, U.S. stock market returns and financial crisis periods (2006–2008) significantly influenced inflows of FPIs. The dynamic model supported that as a group of 19 countries, portfolio investments were significantly influenced by interest rate differentials, freedom index, US stock market and host country stock market returns.

Again, Nwosa and Adeleke (2017) examined if foreign direct investment (FDI) and foreign portfolio investment (FPI) volatility were determined by the same factors in Nigeria. The study used annual data covering the periods 1986 to 2016 while the E-GARCH approach was employed for the data analysis. Based on the analysis, the study observed that trade openness and global GDP significantly explained FDI volatility in Nigeria, while domestic interest rate and stock market capitalization significantly explained FPI volatility in Nigeria. Other variables were insignificant in influencing volatility in FDI and FPI. Consequently, the study recommended the need for prudent management of domestic macroeconomic fundamentals to ensure reduced volatilities in these capital flows which were essential for the growth of the domestic economy, particularly at the time when the Nigerian economy had been in great need of foreign investment owing to the continuous variations in international crude oil price.

In a thesis, Mudyazvivi (2016) carried out an investigation on determinants of FDI and FPI inflows into Sub-Saharan Africa (SSA) between 2000 and 2014. The determinants of capital inflows considered were macro-economic fundamentals, infrastructure availability, and quality of institutions, resource endowment and geographical related issues. These variables were analyzed with the aid of panel regressions based on the random effects framework. The results indicated that SSA's FDI during the period reviewed was majorly attracted by macroeconomic

fluctuations, infrastructure and human resources factors and pushed by global macroeconomic performance. On the other hand, FPI was significantly pulled by GDP growth rate and infrastructural factors. The results further showed that FDI and FPI inflows in regional trading blocs were significantly affected by risk-return differentials, macroeconomic fluctuations; and trade and distance factors. The effects of distance and macroeconomic factors varied across the regional trading blocs.

Considering the mechanisms of global capital flows, Andreou, Matsi and Savvides (2015) investigated determinants of equity capital flows to emerging market economies over the period 1998-2013. In particular, the study sought to investigate which of the sovereign credit ratings, global push or domestic pull factors mattered the most for equity flows. The results from the regression analysis showed that credit ratings were a significant determinant of equity flows to emerging economies. Among the economic variables analyzed, two were consistently significant determinants of equity flows: global risk (VIX index) and U.S. liquidity rate. It was also found that higher global instability reduced capital inflows, while the growth of the U.S. money base spilt over into increased equity flows to emerging economies, especially during the period preceding the collapse of Lehman.

2.4 Gap in Empirical Literature

The empirical studies that falls under the push – pull analysis of capital flows are mainly foreign studies. Only Nwosa and Adeleke (2017) attempted to incorporate push factors like global real GDP growth rate and U.S. inflation rate. To bridge this gap, the present study developed a model that captures both pull and push factors as identified by the aforementioned foreign studies.

3.0 Methodology

3.1 Research Design

A research design provides insights on how to conduct research using a chosen methodology. There are numerous types of research design contained in the literature, but this study applied ex post facto design. Ex post facto research design which is a quasi-experimental study investigates how data on independent variables existing before the study affects a dependent variable. As a result, this study used ex post facto research design because it is aimed at investigating determinants of capital flows in retrospect, specifically, from 1980 to 2020.

3.2 Nature and Sources of Data

The nature of data collated and used for this study were from secondary sources. The major sources of data were the World Development Indicators (WDI), World Data Atlas, Central Bank of Nigeria Statistical Bulletin (2020) and Federal Reserve Bank (FRED) economic database. Push factors such as international liquidity, global volatility index, global real GDP growth rate and global interest rate were sourced from FRED database and WDI. On the other hand, data on pull factors such as Nigeria's real GDP growth rate, exchange rate, monetary policy rate and inflation were sourced from CBN statistical bulletin. Data for the various components of capital flows such as FDI and FPI were sourced from CBN Statistical Bulletin (2020), while data for international banks' credit flow were sourced from the World Data Atlas.

3.3 Model Specification

Many models have been developed in the study of determinants of capital flows. However, the model used for this study was drawn from the empirical work of Tellez-Leon and Ibarra (2019), which explains that different types of capital flows to Mexico was determined by different variables within the scope of pull-push factors as expressed in equation 3.1:

$$F_t = \alpha_1 \log(VIX)_t + \alpha_2 \log(M^*)_t + \alpha_3 \log(Y^*)_t + \alpha_4 \log(R^*)_t + \alpha_5 \log(Y)_t + \alpha_6 \log(R)_t + \alpha_7 \log(P)_t + \alpha_8 \log(e)_t \quad \text{Eqn. (3.1)}$$

Where,

F_t = Capital flows

VIX_t = Global volatility index (proxy for global risk aversion and uncertainty)

M^*_t = Money supply (M1) in the United States of America (global liquidity)

Y^*_t = Real GDP growth rate for USA (proxy for global economic activity)

R^*_t = U.S. federal funds rate (indicator of U.S. monetary policy and proxy for global interest rate)

Y_t = Mexican real GDP growth rate (domestic economic growth)

R_t = Mexican monetary policy rate

P_t = Mexican consumer price index (measured by annual inflation rate)

e_t = The Peso-Dollar exchange rate

In the model used by Tellez-Leon and Ibarra (2019), capital flows were categorized into FDI, FPI and other investments, but the current study used aggregate capital flows. Also, to capture the broad objective of this study, an empirical model that captured the determinants of aggregate capital flows to Nigeria was developed. Again, the Naira to Dollar exchange rate was used in place of the Peso-Dollar exchange rate since Nigeria is the focus of this study.

Based on these modifications, the anchor model was expressed in equations 3.2:

$$CIF_t = \beta_0 + \beta_1 GLIQ_t + \beta_2 GGRT_t + \beta_3 GVIX_t + \beta_4 GITR_t + \beta_5 DGRT_t + \beta_6 EXCR_t + \beta_7 MPR_t + \beta_8 INFR_t + \mu_t \quad \text{Eqn. (3.2)}$$

Where,

CIF_t = capital inflow as a ratio of Nigerian GDP

$GLIQ_t$ = Global liquidity (measured by M1 in the U.S.)

$GGRT_t$ = Global real GDP growth rate (measured by real GDP growth rate for U.S.)

$GVIX_t$ = Global volatility index (proxy for global risk aversion and uncertainty)

$GITR_t$ = Global interest rate (measured by U.S. Federal Funds Rate)

$DGRT_t$ = Domestic real GDP growth rate (measured by Nigerian real GDP growth rate)

$EXCR_t$ = Exchange rate (proxy for Naira-Dollar exchange rate)

MPR_t = Monetary policy rate in Nigeria

$INFR_t$ = Annual inflation rate in Nigeria

β_0 = constant parameter

$\beta_1 - \beta_8$ = coefficients of the independent variables

μ_t = Stochastic term

f = Functional notation

3.3.1 *A priori* expectation

Push factors are expected to have negative coefficients because capital importing countries like Nigeria do not have control over them while pull factors are expected to be positive because they represent domestic macroeconomic factors under the control of capital importing countries. *Ceteris paribus*, the *a priori* expectation (predicted signs) of the independent variables were summarized in Table 3.1 as follows:

Table 3.1: Summary of *a priori* expectation of the independent variables

Variables	Measurement	<i>A priori</i> sign	Source
Push factors:			
GLIQ	United States' narrow money (M1) supply.	Significantly positive (-)	Tellez-Leon and Ibarra (2019)
GGRT	United States' real GDP growth rate.	Significantly negative (-)	Nwosa and Adeleke (2017).
GVIX	Global market risk and investors' sentiments	Significantly negative (-)	Al-Smadi (2018)
GITR	United States' Federal Funds Rate (FFR)	Significantly negative (-)	Lipovina-Božović and Ivanovic (2018)
Pull factors:			
DGRT	Nigeria's real GDP growth rate	Significantly positive (+)	Mudyazvivi (2016).
EXCR	Naira – Dollar rate	Significantly positive (+)	Singhania and Saini (2017).
MPR	Central Bank of Nigeria overnight interest rate	Significantly positive (+)	Tellez-Leon and Ibarra (2019)
INFR	Yearly percentage change in consumer price index (CPI).	Significantly positive (+)	Nwosa and Adeleke (2017).

Source: Summarized by author (2021).

3.4 Description of Model Variables

The dependent variables which are components of capital flows and explanatory variables which are determinants of capital flows based on the push-pull framework have been used in prior empirical studies and have shown varying degrees of significance and directions. These variables are described as follows:

3.4.1 Dependent variables

The dependent variables are foreign direct investment (FDI) inflows, foreign portfolio investment (FPI) inflows and international banks credit (IBC) inflows.

1. **Capital inflows (CIF):** This refers to the aggregate of all forms of foreign capital flows to Nigeria. It shows the monetary value of aggregate foreign capital flows to Nigeria. The CIF is the main dependent variable of this study.

3.4.2 Independent variables

The independent variables to be used for this study are push factors (ILIQ, GGRT, GVIX and GITR) as well as pull factors (DGRT, EXCR, MPR and INFR). These independent variables are described as follows:

1. **Global Liquidity (GLIQ):** Global liquidity is defined as the sum of narrow money (M1) in the U.S. (European Central Bank, 2011). The growth rate of U.S. M1 is included as a proxy for global liquidity. The official component, namely the central bank liquidity, is the funds unconditionally available to settle claims through monetary authorities. Hence, higher international liquidity is expected to push capital from developed countries to developing countries in search of higher returns.
2. **Global Real GDP Growth Rate (GGRT):** Generally, an increase in real GDP growth rate informs investors of a stable economy with a large market size. Changes in real GDP growth rate in resource-rich countries is expected to influence capital flows. For instance, a negative shock to the real GDP growth rate in the U.S. will make investors hold assets outside the United States which automatically pushes capital to other countries of the world where economic growth is stable.
1. **Global Risk Aversion and Uncertainty (GVIX):** Created by the [Chicago Board Options Exchange \(CBOE\)](#), the volatility index which is also known as the "fear index" is a real-time [market index](#) that provides a measure of global market risk and investors' sentiments. Foreign investors, research analysts and portfolio managers look to trends in the global volatility index as a way to measure global [market risk](#), uncertainties, fear and stress before investment decisions are taken. An increase in global risk could lead to a liquidity crunch in the developed countries, hence a decline in capital flows to developing countries.
2. **Global Interest Rate (GITR):** The global interest rate in the context of this study was measured by the Federal Funds Rate (FFR) which indicates the United States monetary policy rate. Lower FFR results in higher liquidity, hence low return on investments in the U.S., leading to increased capital flows from the U.S. to the developing countries.
3. **Domestic Real GDP Growth Rate (DGRT):** Foreign investors are attracted to countries with a high economic growth rate during periods of shocks. As such, an unstable domestic economy would reflect in the growth rate of real GDP, hence would discourage foreign investment inflows. For instance, foreign investors invest when a high potential is discovered in the country and dispose of their investments at the time of economic distress, thus justifying the usage of this variable.

1. Exchange Rate (EXCR): Nigeria is one country that has seen its currency depreciate in recent times. Exchanges, through cross border investments, are contracted in foreign currencies whose exchange rates in terms of the domestic currencies (Naira) are highly volatile. This is because foreign investors' see low values of domestic currency vis a vis its reference currency (U.S. Dollar) as a discouraging factor. As such, foreign investors, being rational individuals, ensure the safety of investments before their capital gains are completely eroded through the volatile exchange rate. Hence, countries with unstable exchange rates are often not regarded as destinations of foreign capital.
2. Monetary policy rate for Nigeria (MPR): The MPR was used to measure the overnight interest rate for Nigeria. A recipient economy, like Nigeria, with higher MPR, will experience a liquidity crunch, hence will require capital inflow to bridge the resource gap. Foreign investors often take advantage of higher returns on capital occasioned by contractionary monetary policy in the recipient economy, hence increase in capital inflows .
3. Inflation Rate (INFR): Inflation is the rate at which the general level of prices for goods and services is rising. An increase in the domestic price level (higher rate of inflation) causes the real value of domestic assets and currency to erode faster. From intuition, investors would naturally lose confidence in such an economy and transfer their assets to countries with stable price levels in situations of extremely high inflation. This implies that capital flows might decline when the recipient country is faced with price instability.

3.5 Technique of Data Analysis

The estimation of data was done using the multiple regression analysis based on the autoregressive distributed lag (ARDL) model. For the ARDL, the bounds test was used to determine the long-run relationship between the regressand and the regressors following the Pasaran criteria of bound limits. One of the merits of the bound test is that it accommodates possible structural breaks which might have adverse implications on the existence of a long-run association between the explained and explanatory variables. Under ARDL, long-run and short-run coefficients were estimated simultaneously and utilized for cointegration test even if the variables are of a mixed level of integration, that is, $I(1)$ and $I(0)$. In other words, the underlying assumption is that the variables could be of mixed integration; $I(1)$ and $I(0)$ but none are integrated at second differencing, $I(2)$ (Pesaran, Shin and Smith, 2001).

4.0 Data Analysis and Discussion

4.1 Test for Stationarity of Data

The test for stationarity of data followed the Augmented Dickey-Fuller (ADF) approach to unit root testing. The ADF test was applied to the variables under consideration to ascertain the stationarity of the time-series data. Table 4.1 displays the variables in level form and first difference form (where the variable was not stationary at level).

As could be seen from Table 4.1, the series of GGRT, GITR and INFR were stationary at levels but CIF, GLIQ, GVIX, DGRT, EXCR and MPR were non-stationary in level form but taking the first difference of the series made them stationary. The probability values of t-statistic values were tested at a 5 per cent level of significance. Hence, variables were adjudged stationary if their respective probability values fell below 0.05 at either levels, that is, $I(0)$ or first difference, that is, $I(1)$. This result implies that the variables were integrated at varying order (but none was integrated at second difference) which informed the use of ARDL technique for the study.

Table 4.1: ADF unit root test

Variable	ADF at Level; I(0)		ADF at first difference; I(1)		Order of integration
	t-Statistic	Prob.	t-Statistic	Prob.	
CIF	-2.116668	0.5204	-6.401889	0.0000	I(1)
GLIQ	-1.171694	0.9028	-3.693755	0.0283	I(1)
GGRT	-4.208298	0.0099	--	--	I(0)
GVIK	-3.435533	0.0612	-4.872251	0.0018	I(1)
GITR	-5.759958	0.0001	--	--	I(0)
DGRT	-2.033786	0.5651	-11.64878	0.0000	I(1)
EXCR	-0.002993	0.9948	-4.621806	0.0035	I(1)
MPR	-3.098962	0.1204	-8.730486	0.0000	I(1)
INFR	-3.773039	0.0289	--	--	I(0)

Source: Author’s results from EViews 10.0 package (2021)

4.2 Diagnostic Tests of the ARDL Model

To ascertain the robustness of the outcomes of the results, it was important to ensure that the stability and the correct functional form of the models were specified, and avoidance of severe serial correlation and heteroscedasticity. The test statistic for the various tests must be statistically insignificant to ensure the absence of the aforementioned econometric problems.

The diagnostic tests of serial correlation, heteroskedasticity and normality of residuals were based on the following hypothesis and decision rule:

HO: There are no serial correlation, heteroskedasticity and abnormality problems.

H1: There are serial correlation, heteroscedasticity and abnormality problems.

Significance Level: $\alpha = 5\%$ or 0.05

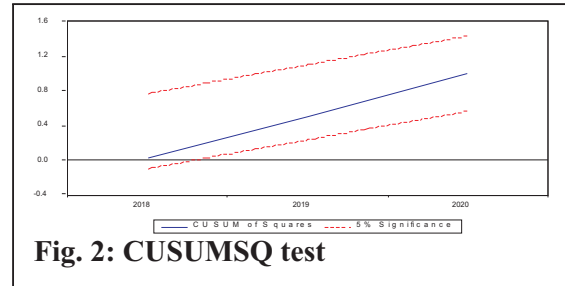
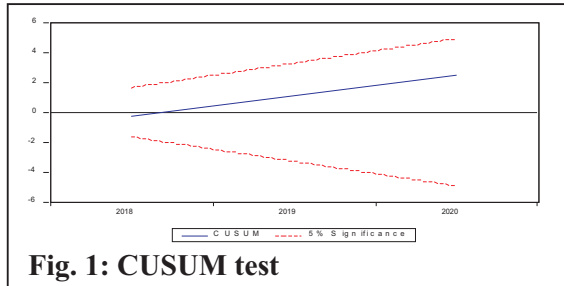
Decision Rule: Reject Ho if the p-value of the critical value is less than α , which mean that there is an autocorrelation problem. Otherwise, do not reject HO:

Table 4.2: Diagnostic tests

Test	Test statistic	t-Statistic {p-value}
Serial correlation test:	F-statistic	2.387115
	Prob.	{0.1309}
Heteroscedasticity test:	F-statistic	1.419424
	Prob.	{0.2443}
Jarque-Bera test:	JB test	0.4466
	Prob.	{0.7998}

Source: Author’s results from EViews 10.0 package (2021)

Figures 1 and 2 show that the cumulative number of recursive residues (CUSUM) and the cumulative number of recursive residues of squares (CUSUMSQ) for the ARDL model were within critical limits for the 5 per cent significance level, indicating that the ARDL model coefficients in each specification were stable.



4.3 ARDL Estimation of the Model

The outcome of the bounds test approach to cointegration which measured the existence of long run relationship in the models was presented in Table 4.3:

Table 4.3: Bound test result

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.483662	10%	1.85	2.85
K	8	5%	2.11	3.15
		1%	2.62	3.77

Source: Author’s results from EViews 10.0 package (2021)

The result of the bounds test showed that the F-statistic value was 4.483662. It was noted that the reported F-statistic exceeded the critical value of the bounds at 5 per cent level, implying a long-run equilibrium relationship between different orders of the dependent and independent variables. This means that the effect of the interactions between push and pull factors on capital flows followed a long run path over the period of study.

4.4 Long Run Estimates

The long-run estimates of the ARDL that depicted the effect of push – pull factors on total capital inflow was presented in Table 4.4:

Table 4.4: Long run estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	81.99332	18.25797	4.490823	0.0002
GLIQ(-1)	-0.090727	0.215275	-0.421449	0.6775
GGRT(-1)	-0.641749	0.237810	-2.698583	0.0131
GVIX(-1)	-0.126934	0.055262	-2.296937	0.0332
GITR(-1)	-0.372623	0.124117	-3.002196	0.0066
DGRT(-1)	-0.164289	0.072976	-2.251283	0.0347
EXCR(-1)	-0.176439	0.048059	-3.671299	0.0060
MPR(-1)	0.728428	0.625056	1.165379	0.2563
INFR(-1)	-0.651653	0.204750	-3.182675	0.0043

Source: Author’s results from EViews 10.0 package (2021)

The results showed that the intercept (constant) of the model is 81.99332, implying that when the measures of independent variables are fixed or held constant, capital flows will increase. The estimated coefficients showed that apart from MPR, all the other variables within the push – pull framework exerted negative effect on total capital flows (CIF) to Nigeria. The push factors such as GLIQ, GGRT, GVIX and GTR caused CIF to decline by approximately 0.090727, 0.641749, 0.126934 and 0.372623 units, implying that the push factors generally did not encourage capital flows to Nigeria and that potential flows to Nigeria were susceptible to global factors. Apart from the discouraging effects of push factors on capital flows to Nigeria, results for Table 4.6 also revealed that apart from the MPR, other pull factors such as DGRT, EXCR and INFR further hindered capital flows to Nigeria as their respective coefficients showed that CIF reduced by 0.164289, 0.176439 and 0.651653 units. However, the domestic MPR exerted positive effect on CIF such that capital flows to Nigeria accelerated by 0.728428 units in the face of a unit change in the monetary policy rate (MPR).

4.5 Error Correction Model (ECM)

The optimal lag length of 2 was chosen based on the Akaike info criterion (AIC) generated from the ARDL model (2, 1, 1, 1, 2, 2, 1, 1, 1). From the ARDL estimation of determinants of total capital flows (CIF) to Nigeria, the following results of the long run estimates and error correction mechanism (ECM) were discussed. The ECM which explained the adjustment mechanism of the total capital flows (CIF) model was presented in Table 4.5:

Table 4.5: Error correction mechanism and short run dynamics

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CIF(-1))	0.378461	0.117262	3.227487	0.0039
D(GLIQ)	-0.803205	0.161381	-4.977074	0.0001
D(GGRT)	-0.331353	0.096137	-3.446671	0.0023
D(GVIX)	-0.107819	0.041349	-2.607546	0.0161
D(GTR)	0.208947	0.094144	2.219439	0.0371
D(GTR(-1))	0.299262	0.118940	2.516071	0.0197
D(DGRT)	0.421589	0.315049	1.338172	0.1945
D(DGRT(-1))	0.106168	0.030824	3.444272	0.0023
D(EXCR)	-0.076439	0.048059	-1.590509	0.1260
D(MPR)	-0.358438	0.157756	-2.272102	0.0332
D(INFR)	-0.358438	0.107697	-3.328209	0.0031
ECM(-1)	-0.575256	0.082106	-7.006280	0.0000
R-squared	0.904014			
Adjusted R-squared	0.834206			
F-statistic	12.94998			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.949665			

Source: Author’s results from EViews 10.0 package (2021)

The error correction model (ECM) was employed to show the nature of the short run adjustment process towards the long run equilibrium state. It is noteworthy that the ECM(-1), which is the residual value, was negative and significant in model one. The ECM showed that over 57.5 per cent of the error associated with the short run adjustment mechanism was being corrected per period in model one. This further proves the system had a relatively high adjustment speed and could also converge to its equilibrium state.

The F-statistic of 12.94998 with its prob. (0.0) showed that the push – pull parameters collectively

exert statistically significant effect on total capital flows to Nigeria. This implied that the interactions between the push and pull variables significantly affect capital flows to Nigeria. Similarly, the adjusted R-squared (0.834206) indicated that the interactions between the push – pull factors accounted for approximately 83 per cent of the total variations in the total capital flows to Nigeria, implying that the independent variables jointly explained significant proportion of capital flows to Nigeria. As such, the model was found fit after taking into account of the loss in the degree of freedom. The Durbin – Watson statistic of 1.949665 was observed to be approximately 2, which indicates the model was not spurious. The short-run coefficients for the push factors indicated that D(GLIQ), D(GGRT) and D(GVIX) exerted negative effects on total capital flows to Nigeria while the effect of D(GITR) were observed to be positive. On the pull factors, it was seen that D(DGRT) exerted positive effect on capital flows to Nigeria while D(EXCR), D(MPR) and D(INFR) negatively influenced capital flows to Nigeria

4.6 Discussion of Results

In the long run and short run, the effect of GLIQ on the various components of capital inflows was largely negative. GLIQ had a negative and significant effect on total capital inflows in the short run while it had negative and insignificant effect on total capital inflows in the long run. The negative effect of GLIQ on capital flows could be due to the volatile macroeconomic environment of Nigeria occasioned by incessant cases of insecurity in the country. Also, the negative and significant effect of GLIQ in the short run could mean that excess liquidity in the US were pulled by other countries. This finding was in consonance with the a priori expectation but in contrast with Tellez-Leon and Ibarra (2019); Belke and Volz (2018), who found that increases in GLIQ increased capital flows to developing countries..

With the findings that GGRT exerted negative effect on total capital inflows (CIF) in the long run and short run, this finding was in tandem with the a priori expectation and could imply that foreign investors might have withheld their investments from Nigeria due to better economic sustainability in the developed economies, especially the United States. It then implied that foreign capital would likely not flow to Nigeria because investors prefer the developed economies with steady growth rate safe for better investment returns. The study by Onyele (2022); Lipovina-Božović and Ivanovic (2018); Nwosa and Adeleke (2017), support this finding that better economic growth in developed countries hinders capital flows to developing countries but the observation of Al-Smadi (2018) showed that GGRT did not stop foreign capital from flowing to Jordan, which is in contrast with the findings of this study.

The effect of GVIX (which was used to measure global risk aversion) on capital flows was expected to be significantly negative because an increase in GVIX would hinder investment flows to developing countries (Tellez-Leon and Ibarra, 2019; Al-Smadi, 2018). This was the case as increase in GVIX was found to diminished total capital flows to Nigeria. As such, it could be said that the dynamics of GVIX do hinder capital flows to Nigeria but may not hinder all the components of capital flows from developed countries at the same time. This does not align with Tellez-Leon and Ibarra (2019), who found a negative relationship between GVIX and CIF in Mexico, but is in tandem with the findings of Al-Smadi (2018), who found that foreign investors preferred financial markets which allow for risk diversification.

This study found that GITR caused a diminishing effect on capital flows to Nigeria in the long run as predicted, although it exerted a negative and significant effect on total capital inflows. In the short run, across the models, GITR was found to have exerted positive effects on capital flows probably due to the frequent quantitative easing embarked upon by the United States' monetary authorities. Hence, with quantitative easing, there could be excessive liquidity in the global monetary system which plausibly spilled over to Nigeria for a short while. The findings of this study agree with those of Lipovina-Božović and Ivanovic (2018) but fail to agree with the

findings of Tellez-Leon and Ibarra (2019), that GITR lowered capital inflows.

DGRT was predicted to emerge with positive and significant coefficients because it was expected that the stable growth rate of the domestic economy should be able to pull capital from the developed world to Nigeria. This appeared not to be the situation in Nigeria as aggregate capital flows decreased significantly in the long run probably due to the inverse response of capital flows to DGRT. This implies that foreign investors were not attracted to Nigeria due to unstable DGRT as foreign investors would like to avert macroeconomic shocks that would negatively affect their returns. These findings are in line with Mudyazvivi (2016) that unstable DGRT hinders foreign capital flows to developing countries, but it fails to agree with the observation of Al-Smadi (2018), that DGRT attracted capital inflows to developing countries.

There is a positive and insignificant effect of MPR on aggregate capital flows to Nigeria. Also, in the short run, aggregate capital flows to Nigeria was hindered by the dynamics of MPR. It then implies that changes to the monetary policy to manage macroeconomic dynamics in Nigeria have largely failed to pull foreign capital to Nigeria. This has been largely attributed to inconsistencies in monetary policy by the recipient country's government.

The effect of INFR on total capital flows was negative and significant. This conforms with the prediction that INFR investors are often attracted to markets with moderate inflation rate. This clearly shows that aggregate capital flows to Nigeria was largely discouraged due to rising inflation rate and probably its transmission effects on the domestic currency. This implies that foreign portfolio investors were probably aware of the potential loss of returns due to a fall in the time value of money, due to the rising rate of inflation in Nigeria. Also, international banks were on alert for the possible effect of inflation on returns and interest payments in the future.

5.0 Summary of Conclusion and Recommendations

5.1 Summary of Findings

Specifically, the findings from the analyses and tests were summarized as follows:

- 1) Regarding the effect of global liquidity on capital flows to Nigeria, it was found that aggregate capital flows to Nigeria decreased insignificantly due to dynamics of global liquidity. This implies that a slight increase in global liquidity denied Nigeria of foreign capital inflows in the long run.
- 2) With respect to the effect of global real GDP growth rate, aggregate capital flows to Nigeria had declined significantly due to an increase in global real GDP growth rate in the long run. This implies that rising global real GDP may be attracting international capital flows to the advanced countries, especially the United States rather than Nigeria.
- 3) Concerning the effect of global risk aversion (measured by the global volatility index), it was seen that aggregate capital flows to Nigeria had declined significantly in the long run due to global risk aversion. This points to the fact that much foreign capital did not flow to Nigeria due to investors' fear of a global crisis.
- 4) Findings relating to the effects of global interest rate on capital flows to Nigeria indicated a negative and significant effect. This could be due to the signaling effect of the global interest rate.
- 5) In the long run, the domestic real GDP growth rate significantly and negatively affected aggregate capital flows to Nigeria. This indicates that the unsustainable economic growth rate witnessed in Nigeria has been largely unfavourable in attracting foreign capital inflow.
- 6) Looking at the effect of the exchange rate on capital flows to Nigeria, it was observed that aggregate capital flows to Nigeria was significantly declining due to a rising exchange rate. This implies that the unstable naira – dollar exchange rate has not been appealing to foreign investors.

- 7) Concerning the effect of monetary policy rate (MPR) on capital flows, the study found that monetary policy rate had a positive and insignificant effect on aggregate capital flows to Nigeria in the long run. This shows that the MPR has not been very effective in pulling capital flows to Nigeria.
- 8) Findings from the effect of inflation rate on capital flows to Nigeria showed that aggregate capital flows were significantly reduced to due inflationary pressure in the long run. This means that capital flows to Nigeria could be undermined by high inflation rate.

5.2 Conclusion

A shift in the inflow of foreign capital will require important macroeconomic adjustments and close monitoring of vagaries of external factors associated with the global economy. To this end, the primary objective of this study was to investigate the determinants of capital flows into Nigeria. The study found that aggregate capital flows to Nigeria were majorly driven by global factors. Also, the results showed that the various components of capital flows were affected differently by the pull and push factors and these effects varied with time as shown by the long-run and short-run estimates of the ARDL model. However, it was observed that though the pull effects of capital flows was experienced in the long run, it was much stronger and significant when it interacts with the push factors as shown by the high coefficient of multiple determination and F-statistic of the error correction model. Hence, it was concluded that in determination of capital flows to Nigeria, both the push and pull factors are important, meaning that policies aimed at attracting foreign capital to Nigeria should focus on managing the vagaries of both push and pull factors that could determine the direction of such capital flows.

5.3 Recommendations

Based on the findings, the recommendations were as follows:

- 1) The Nigerian government should improve its absorptive capacity such as enhancing the performance domestic macro economy to encourage foreign investors to channel excess liquidity abroad into Nigeria through international investments.
- 2) This study calls for policies that would enhance the competitiveness of the domestic economy in the global scene. This can be achieved by repositioning domestic industries at the right trajectory of the international value chain to effectively compete and benefit from opportunities offered by global financial flows, thus bringing the much-needed capital essential for growing a strong, inclusive and competitive economy in Nigeria.
- 3) Behavioural factors should be considered in policies aimed at enhancing capital inflows as different investors might choose to diversify their investments during periods of global shocks that might accelerate investors' risk aversion or sentiments. This policy implication could help reduce the pressure of investor sentiment on capital flows to Nigeria.
- 4) Monetary policy technical committee (MPTC) of the Central Bank of Nigeria should continue to monitor not only the developments at the domestic level but also at the international sphere. That is, when preparing monetary policy documents for the Monetary Policy Committee meetings, the MPTC should take cognizance of the monetary policy activities of Nigeria's major sources of foreign capital particularly, the United States.
- 5) There is a need to reduce restrictions on quality capital inflows, enhance dependable economic conditions for productive firms (whether foreign or domestic), including improving the ease of doing business in the economy.
- 6) Both local and foreign investors should be banned from using foreign currencies within Nigeria. Furthermore, exchange rate management should be credible such that market actors (including foreigners) and stakeholders, in general, should have the confidence that intervention rules to defend the naira are transparent, consistent and credible.

- 7) Government should pursue expansionary monetary policy and foreign exchange policies that would ensure the competitiveness of the financial and economic system to attract the much needed foreign capital inflows that would engender economic growth.
- 8) The monetary authority should ensure that inflation does not exceed the current or recent threshold of inflation rate (double digits) so that it would not negatively influence capital inflows, especially FPI and IBC into the country.

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