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ASSYMETRIC EFFECTS OF CAPITAL FLIGHT ON ECONOMIC GROWTH IN NIGERIA

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ABSTRACT
Considering the negative impacts of capital flight on any economy where there is evidence of persistent increase of the phenomenon capital flight and the fluctuating nature of capital flight estimate from various studies, this study aims at establishing the asymmetric responses of economic growth to capital flight in Nigeria using data sourced from world bank development indicator and Central Bank of Nigeria Statistical Bulletin from 1981 to 2020.the study employed the non linear autoregressive distributed lag model for analysis. The results show that Capital flight for all the periods is negatively related with gross domestic product. The study therefore recommends that appropriate policy measures such as moderate interest rate which will encourage investors to access funds and households to saving should be applied in Nigeria so as to increase economic growth and reduce capital flight in the country.

Key Words: capital flight, economic growth, NARDL.

1.0 INTRODUCTION:

Capital flight concept has been a controversial issue which has attracted attention in the academic and monetary policy authorities of developing and emerging economies especially in sub-Saharan African countries. This is as a result of the implication of the phenomena in economic growth of any economy with persistent flight in capital from the domestic economy. Capital flight drains a country of capital which results to low savings and inadequate capital formation.

Classical economic theory stipulates that the major role of investment is accelerating the rate at which economy grows. Nigeria is among African countries has experienced persistent and massive capital out flowed to developed nations especially the western countries. Before economic growth can take place, certain variables must be triggered. Among these variables are savings and investment (Ugochukwu, Oruta, Israel, & Evita 2021). Ndikumana, Boyce, and Ndiaye (2014) refer to capital flight as the variance between inflows recorded and uses of foreign exchange recorded. Yet scholars generally agreed on drivers of capital flight: capital flight occurs when there are capital outflows from the capital scarce economies (mostly developing countries). Nyong (2003) noted that, capital flight should be seen as any form of abnormal capital outflows from a developing country by economic agents (private or public with the intention of concealing such flow).

This is abnormal because one expects capital to flow from resource surplus to scare countries as suggested by capital arbitrage theory, theory of the firm and product cycle theory. Such

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abnormal capital outflow are responsive to political pressures at home coupled with domestic economic policy distortions such as heavier taxes, capital control and exchange rate problems, political instability, insecurity and other forms of distortions which negates economic growth. Ajayi (2012) added that the continuous outflow of domestic capital as a result of economic and political instabilities or uncertainties in the home country is called Capital flight. This worrisome situation denies the home country numerous economic resources that could be used to stimulate economic activities in the home country, promote welfare of citizens and accelerate economic growth (Beja & Edsel, 2006).

A glance at capital flight as illustrated in Figure 1 will buttress the Nigerian situation.

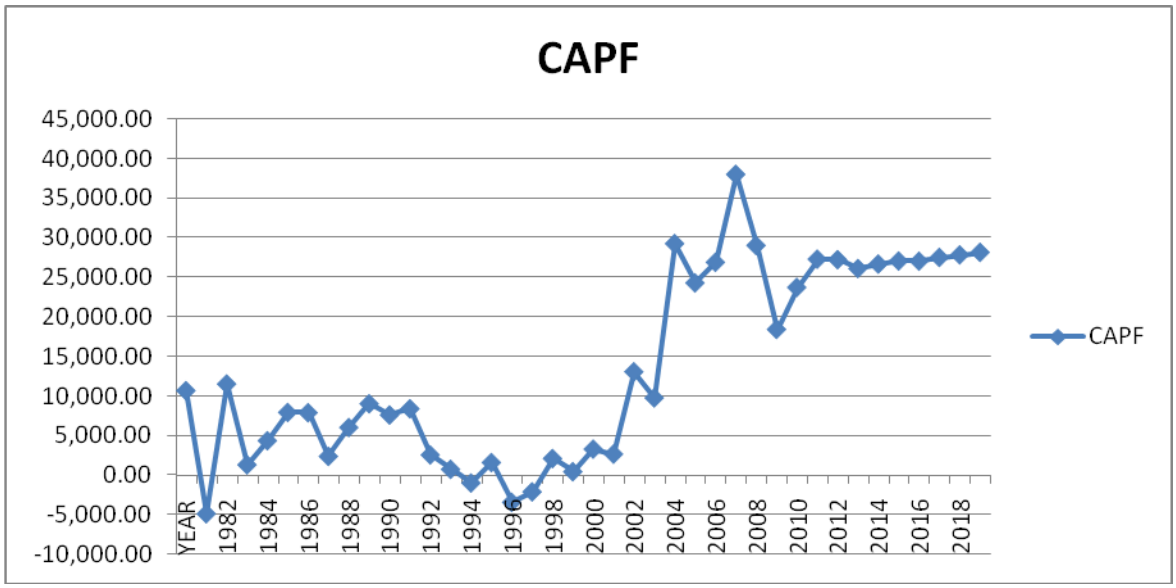

Figure 1: Nigerian capital flight trend from 1981 to 2020

From figure 1, capital flight has been swinging or fluctuating from 1981 to 2000 and witnessed a steady and rapid rise 2001till 2008, between 2009 and 2010 it decrease sharply. It picked up again from 2012 and continues to rise steadily till 2020. This implies that as capital flight is rising, it will negatively affect other key macroeconomic variables and ripples down to low economic activities. So capital flight needs urgent attention if our economy will achieve expected objectives.

The federal government of Nigeria has made several efforts to curb increasing rate of capital flight. The government enacted laws and established agencies such as The Economic and Financial Crime Commission Act of 2004 (EFCC), the Independent Corrupt Practices and other Related Offences Commission (ICPC), the Banks and Other Financial Institutions Act of 1991, the Advanced Fee Fraud and other Fraud Related Offences Act of 1995 and the Money Laundering Act of 1995 etc. Although these strategies and acts have been existing, yet every year Nigeria continue to record rising rate of capital flight in Nigeria. This call for better approach to curb the ugly situation which capital flight has push the nation into.

Considering the effect of capital flight on economies of developing countries including Nigeria, there are streams of rich and divers literatures on various areas relating to capital flight such as impact on economic growth, its determinants, domestic investment, its effect on poverty, savings gap, etc. Further investigations were made to ascertain the effect of capital flight on agricultural productivity, and the financial system. For instance, Usman and Arene (2014) studied the effects of capital flight and its macro-economic determinants on agricultural

growth in Nigeria. Determinants of capital flight and its impact on the Nigerian economic growth and development include studies carried out by (Ajayi, 1997; Okoli, & Akujuobi,2009; Bakere, 2011; Omviodiviokit, 2002; Gosarova, 2009; Obidike, Kalu, Odinye & Ogwuru, **2015;** Adedayo & Ayodele 2016; Igwema, Egbuluonu, & Nneji, 2018; Musibau 2017; Akani, 2016, Orji, Ogbuabor, Kama, & Orji, **2020**). While **(**Adekunle, 2012; 2019; Effiom, Uche, Otei & Effiong, 2020; Ojabo, 2021**),** established the relationship between capital flight and domestic investment.

Nevertheless, empirical literatures on effect of capital flight on economic growth and on different sectors of the economy believed that linear relationship exist between capital flight and economic variables. They premised their studies on the assumption that the impact of capital flight on economic growth and private savings is symmetric, such that reductions in capital flight also lead to proportionate increases in economic growth levels. Lerner and Tufano (2011) noted that the mobility and speed at which capital moves internationally with the current financial innovation together with the assumed inverse indirect impact capital flight might have on other macroeconomic variables directly associated with growth, including interest rate and inflation.

This paper actually contributes to the vast literatures on capital flight in Nigeria by decomposing impact of capital flight on economic growth into negative and positive impacts considering positive and negative trends of Nigerian capital flight. We thus investigate asymmetric impacts of capital flight on economic growth. This approach contrast the linear form of the autoregressive distributed lag (ARDL) framework, we employs the nonlinear ARDL (NARDL) as proposed and developed by Shin, Yu, and Greenwood-Nimmo, (2014). Its advantage is that it allows assessment of increasing and decreasing impacts of capital flight the dependent variables. Secondly, considering the fluctuating movement of capital flight in Nigeria over the years, it is quite misleading to assume only symmetric relationship among the variables of interest.

This gives credence to investigate the impact of capital flight on economic growth in Nigeria. Remaining part of this paper is devoted to exploring into this enquiry with the aim of finding solutions to the same. Following the introduction as section one, literature review is captured in section, methodology is in section three. Section four provides data presentation and results discussion. Section five contains the summary, conclusion and policy recommendation.

2 LITERATURE REVIEW

2.1 Theoretical Review

There is this believe that capital flight drains an economy investible resources and transfer same to another country. This movement of resources negatively affects both private and public investments. Considering the private investment aspect, capital flight lead to a fall in savings which affects banks ability to mobilize and create credit. This consequently results to reduction in domestic investment. Furthermore, if reduction in tax base is allowed to persist for a long time with it negative repercussions evidently seen in decline in government revenue. This may force the government through the central bank to print more money. This inevitably prompt inflationary tendency on the economy and compels investors to move their investment abroad so as to escape devaluation of the real worth of their assets fueled by inflation surge in the home country. Thus, according to the postulation of portfolio selection theory, these investors might be rationally induced to seek investment opportunities elsewhere outside the domestic economy.

Undoubtedly, also increase in capital flight increases fear, uncertainty and doubts on the ability of the government to finance fiscal deficits and fund her budget deficit. This mounts inflationary tensions and pressure and increases the tendency for the splitting of domestic assets held by the private sector. As a result of this, private investment falls. A persistent budget deficit plugs in debt unsustainability which causes the domestic debt to be rising. As observed by Ndiaye (2014) with regards to domestic debt, debt unsustainability might

generate risk of bankruptcy on the part of private firms, leading to total fall in private domestic investment. On the part of the government, rising and unsustainable public debt may build no confidence in government securities. The financial markets will poorly respond when government securities like bonds are issued. These gives credence to debt-driven capital flight thesis which states that external debt projects capital flight by depreciating domestic economy's currency from which external debt repayment is made and as the demand for foreign currency increases due to debt repayment.

2.2 Empirical Review

Literature on capital flight is rich, comprehensive and diverse. However, they all agreed that capital flight exerts negative effects on the economy. Some of the important literatures to this present study are presented below chronologically:

Ogundipe *et al* (2021) used secondary data sourced from world bank dataset from 1981 to 2019 to provide empirical evidence that capital flight exerts negative impact on Nigerian economic growth. The error correction model was used to ascertain the long run relationship between variables of the model. They further suggested that external debt and foreign direct investment should be employed in productive areas to ensure steady increase in domestic production and reduce capital flight.

On their empirical study of capital flight in Nigeria, Makwe, Gbosi and Gbanador (2021) used foreign direct investment abroad as proxy to capital flight and data extracted from Statistical Bulletin of the CBN and the National Bureau of Statistics to examine the long run relationship between capital flight and human development index and growth in Nigeria. Their unit root test result conducted through Augmented Dickey Fuller showed mixed integration: at level and after the first difference, thus prompting the use of autoregressive distributive lag and bonds test approach to establish the long run and short run relationship among the variables of the study.

Their analysis revealed that foreign direct investment outflows (capital flight) were negatively related to human development index and growth. Orji *et al* (2020) employed data obtained from Central Bank of Nigeria statistical bulletin ranging from 1981 to 2017 to analyze the relationship existing between capital flight and Nigerian economic growth. They applied ARDL bounds test methodology and observed that capital flight has a reduction effect on economic growth in both short and long run. Their study further discovered that domestic investment, credit to private sector and supply of money all have significant effect on economic growth also. Concluding, they recommended proactive measures which will reduce capital flight and build a more attractive economy that will capital formation within the country.

Using times series annual data ranging from 1990 to 2017, Makwe and Oboro (2019) investigated the effect of capital flight on Nigeria economic growth, ADF test was conducted to determine the stationarity of variables in the model, short run and the long run analysis was conducted using ordinary least square econometric technique. The T-test results showed the presence of a strong negative relationship existing between capital flight and real gross domestic product which serve as proxy for economic growth. The papers opinion is that since capital flight has a negative relationship with the real gross domestic product (RGDP), the government and the monetary authorities should do well to have a firm grip on the type and form of debt borrowed.

Ani *et al* (2018) through the use of ordinary least square technique examined the capital flight impact on economic growth in Nigeria between 1981 and 2016. Findings of the study proves that apart from the Gross Fixed Capital Formation (GFCF) that showed positive relationship with capital flight, other variables of the study which include Exchange Rate (EXR), Inflation (INF) and Terms of Trade (TOT) gross domestic product (GDP) were negatively related to capital flight during the period of the study. The opinion of the paper is that the government should use appropriate policy measures and

ensure its careful implementation to enhance productivity within the economy.

Igwemma *et al* (2018) added that capital flight have inverse relationship with economic growth of Nigeria while foreign education, medical sending and looted funds are the main conducts through which huge capital resources exit the country. This was done by their study which examined the impact of capital flight on the Nigerian economy from 1986-2016. They data for the study were obtained from various sources including Central Bank of Nigeria (CBN) Statistical Bulletin, World Bank Development Index,

Economic and Financial Crimes Commission Bulletins, Tertiary Education Trust Fund Publications and the Federal Ministry of Information Annual Briefings and Extracts for the various years. ADF stationarity test which the variables were subjected to revealed a mixed order of integration thus, making bound test appropriate for establishing the long run relationship. The study employed simultaneous equation model which revealed a negative and significant relationship between capital flight and economic growth.

2.3 Research Gap

Based on the literatures reviewed on impact of capital flight on economic growth above, it is evident that none of these studies investigate the asymmetric impact of capital on variables of interest to the study. Worthy to note that the first attempt to determine the asymmetric impact of capital flight in Nigeria was done by Effiom *et al* **(2020) who** employed the NARDL to determine the existence or otherwise of symmetry in the response of Nigerian Governments investment to Nigerian capital flight.**Thus this study de**p**arts from existing studies by assessing the non linear im**pact of capital flight economic growth in Nigeria.

3 RESEARCH METHODOLOGY

3.1.1 Capital Flight Measurement

This study adopted the World Bank residual (broad) method to measure capital flight. The residual approach has the following variants; World Bank's (1985), Morgan Guarantee (1986), Erbe (1985), Cline (1995), and Collier et al (2001 & 2004). World Bank (1985) residual approach is an indirect measure of capital flight which compares the sources of capital inflows (i.e., net increases in external debt and the net inflow of foreign investment) with the uses of these inflows (i.e., the current account deficit and additions to foreign reserves). This approach was used by Almounsor (2017) to estimate capital flight from Saudi- Arabia. Algebraically, this method expressed in equation 1

$$KFr = \Delta ED + FDI - CAD - \Delta FR \qquad (1)$$

Where KFr is capital flight, Δ denotes change, ED is stock of gross external debt reported in the World Bank or IMF data, FDI is the net foreign investment inflows, CAD is the current account deficit/surplus and FR is the stock of official foreign reserves. This broadest approach to capital flight measurement has the advantage in that it incorporates all the reported and unreported build-up of foreign capital for both public and private sectors. Considering the fluctuation trends in the movement of capital flight estimate from Nigeria and to effectively capture the increasing and decreasing effects of capital flight on private savings and economic growth, we applied NARDL model as recently developed by Shin et al. (2014).

The study made use of time series secondary data sourced from central bank of Nigeria statistical bulletin (2020) and World Bank development indicator website.

3.1.2 Model Specification

The NARDL model is an asymmetric modification of the linear ARDL model of Pesaran, Shin, and Smith (2001). The functional form of the model can be specified as shown in equation 2

$$GDP = f(CAPF, INFR, INTR) \qquad (2)$$

The econometric form of the two equations in the linear form is specified in equation 3:

$$GDP = \alpha_0 + \alpha_1 CAPF + \alpha_2 INFR + \alpha_3 INTR + \mu_1 \quad (3)$$

The log-linear specifications of the econometric equations are as expressed in (4):

$$\log(GDP_t) = \alpha_0 + \alpha_1 \log(CAPF_t) + \alpha_2 INFR_t + \alpha_3 INTR_t + \mu_{1t} \quad (4)$$

To check the robustness, we proceed to estimate another aggregative model which capture asymmetric effects of capital flight on economic growth as proxy by gross domestic product (GDP).

$$\log(GDP_t) = \alpha_0 + \alpha_1 \log(CAPF_t^+) + \alpha_2 \log(CAPF_t^-) + \alpha_3 INFR_t + \alpha_4 INTR_t + \mu_{1t} \quad (5)$$

GDP = gross domestic Product
CAPF = capital flight
INFR = inflation rate
INTR = interest rate
μ = Stochastic error term
Log = log-linear
α economic parameters to be estimated.

The above models explain that gross domestic product is influenced by capital flight, inflation rate and interest rate. On a priori, gross domestic product is expected to be a decreasing function of capital flight. Equally, inflation rate and interest rate expected to show negative relationship with gross domestic product, although interest rate is not a direct function of economic growth, hence they serve as control variables to avoid variable omission.

3.2 Estimation Procedures

If we specify a simple static models which express the relationship between gross domestic product (Y) and capital flight (X) and private savings:

$$y_t = \phi_t + \phi_1 X_{1t} + \mu_{1t} \quad (6)$$

ϕ_1 are the capital flight elasticity's of gross domestic product which are expected at a priori to be negatively signed. These Equations implies that an increase or decrease in capital flight triggers a contraction or rise in gross domestic product. Specifically, in symmetric and linear framework, the responses of gross domestic product to periods of capital flight increase reflect what is obtainable during periods of decrease in capital flight. Considering the trend and fluctuating movement of capital flight in Nigeria, we employed a nonlinear ARDL which decomposes the normal or conventional ARDL to capture long-run and short-run positive and negative (asymmetries) in the transmission mechanism simultaneously. According to Shin et al. (2013), the asymmetric cointegrating relationship in NARDL framework starts by splitting the exogenous variables in equations (6) into a partial sum process as presented in equation 7:

$$y_t = \phi_t + \phi_1^+ X_{1t}^+ + \phi_1^- X_{1t}^- + \mu_{1t} \quad (7)$$

Where y_t is k x1 vector of gross domestic product at time t; X_t is a k x 1 vector of multiple regressors specified such that $X_t = X_0 + X_t^+ + X_t^-$ indicating natural logarithm of capital flight; $\phi^+ and \phi^-$ are the corresponding asymmetric cointegrating parameters, which shows that gross domestic product respond asymmetrically as capital flight shows fluctuating movement; μ_1 is the stochastic error terms. Conversely, $X_t^+ + X_t^-$ portrays the partial sum processes of negative (-) and negative (-) innovations in X_t such that X_t is defined as:

$$X_t^+ = \sum_{i=1}^{t} \Delta X_i^+; \quad X_t^- = \sum_{i=1}^{t} \Delta X_i^- \quad (8)$$

And

$$\Delta X_i^+ = \sum_{i=1}^{t} Max(\Delta X_i, 0), \quad (9)$$

$$X_t^- = \sum_{i=1}^{t} Min(\Delta X_i, 0) \quad (10)$$

Where ΔX_i represents variations in the regressors *X*t, The (+) and (-) are superscripts showing the negative and positive reactions circulating a zero threshold, which defines and sets boundaries for the regressors, implying that the first difference of the series is assumed to be normally distributed with zero mean. A nonlinear model which exhibits both long run and short run asymmetries can be modeled as follows:

$$y_t = \sum_{i=0}^{q} \psi_t y_{t-1} + \sum_{i=0}^{r} (\partial_i^{+1} X_{t-i}^{+1} + \partial_i^{-1} X_{t-i}^{-1}) + \mu_t \quad (11)$$

We proceed to specify the conditional error correction model for equation (3.10) which contain the negative and positive partial sums as:

$$Y_t = \pi y_{t-1} + \lambda^+ X_{t-1}^+ + \lambda^- X_{t-1}^- + \sum_{i=1}^{q-1} \gamma_i \Delta y_{t-1} + \sum_{i=1}^{r-1} (\sigma_i^+ X_{t-1}^+ + \sigma_i^- X_{t-1}^-) + \mu_t \quad (12)$$

Shin et al. (2013) noted that equation (12) adequately corrects for the potentially weak endogeneity of non-stationary explanatory variables adequately in a nonlinear ARDL model. The relationship $-\phi_t^+ = \lambda^+ / q$ and $-\phi_t^- = \lambda^- / q$ are applied while determining the long run coefficients. The null hypothesis states that no long run relationship exists within the levels of y_t, X_t^+ and X_t^- this gives $q = \lambda^+ = \lambda^- = 0$ will be tested using the bound testing technique proposed and used by Pesaran et al. (2001).

This approach is valid no matter the time series properties of *X*t. The Wald test which has the null hypothesis of no asymmetry in the long run coefficients $(\phi_1^+ = \phi_1^-)$ for model as well as $(\sigma_i^+ = \sigma_i^-)$ for the short run coefficients will be estimated. If the result proves otherwise, we reject the null hypothesis.

We proceed to ascertain the time series properties of the data using Philip-Perron unit root test also we relied on descriptive statistics to establish the basic statistical properties of the data; we proceed to estimate the NARDL model. In order to confirm the reliability of the NARDL estimates, Post-estimation or diagnostics tests such as normality, linearity, serial correlation, and heteroskedasticity tests of the estimated model were carried out. Wald test for asymmetry (for short-run and long-run) which is crucial to this study is tested. This test is based on the null hypothesis that positive and negative variations in capital flight has direct opposite influence on gross domestic product and private savings in Nigeria.

The decision rule states that if the probability of the Wald test is above conventional significance level of 1% or 5% significant level, conclusion of no asymmetry is accepted. Conversely, if the probability is below the 1% or 5% significant level, we reject the null hypothesis and conclude that there exists asymmetric effect of capital flight on gross domestic product and private savings in Nigeria.

4. Results and Discussion

Table 1. Descriptive statistics

	LNGDP	LNCAPF	INTR	INFR
Mean	8.680227	9.157062	17.46611	19.19139
Median	9.169617	9.318353	17.35000	13.04000
Maximum	11.87903	10.54510	29.80000	57.20000
Minimum	4.975561	6.241445	7.750000	4.700000
Std. Dev.	2.425496	1.175559	4.804703	15.65291
Skewness	-0.228594	-0.790612	0.197621	1.484523
Kurtosis	1.503377	2.575729	3.496974	3.893567
Jarque-Bera	3.673350	4.020414	0.604798	14.42054
Probability	0.159346	0.133961	0.739043	0.000739
Sum	312.4882	329.6542	628.7800	690.8900
Sum Sq. Dev.	205.9060	48.36782	807.9809	8575.480
Observations	36	36	36	36

Authors-computation

Table 2: Unit Root Test Results

Philip-Perron statistic						
Variables	**Level**	**1st Difference**	**Critical Values**	**Order of Integration**	**Prop Value**	**Decision**
LNGDP	-1.834706	-3.124393*	1% -3.615588 5% -2.941145* 10% -2.609066	*I*(1)	0.0331	Reject H_0
LNCAPF	-4.084186*		1% -4.273277 5% -3.557759* 10% -3.212361	*I*(0)	0.0156	Reject H_0
INFR	-3.156398*		1% -3.610453 5% -2.938987* 10% -2.609066	*I*(0)	0.0305	Reject H_0
INTR	-3.147538*		1% -3.610453 5% -2.938987* 10% -2.607932	*I*(0)		Reject H_0

Source: *Author's computation (*shows the variable is stationary at 5% level of significant)*

Table 1 presents the descriptive statistics of the data model. It shows that our major variables of interest; log of gross domestic product, log of capital flight, interest rate and inflation rate all have the mean of 9.157062, 8.680227, 6.233621, 17.46611, and 19.19139 respectively with corresponding maximum and minimum values.

The standard deviations estimates show some significant shifting of the variables away from their corresponding mean values, their kurtosis shows that variables follows a normal distribution although gross domestic product shows kurtosis approximately equal to 2, capital flight, interest rate and inflation rate show kurtosis values greater than 2. Only two variables were leptokurtic, with kurtosis values exceeding 3. The variables were negatively skewed, implying a long left tail, with Jarque-Bera statistic indicating that a normal distribution of the variables.

Table 2 present the unit root stationarity test, it shows that all the variables are stationary at different order (i.e *I*(0) and *I(1))*. The log of capital flight (lnCAPF) inflation rate and interest rate were stationary at level *I*(0), since their PP values is less than the critical values at 5% level of significance while log of Gross domestic product (ln GDP) were found to be stationary after the first difference since their PP values were less than the critical values at 5% level of significance .

Null hypothesis of no unit root was accepted form LNCAPF, INFR and INTR at level form but was rejected after 1st difference. Also null hypothesis of no unit root was rejected for, LNGDP at level. Thus, we conclude that the variables under investigation are integrated at level (*I*(0)) and after first difference (*I*(1)). Thus, we have a combination of order of integration.

Next we tested the co integration relationship among the variables using NARDL bound test for model as shown in the Table 3

Table 3: NARDL Model Bounds Test for LNGDP, LNCAPF, INTR and INFR

Test Statistic	**Values**	**K**	**Lower bound(**I0)	**Upper bound(**I1)	**Significant level**
F-statistic	8.508145	4	2.86	4.01	5%

Source: Author's computation

From Table 3, the result obtained indicated that although the variables were found to be integrated of mixed order, there exist long run relationship between log of gross domestic product, capital flight and other explanatory variables because the calculated F-statistc value (8.508145) is above the upper bound critical value (4.01) at 5% level of significance.

4.1 Result NARDL

Table 4 is NARDL estimated results (the short- and long-run) for the 1st model; log of gross domestic product and capital flight model. The optimal lag length of the model (1, 2, 0, 0, 0) was automatically selected via the Akaike Information Criterion (AIC). Results of the analysis in model 1 indicate that in the short run, capital flight for all the periods is negatively related with gross domestic product.

Specifically, we observed that increase or positive deviations in capital flight (LNCAPF_POS) and (LNCAPF_POS(-1) lead to insignificant reduction gross domestic product, also negative deviations (LNCAPF_NEG) in capital flight lead to a significant reduction in gross domestic product. Where LNCAPF_POS stands for increase in the volume of capital flight while LNCAPF_NEG stands for decrease in volume of capital flight.

From Panel B, the long run estimated results indicate that 100% increase in capital flight will on an average trigger about 22% increase in gross domestic product in the long run although

this result is insignificant as the probability value is greater than 0.05. While a decrease of capital flight by 100% will on the average cause gross domestic product to decrease by about62%. There is clear difference between the short run and the long run. In the short run capital flight all have depressing effect on economic growth. The result long-run estimation contradicts to theoretical expectation hence the short run estimation follow a priori expectation.

Interestingly, the error correction term is appropriately signed and significant indicating that about 13% disequilibrium movement will be corrected within one year.

Table 5 shows the Wald test along with other post estimation diagnostic tests that was conducted. Wald test has the null hypothesis that capital flight has no asymmetric effect on gross domestic product. From the result the null hypothesis, cannot be rejected at the conventional 5% level of significance both in the short run ($\psi_1^+ = \psi_1^-$) and long run ($\phi_1^+ = \phi_1^-$).

Results of diagnostics test show that the model residuals are abnormally distributed as indicated by Jarque-Bera statistic (p = 0.000), it also indicated that the model do not suffer from autocorrelation (p = 0.4781) and there is no evidence of heteroscedasticity (p = 0.1056).

Table 4: Estimated NARDL short and long run results gross domestic product model (1, 2, 0, 0, 0)

Panel A – Short Run Results

Dependent Variable: LOG(GDP)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob**
D(LNCAPF_POS)	-0.137355	0.384949	-0.356812	0.7240
D(LNCAPF_POS(-1))	-0.437940	0.436957	-1.002248	0.3251
D(LNCAPF_NEG)	-0.819422	0.409709	-2.000007	0.0437
D(INFR)	-0.017639	0.013183	-1.337948	0.1921
D(INTR)	0.087774	0.047083	1.864226	0.0732
CointEq(-1)	-1.305980	0.638532	-2.045285	0.0407

Panel B – Long Run Coefficients

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNCAPF_POS	0.220439	0.118732	1.856617	0.0743
LNCAPF_NEG	-0.627438	0.140418	-4.468368	0.0001
INFR	-0.013506	0.008698	-1.552795	0.1321
INTR	0.067209	0.054042	1.243644	0.2243
C	2.792751	1.113529	2.508018	0.0185

Source: Author's computation

Table 5: Test of Asymmetry of gross domestic product Model

Variable	Coefficient	Prob
$\phi_1^+ = \phi_1^-$	1.620488	0.2139
$\psi_1^+ = \psi_1^-$	3.129366	0.0882
Jarque-Bera normality test	376.7607	0.0000
Breusch-Godfrey serial correlation LM test	0.760189	0.4781
Breush-Pagan-Godfrey heteroscedasticity test	1.918513	0.1056

Source: Author's computation

However, findings of this study are in consonance with empirical findings from previous studies that revealed that capital flight reduced economic growth of host economies (Kazi, et al, 2017; Ogundipe, et al, 2021). Capital flight impacts growth through reduction on investment as established by Effiom, *et al* (2020). We were unable to find a study that dealt with asymmetric effects of capital flight on economic growth enable us compare or contrast the asymmetric result of this study.

5. CONCLUSION AND RECOMMENDATION

In this study, we employed the NARDL to establish if there is the presence or otherwise of asymmetry in the response of Nigerian economic growth proxy by gross domestic product to capital flight in Nigeria. Our findings revealed that capital flight for all the periods is negatively related with gross domestic product. Specifically, we observed that increase or positive deviations in capital flight (LNCAPF_POS) and (LNCAPF_POS(-1) lead to insignificant reduction gross domestic product, also negative deviations (LNCAPF_NEG) in capital flight lead to a significant reduction in gross domestic product.

The result also revealed that there is symmetric response of gross domestic product to capital flight in both short run and long run. The study therefore recommends that appropriate policy measures such as moderate interest rate which will encourage investors to access funds and households to saving should be applied in Nigeria so as to increase economic growth and reduce capital flight in the country.

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