Assessing the Efficiency of the Public Expenditure Route in Transmitting Foreign Aid to Capital Flight in Nigeria

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Abstract

The study assessed the transmission efficiency of foreign aid to capital flight through the public expenditure route in Nigeria. Adopting *ex-post facto* design, the study used data collected from secondary sources from 1986 to 2023. Descriptive statistics were used to describe the statistical properties of the data set, followed by testing for the stationarity properties of the time series data used. The Structural Vector Autoregressive (SVAR) model was used to account for the transmission efficiency of the model. Findings of the study revealed that foreign aid efficiently responds to capital flight through the public expenditure route in Nigeria, which implies that public expenditure is an efficient route for the transmission of foreign aid to capital flight in Nigeria. The study therefore recommended that foreign aid should be encouraged as a model for the promotion of public expenditures in Nigeria. However, funds meant for capital expenditure should be transparently allocated and the handlers be subjected to integrity test to ensure that public expenditure is insulated from capital flight. Also, the Federal ministry of finance, Ministry of Economic planning and the Central Bank of Nigeria should discount the causal effect of foreign aid on capital flight..

Keywords: Foreign Aid, Capital Flight and Public Expenditure

Introduction

Over the last five decades, developing countries have received increasing amounts of Official Development Assistance (ODA).. ODA is mostly funded by bilateral grants between nations, while some funding also comes from loans that are typically handled through non-governmental and international organizations. Lack of savings and foreign currency prevents developing economies, especially those of poorer nations, from growing, trapping them in a continuous poverty cycle. Thus, aid is expected to boost recipients' physical and human capital stocks (Corporate Finance Institute, 2021). As a result, receiving foreign aid helps countries increase domestic security. Aid could be provided in form of bilateral assistance to needy nations to relieve them from the economic slavery, control and authorities of aggressive regimes through diplomatic appeal or payment for the right to utilise or establish military installations abroad. It is helpful to promote a government participation in foreign institutions, to attain its political goals, improve accessibility of its diplomats to other countries and gain diplomatic recognition (Corporate Finance Institute, 2021)..

Nigeria as a country is faced with a paradoxical situation of increasing level of foreign aid inflows and corresponding high level of capital flight. This seemingly co-movement of foreign aid and capital flight in the country is worrisome. The concurrent flow of capital flight and foreign aid (especially ODA) in an incompatible path has raised the empirical question of whether foreign capital inflows contribute to capital outflows by making available foreign currency, which gives liquidity to support capital flight in Nigeria or otherwise.

The strand of argument following the corruption route, the volatility route, the Dutch disease route, and the public investment route is that aid could increase capital flight in an economy through corruption in contrast to the Portfolio substitution route which argued that aid could reduce capital flight in an economy through domestic budgetary finance reductions (Knack,

2001; Bulir & Hamann, 2003, Buffie et al (2004). Thus, given that public capital is complementary, foreign aid is expected to reduce capital flight. It means that a rise in public capital is expected to increase private capital return whilst the incentive to shift portfolios to other countries reduces. This suggests that, foreign aid precedes capital expenditure which in turn precedes capital flight. Again, the dire need of foreign capital in developing countries such as Nigerian is to enable the country address fiscal rigidities. However, corruption is engendered when aid is diverted into private assets while unscrupulous wealth holders seek safe havens, capital outflows may be affected (Economic Development in Africa Report, 2020). Thus, in light of the consistent rise in capital flight, corruption, and public spending amidst aid, the response of capital flight to foreign development assistance through corruption and expenditure channels in Nigeria needs to be empirically investigated, which is the problematic of this study.

Thus, empirically, the net effect can be determined, hence, the relevance and imperative of this study in Nigerian context. This is due to the fact that Transparency International has consistently ranked Nigeria as a corrupt country ((Yakubu, sessu & Sjahruddin, 2020). Nigeria's corruption perceptions index was 27 in 2018.Though Nigeria corruption perceptions index (CPI) in recent years substantially fluctuated, it tended to increase through 2004-2018 period ending at 27 score in 2018 which moved the country to 144th from 148th in Transparency International latest corruption index. Nigeria scored 24th out of 100 points, ranked 154th out of 180 countries in 2020 (corporate finance institute, 2021).

Although a number of studies on foreign aid and capital flight have been conducted in sub-Saharan African countries like Nigeria, such studies tend to explore other routes like the volatility route, the Dutch Disease route, the portfolio substitution route while the public expenditure route is scarcely explored. as enunciated in the literature, there is paucity of empirical literature linking foreign aid and capital flight especially in Nigeria. Thus, the novelty of this research is from the fact that it is specific on the Nigerian economy and aims at investigating the nexus between foreign aid and capital flight with explicit transmission analysis using the public expenditure route. In light of these circumstances, this study explored foreign aid effect on capital flight and capital expenditure route in Nigeria.

Conceptual Clarification

Foreign Aid

The term ‘foreign aid’ has been conceptualized by William (2021) as international transfer of capital, goods, or services from a country or international organization for the benefit of the recipient country or its population. The commonest type of foreign aid is official development assistance (ODA), defined by William (2021) which as the assistance given to promote development and to combat poverty. The primary source of ODA which for some countries represents only a small portion of their assistance is bilateral grants from one country to another, though some of the aid is in the form of loans, and sometimes the aid is channeled through international organizations and nongovernmental organizations (NGOs). For example, the International Monetary Fund (IMF), the World Bank, and the United Nations Children’s Fund (UNICEF) have provided significant amounts of aid to countries and to NGOs involved in assistance activities.

Williams (2021) expounds that foreign aid may be used to achieve a country’s diplomatic goals, enabling it to gain diplomatic recognition, to garner support for its positions in international organizations, or to increase its diplomats’ access to foreign officials. The author outlined other purposes of foreign aid as promoting a country’s exports and spreading its language, culture, or religion.

Capital Flight

Capital flight is defined by Ndikumana and Boyce (2002) as residents' capital outflows, excluding recorded investment abroad. To Cooper and Hardt (2000), capital flight is the flow of financial assets resulting from the holder's perception that capital is subjected to inordinate level of risk due to devaluation, hyperinflation, political turmoil or expropriation of retained earnings at home in domestic currencies. This implies that the owner of funds in the hostile environment is seeking a safe haven for the fund. Walter (1987) defines capital flight as 'capital which flees' involving international asset redeployments or portfolio adjustments due to significant perceived deterioration in risk-return profiles associated with assets located in a particular country. Although the legality or illegality of the activity might be debatable, the key issue is that there is a conflict between the objectives of asset holders and society (Hermes & Lensink, 2001).

Capital flight can be either legal or illegal. Legal capital flight usually takes the form of repatriation of invested capital by foreign investors. In this case, the capital outflows must be properly reported according to existing accounting standards and comply with the country's laws. Conversely, illegal capital flight generally appears in the form of illicit financial flows (IFFS). Essentially, illicit financial flows disappear from records within a country and do not return to the country. Note that illegal capital outflows are mostly associated with countries that impose strict capital control policies (Corporate Finance Institute, 2021).

The Public Investment Route

Through domestic there is a scenario in which assistance would have the opposite result, as the first three scenarios all suggested that assistance would encourage capital flight. Help was once believed to close the "two gaps" of savings and foreign exchange. As the potential for converting output and consumption between tradable and non-tradable commodities became more apparent, the savings gap took centre stage as the foreign exchange gap shrank. Assistance was provided for investment financing. Aid now finances public investment, which roughly equates to infrastructure in terms of scale and timing, complicating the role of aid once distinct roles for the public and private sectors are allowed. Penn World Tables and clothing priced at global PPP rates can be used to abstract. By the 1970s, this concept of aid's goal was most likely widespread. Even if the effects on capital flight were ignored, aid should reduce capital flight because public and private capital complements one another. In other words, increased public money availability should reduce the incentive to diversify portfolios abroad while increasing the return on private capital. The channel of transmission of foreign aid to capital flight through public expenditure route is illustrated in figure I.

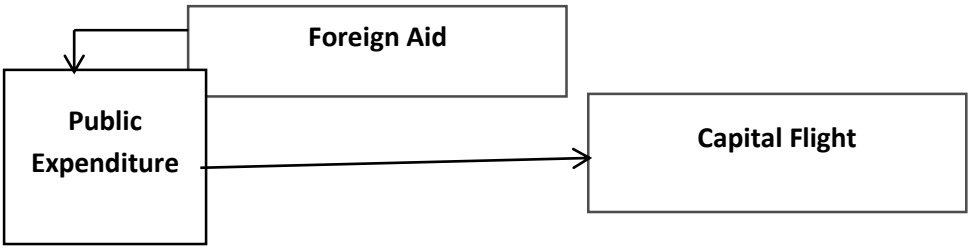


Figure 1: Schematic Model showing the channel of transmission from foreign aid to capital flight through public expenditure route

Source: Author's Construction

Figure 1 shows that foreign aid is transmitted to capital flight through public expenditure and corruption routes. There is a transmission channel from foreign aid to public expenditure, to corruption and then to capital flight. Thus, foreign aid inflow to Nigeria are corruptly siphoned

under the cover of public expenditure and stalked abroad (OECD, 2022). Swaroop, Jha and Rajkumar (2000) assert that because public and private capital are complementary, aid prevents capital flight. Thus, private capital stock improves as that of public capital does, which lessens the incentive to move investments abroad. Since aid lessens the demand for taxation, Mile (2017) emphasized that there is concern that it will lessen public pressure for accountability, which will encourage corruption. Furthermore, through high procurement costs, aid may immediately provide doors for public sector corruption.

Foreign aid and capital flight in Nigeria due to corruption are obviously linked. A broader criticism of the effects of aid on governance has been bolstered by spectacular and real cases where dishonest politicians siphoned foreign assistance fund into accounts of Swiss bank. It is well documented that the demands of taxpaying citizens for the inspection of how their money was utilized were the beginnings of accountable governance. It is feared that because help lessens the need for taxation, the public's demand for accountability will also lessen. In addition to the very general connection to weak governance, aid may also promote public sector corruption through high procurement costs (Bakare, 2011).

Theoretical Review

Two theories: the gaps model of foreign aid and portfolio choice model of capital flight are reviewed in this section.

The Gaps Model of foreign Aid

The gaps model was developed by Chenery and Strout in 1966 to strengthen the Harrod-Domar model's argument about the role of foreign aid in the increase of physical capital accumulation. Harrrod-Domar model concluded that foreign aid assists in filling the saving gap in developing countries. Chenery and Strout further argued in the Two-gap model that apart from saving gap, there are foreign exchange gap that hinder the developing countries to import capital goods for economic growth. Thus, they argued that, foreign aid provides funds to the developing countries for the importations of capital goods. Furthermore, Chenery and Strout (1996) added the third gap model. The model argued that, there is scarcity of technological advancement and marginal skills that can be used efficient in production in developing countries. Thus, they called it human capital gap. On the basis of these gaps, Chenery and Strout (1996), maintained that the inflow of foreign aid from developed countries to developing countries immensely assists developing countries to supplement their capital shortages for enhanced production. They argued that all capital inflows facilitate and accelerate growth by removing foreign exchange and domestic savings gags; as such, constitute net additions to a developing country's productive resources thus increasing its growth.

With passage of time, Effiom, Achu and Edet (2020) and Lance Taylor in 1994 extended the two-gap model and introduced the three-gap model and added the fiscal deficit gap (Broner, Didier, Erce & Schmukler, 2013). They stressed that the main source of growth challenge of developing countries is the government budget constraint rather than the foreign exchange constraints and savings gap. This fiscal gap has to do with the gap between government revenues and expenditures which tends to inhibit the growth strides of developing countries. Thus, foreign capital inflows are necessary in filling these gaps and promoting growth in developing countries.

Portfolio Choice Model of Capital Flight

This model explains the portfolio behaviour of wealth holders in an economy. Sheets (1995), presents the portfolio model as applicable to the capital flight decision of wealth holders. According to this model, capital flight arises from portfolio diversification incentives, return differential incentives and relative risk incentive. In one of the first theoretical models, Khan

and Haque (1985) showed that two-way capital flows, private capital flight occurring simultaneously with private foreign borrowing, can arise in a model where domestic and foreign investors face an asymmetric risk of expropriation, so they invest with foreign funds.

Girma and Tilahun (2021) maintain that the expectation of increased tax obligations created by the potential nationalisation of private debt generates capital flight. In his simple model, private borrowers can invest their own and borrow funds abroad, where they earn less than domestic projects. But the borrower escapes the obligation to repay the loan or pay taxes. Potential nationalisation of private debt implies that the flight of capital of any one borrower increases the tax obligation of remaining borrowers. In one equilibrium, borrowers invest domestically and loans are repaid, while in another there is capital flight and default on foreign loans.

Another type of capital flight model has explored why domestic agents face high and uncertain risks of explicit and implicit taxation of domestic assets. Alesina and Rodrik (1994) considered a model in which different government types with conflicting distributional goals randomly alternate in office. The uncertainty over future fiscal policies leads simultaneously to capital flight, low domestic investment, and the occurrence of large external debts. The over-borrowing occurs since the current government does not fully internalise the future costs of servicing the debt. In Velasco and Tornell's model (1992), the government is the clearing home of interests of various groups, and confiscatory policies are the outcome of the interest group game. If different groups have the ability to extract transfers from government each group effectively has common access to other capital stocks. Capital flight offers an asset that may have a lower return, but its return can be privately appropriated.

Theoretical Linkage

The Chenery and Strout gaps model and the portfolio choice model of capital flight are adequate in explaining the dynamics of foreign aid and capital flight in the context of the Nigerian economy. The gaps model has sufficiently explained the dire need of foreign capital in the Nigerian economy to enable the economy address fiscal rigidities. These interventions enter the economy in form of aid and debts. Consequent upon their inflows into the Nigerian, such aids are first diverted into private assets since aid reduces government taxes, people do not necessarily demand for accountability of such aid inflows. When such monies are corruptly converted into private assets, these unscrupulous wealth holders begin to seek safe heavens by way of diversifying their portfolios by investing abroad and domestically. They do this because of fear of the government confiscating that illicit wealth and partly because of conditions of macroeconomic and political instability that increase the riskiness of investing domestically relative to holding foreign assets. Their investment of the illicit wealth abroad is further predicated upon the premise that foreign assets are much more liquid than domestic physical capital or claims on domestic physical capital.

Empirical Review

Several studies have been reviewed relative to this study to provide enough literature about capital flight and foreign aid to compare findings and strengthen the conclusions about the current findings.

To examine the impact of capital flight on economic growth in Nigeria, Miftahu, (2021) employed annual time series data spanning 1980 to 2019. The data collected were analyzed using the Autoregressive Distributed Lag (ARDL) model to account for the hypotheses. The author found that there existed the presence of long-run and short-run relationship between real GDP, capital flight, foreign reserve, external debt, and domestic investment in Nigeria. The study also presented that the impact of various coefficients showed a negative and significant impact that capital flight has; while foreign reserve, external debt, and domestic investment

showed a positive impact on economic growth in the long-run period. The key recommendation was that government should design feasible economic reform measures to curtail the rising wave of capital flight. This study is relevant and has guided the current research in methodological approach.

Studying on the capital flight in 2021, Okafor and Obiajulu (2021) used the period of 2003–2017 to link between kidnapping and capital flight by utilizing a sample of 67 developing countries. They found from GMM technique that kidnapping rate has a positive and significant impact on capital flight. However, estimations of the marginal differences showed that this significant effect remained consistent only in the sample of 'fragile' developing countries. These results are stated to remain consistent to alternative measures of capital flight.

Jamal (2019) researched comparatively on the capital displacement effects of Chinese and U.S. foreign aid to developing countries. They applied panel data from the period of 2010 to 2017 with the Bank of International Settlements and overseas development assistance data for the U.S. and China. The large amounts of aid delivered to developing countries are associated with aid leakage in the form of capital flight and the Chinese foreign aid produces more capital flight to offshore financial centers and to Chinese destinations, whereas U.S. foreign aid displaces capital to the U.S. or destinations in the developed West were tested. Their findings indicated that from 2010 onwards, U.S. foreign aid is positively correlated with capital flight back to the United States itself, whereas Chinese foreign aid is correlated with capital flight to offshore financial centers. It was noted that, the findings have policy implications for aid conditionality, corruption, safeguards, and how both countries disburse aid. Commendable efforts were by the researcher, explaining the capital displacement effects of Chinese and U.S. foreign aid to developing countries. However, it is different from the current study in that it is not specifically focused on Nigeria and two; it has not linked aid with capital flight in a typical developing country like Nigeria.

A theoretical and empirical study was carried out by Ndikumana and Sarr (2019) to ascertain the concurrent rise in foreign direct investment inflows in Africa and capital flight using annual data covering the period of 1970 to 2015 from the continent with a sample of 30 African countries. The study found that FDI flows are positively related to capital flight. They concluded that higher FDI inflows lead to higher capital flight within the continent.

Using a panel framework, Osei-Assibey, Domfeh and Danquah (2018) investigate the effect of corruption and institutional governance indicators on capital flight using a portfolio choice framework through the GMM and fixed effect regression on panel data of 32 countries in Sub-Saharan Africa (SSA) over a sample period covering 2000 to 2012. Result shows that high perception of corruption facilitates an increase in capital outflow from SSA. Implying that, corruption encourages capital flight in the continent thereby retard economic growth in the long-run.

Gap in Empirical Literature

Economic literature is relatively scarce with empirical literature linking foreign aid and capital flight using the public expenditure route. The political economy of foreign aid and capital flight has been under researched especially in the context of developing countries like Nigeria who have benefited from foreign aid inflows and at the same time have experienced upsurge in capital flight. However, there is dearth of studies on the transmission of foreign aid to capital flight through the public expenditure route in Nigeria. The previous studies hardly adopt SVAR model while the present study used the model to estimate the transmission of foreign aid to capital flight.

Methodology

Ex-post facto design was used to analyze the data collected from the secondary sources. Descriptive statistics were used to describe the properties of the data set, followed by testing for the stationarity properties of the time series used. The Structural Vector Autoregressive (SVAR) model was used to ascertain the transmission mechanism of foreign aid to capital flight through public expenditure route in Nigeria.

Thus, empirical model for this study is implicitly specified as follows:

$Cafl \rightarrow PEX \rightarrow Aid$ … … … (3.1)

Where:

$caf l$is capital flight,

aid is foreign Aid

pex is public expenditure

The level form of the model 3.1 variables was used in the SVAR model. Consequently, using SVAR(1), the model will be presented with three variables as follows:

As a result, our model's requirements for the arrangement of our variables will result in the transposed matrix displayed below, which has the following structure:

$$cafl_t = f\left(cafl_{t-1}, pex_{t-1,} aid_{t-1,} cafl_{t,} pex_{t,} aid_{t,}\right) \ldots\ldots\ldots\ldots 3.2$$

$$pex_t = f\left(pex_{t-1}, aid_{t-1,} cafl_{t-1,} pex_{t,} aid_{t,} cafl_{t,}\right) \ldots\ldots\ldots\ldots\ldots 3.3$$

$$aid_t = f\left(aid_{t-1}, pex_{t-1,} cafl_{t-1,} aid_{t,} pex_{t,} cafl_{t,}\right) \ldots\ldots\ldots\ldots\ldots 3.4$$

Consequently, the normalized SVAR (1) system of the equations will yield:

$$cafl_t = \beta_{11}^1 cafl_{t-1} + \beta_{12}^1 pex_{t-1} + \beta_{13}^1 aid_{t-1} + \beta_{11}^0 cafl_t + \beta_{12}^0 pex_t + \beta_{13}^0 aid_t + \varepsilon_{1t} \ldots. 3.5$$

$$pex_t = \beta_{21}^1 pex_{t-1} + \beta_{22}^1 aid_{t-1} + \beta_{23}^1 calf_{t-1} + \beta_{21}^0 pex_t + \beta_{22}^0 aid_t + \beta_{23}^0 calf_t + \varepsilon_{2t} \ldots\ldots 3.6$$

$$aid_t = \beta_{31}^1 aid_{t-1} + \beta_{32}^1 pex_{t-1} + \beta_{33}^1 cafl_{t-1} + \beta_{31}^0 aid_t + \beta_{32}^0 pex_t + \beta_{33}^0 calf_t + \varepsilon_{3t} \ldots\ldots 3.7$$

The left hand side represents the contemporaneous effect and it is displayed in the over-parameterized Structural VAR matrix as:

$$\begin{bmatrix} 1 & -\beta_{12}^0 & -\beta_{13}^0 \\ -\beta_{21}^0 & 1 & -\beta_{23}^0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} cafl_t \\ pex_t \\ aid_t \end{bmatrix} = \begin{bmatrix} \beta_{11}^1 & \beta_{12}^1 & \beta_{13}^1 \\ \beta_{21}^1 & \beta_{22}^1 & \beta_{23}^1 \\ \beta_{31}^1 & \beta_{32}^1 & \beta_{33}^1 \end{bmatrix} \begin{bmatrix} cafl_{t-1} \\ pex_{t-1} \\ aid_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \ldots\ldots\ldots\ldots\ldots\ldots 3.8$$

Hence, $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t \ldots\ldots\ldots 3.9$

Where:

$A_0 = 3 \times 3$ matrix of contemporaneous effects of endogenous parameters

$Z_t = 3 \times 1$ column vector matrix of estimable endogenous variables

A_1 = endogenous estimable variables of 3×3 matrix

Z_{t-1} = lagged estimable endogenous variables of 3×1 column vector matrix

ε_t = error terms of 3×1 column vector matrix in the system.

Because there are more parameters in the above model than there are equations, it cannot be estimated using SVAR. Based on economic theory and institutional knowledge, the studies are unable to estimate an over-parameterized model; therefore, certain limits will be placed on some matrix parameters in order to address the identification issue in SVAR. The present study therefore can limit the top members above the matrix diagonal to zero by using the recursive method In other words, we set $-\beta_{12}^0 = -\beta_{13}^0 = -\beta_{14}^0 = \beta_{23}^0 = \beta_{24}^0 = 0$.

In light of this, the general SVAR model can be defined as:

$$A_0 Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + ... + A_P Z_{t-P} + \varepsilon_t \quad \ldots\ldots 3.10$$

$$\Rightarrow A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t \quad \ldots\ldots 3.11$$

Where:

A_0 = coefficients of contemporaneous effects matrix

Z_t = endogenous estimable variables vector matrix

A_1 = coefficients of parameters matrix

Z_{t-1} = lagged endogenous variables vector matrix

ε_t = the system of uncorrelated structural shocks vector matrix = $B\eta_t$

The study set to unity var(ε_{it}) and it is chosen to record in-the-moment exchanges among the Z_t and also shocks in the standard deviation structural of the model.

Due to the recursive nature of the majority of macroeconomic variables, limiting the matrix above to the recursive formulation produces:

$$cafl_t = lags + \varepsilon_{1t} \ldots\ldots 3.12$$

$$pex_t = \beta_{21}^0 cafl_t + lags + \varepsilon_{2t} \ldots\ldots 3.13$$

$$aid_t = \beta_{31}^0 pex_t + \beta_{32}^0 cafl_t + lags + \varepsilon_{3t} \ldots\ldots 3.14$$

Thus, the parsimonious form of equations 3.12 – 3.14 is specified in a triangular matrix below:

$$A_0 = \begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} cafl_t \\ pex_t \\ aid_t \end{bmatrix} = \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \ldots\ldots 3.15$$

A_0 =From our equation (3.14), where $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t$,

It was established that

$$\varepsilon_t = B\eta_t$$

And $B = \begin{bmatrix} \sigma_1^2 & 0 & 0 \\ 0 & \sigma_2^2 & 0 \\ 0 & 0 & \sigma_3^2 \end{bmatrix}$ = var (η_t) = 1(unit variance)

$$A_0 = \begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} cafl_t \\ pex_t \\ aid_t \end{bmatrix} = \begin{bmatrix} \sigma_1^2 cafl & 0 & 0 \\ 0 & \sigma_2^2 pex & 0 \\ 0 & 0 & \sigma_3^2 aid \end{bmatrix} \begin{bmatrix} u_{cafl} \\ u_t{}^{pex} \\ u_t{}^{aid} \end{bmatrix}$$

The system was made recursive as a form of restriction. From Wold (1951), it was assumes that the structural shocks and a typical lower triangular are uncorrelated in A_0. The method is used to identify the structural equations parameters. Making the system recursive will also be one of the limits employed in this effort. This idea was put forth by Wold in 1951 based on the supposition that structural shocks are often uncorrelated and lower triangular. This is a technique for finding the structural equations' parameters. According to Wold's proposal, there are exactly as many unknown parameters as were the summative model is calculated.

Thus, the normalized SVAR of the form $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t$ would become $A_0 e_t = B\eta_t$. But $B\eta_t = Bu_t$; therefore, the estimable Structural VAR model baseline line can be specified in as:

$$A_0 e_t = Bu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.16$$

In matrix form, we have:

$$\begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} cafl_t \\ pex_t \\ aid_t \end{bmatrix} = \begin{bmatrix} \sigma_1^2 cafl & 0 & 0 & 0 \\ 0 & \sigma_2^2 pex & 0 & 0 \\ 0 & 0 & \sigma_3^2 aid & 0 \end{bmatrix} \begin{bmatrix} u_t{}^{cafl} \\ u_t{}^{pex} \\ u_t{}^{aid} \end{bmatrix}$$

$$A_0 \; e_t \quad = \quad B \quad u_t$$

Where matrix:

A_0 = contemporaneous effects matrix if long run

e_t = column vector matrix for stochastic variables in the model

B = model structural shocks

u_t = column vector of structural shocks in the model

Matrix "S" is specified as:

$$e_t = A_0 Bu_t = \begin{bmatrix} e_t{}^{cafl} \\ e_t{}^{pex} \\ e_t{}^{aid} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 \end{bmatrix} \begin{bmatrix} u_t{}^{cafl} \\ u_t{}^{pex} \\ u_t{}^{aid} \end{bmatrix}$$

The above representation shows the early effect of shocks in the SVAR model. It is the findings from impulse responses that would present the final shocks effect in the SVAR model.

The following channels show the effect of foreign aid response to capital flight in Nigeria.

i. $-\beta_{21}^0$ measures the relationship between capital flight and public expenditure.
ii. $-\beta_{31}^0$ measures the relationship between foreign aid and capital flight
iii. $-\beta_{32}^0$measures the relationship between foreign aid and public expenditure.

The distinguishing feature of SVAR from normal VAR is that it is criticized to be theoretical in the specification and statement of restrictions about the flow and behaviour of the variables in the model, this governs their estimation process and transmission channels as they enter the model.

Result of the Findings

Descriptive analysis, trend analysis and structural VAR analysis results are presented and analyzed in this section.

Descriptive Statistics

Descriptive statistics such as mean, standard deviation, skewness, kurtosis ad Jargue-Bera are used in this study.

Table 1: Summary of Descriptive Statistics of the Study Variables

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Jarque Bera	Probability	Obs
AID	2680104	3516580	0.829336	4.425274	6.775343	0.0338	44
CAFL	1918.525	781.0062	0.176529	3.047490	0.179783	0.9140	44
PEXT	2435.22	18.34960	-0.538433	5.642002	7.396120	0.4281	44

Source: Extract from Results of E-views 9

Table 1 shows the summary statistics on the variables used in the study for test of normality properties of residuals in the data set. The standard value of Skewness of a symmetric distribution, such as normal distribution is zero. The Skewness values for all the series used in the study are close to zero which suggests that they are Skewness normal. The Kurtosis of a normal distribution is 3. The Kurtosis distribution measures the peakness of a distribution that is usually assumed to be normal. As shown in Table 4.1, the series values were close to 3 except that of PEXT. The divergent of PEXT from normally distributed value could be due to extrapolation used in obtaining data on corruption before 1993 when official data were not yet documented as the TI had not started publication of CPI. Nevertheless, the series do not exhibit characteristic of a distribution with a high peak and flat tails called leptokurtic (k>3). They do not also have substantially flat-topped curves and thinner tails called platykurtic (k<3), but they have generally exhibited mesokurtosis (k=3) suggesting a normal distribution.

Jarque – Bera results show that apart from CALF which was significant at 0.01 level, the rest of the series failed to reject the null hypothesis of a normal distribution. It is therefore, clear that the series are subject to distribution that is not different from the normal one.

Trend Analyses of the Study Variables

This section focuses on the trend analyses of the study variables.

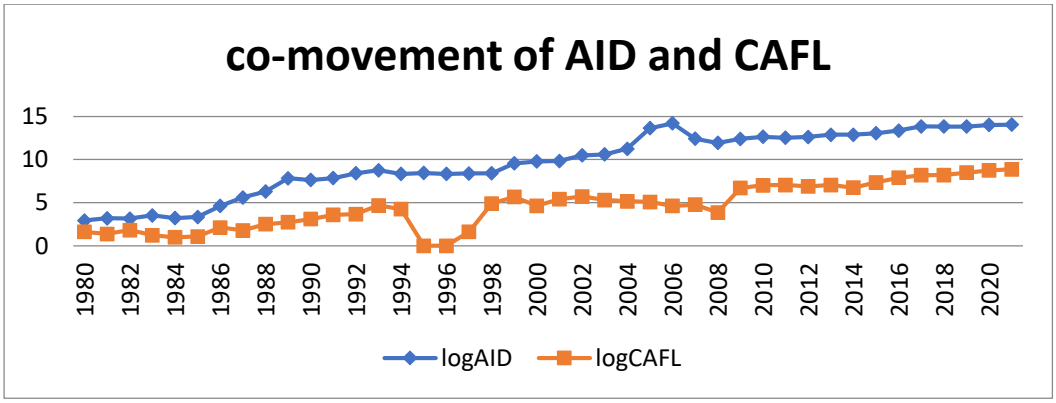


Figure 2: The co-movement of capital flight and foreign aid

Figure 2 displays the movement of capital flight alongside foreign aid in Nigeria within the study period. The trend showed an irregular movement of capital flight and foreign aid within the period. However, it was observed that a co-movement existed between the two variables since both of the trended in a perpendicular direction. This posed a paradox since increase in foreign aid was not expected to be accompanied by a corresponding increase in capital flight.

4.2 Stationarity Test

Table 2: Stationarity Test Results

Variable	ADF		PP		KPSS		Order	Decision
	t-Statistic	Critical Value @5%	t-statistic	Critical Value @5%	LM-Statistic	Critical Value @5%		
CAFL	-3.644204	-2.938987	-3.663353	-2.935001	0.175218	0.4630000	I(1)	Reject H_0
AID	0.291262	-2.935001	-3.882722	-2.935001	0.185277	0.4630000	I(1)	Reject H_0
COPT	-6.364406	-2.935001	-3.663358	-2.935025	0.043361	0.4630000	I(1)	Reject H_0

Source: *Extract of Author's Computations from E-views 9.*

Results presented in Table 2 show that the series failed to attain stationality at levels. Thus, the series have indicated a uniform order of integration and hence, appropriate for the use of Structural Vector Auto-Regressionn (SVAR) Analysis.

Structural Vector Auto-Regression (SVAR) Analysis

Ordering of Variables and the SVAR Results

The ordering of the variable for estimation with structural VAR followed Cholesky approach depicting the effect of foreign aid on capital flight through the public expenditure route in Nigeria. The transmission is therefore, depicted as AIDT→PEXT→CAFLT.

Table 3: Result of Johansen Co-integration

Trace Statistics	Critical Value @ 0.05	Prob. Value	Max-Eigen Statistics	Critical Value @ 0.05	Prob. Value
37.15351	29.79707	0.0059	25.96977	21.13162	0.0096
11.18374	15.49471	0.2005	11.18347	14.26460	0.1453
0.000273	3.841466	0.9889	0.000273	3.841466	0.9889

Source: Extract of Author's Computations from E-views 9.

Result of Johansen Co-integration presented in Table 3 shows that there exists a long run relationship among the variables. Thus, both the Trace and Max-Eigen statistics indicated the existence of one integrating equation in the system. This is because the probability value of one equation was significant at 0.05 level of significance. The existence of long run relationship in the system therefore, renders SVAR model estimation appropriate.

Table 4: SVAR Lag Order Selection Criteria for SVAR Model using the Public Expenditure Route

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1058.611	NA	8.84e+19	54.44159	54.56955	54.48750
1	-957.4406	181.5878*	7.84e+17*	49.71490*	50.22677*	49.89855*
2	-954.2067	5.306942	1.06e+18	50.01060	50.90636	50.33199
3	-945.2756	13.28204	1.09e+18	50.01414	51.29380	50.47327

Source: Extract of Author's Computations from E-views 9.

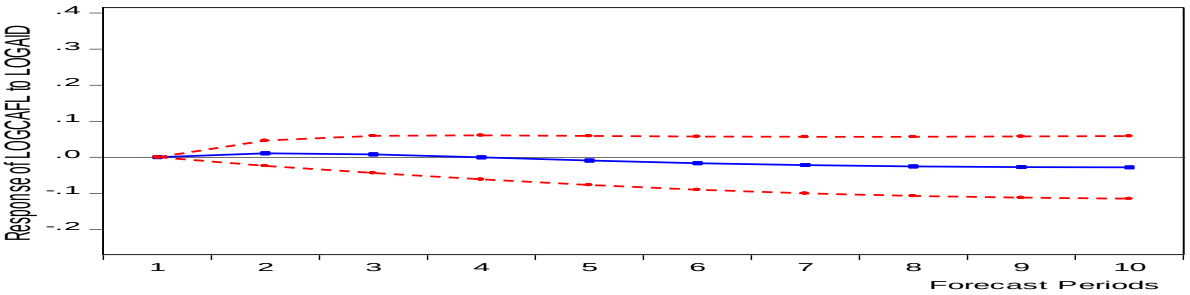
Table 4 shows that all the information selection criteria: the sequential modified LR test statistic, the Final Prediction Error (FPE), the Akaike's Information Criterion (AIC), the Schwartz Information Criterion (SC) and the Hannan-Quinn, Criterion (HQC) suggested the selection of a maximum lag length of One. One lag length was therefore, selected for the Structural VAR model. The study therefore, selected one lag length in estimating the structural VAR for the corruption route.

Table 5: Recursive SVAR Result (AIDT→PEXT→CAFLT)

	CAFL	PEXT	AID
CAFL	1		
PEXT	0.037	1	
AID	0.066	-1.40	1

Source: Author's Computation from Eviews-10 Output

From the SVAR results in Table 5.13, foreign aid (AID) respond negatively to changes in capital flight (CAFL) contemporaneously by 6.6%. In a similar way, public expenditure (PEXT) indicated a negative transmission effect contemporaneously by 3.7% due to changes capital flight in the country. The results also indicate that public expenditure is positively related to foreign aid. A 1% increase in public expenditure increases foreign aid by 140%. With 1% decrease in foreign aid, capital flight would reduce in Nigeria.

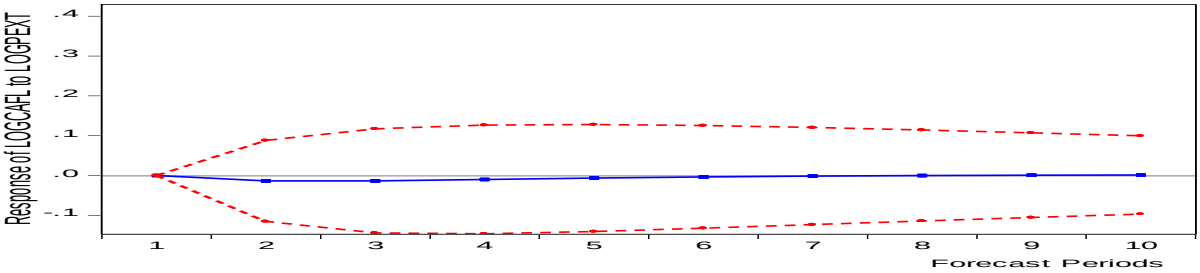


Source: Author's Computation from E-views 10 Output

Figure 5: Response of Capital Flight to Innovation in Foreign Aid

From Figure 5 capital flight would pose a temporal shock as a response to a one SD innovation to foreign aid with positive values in the short run up to the 4th period and would respond negative after the 5th period of the ending short run. Negative response from capital flight would continue steadily from the 6th period to the 10th period in the ending long run with no reverting tendencies temporally. Specifically, only in period 2 and 3 that capital flight experienced positive and significant response in the short run. Period 5 lead a significant negative response through to the last period of the long run permanently. The negative response in the long run

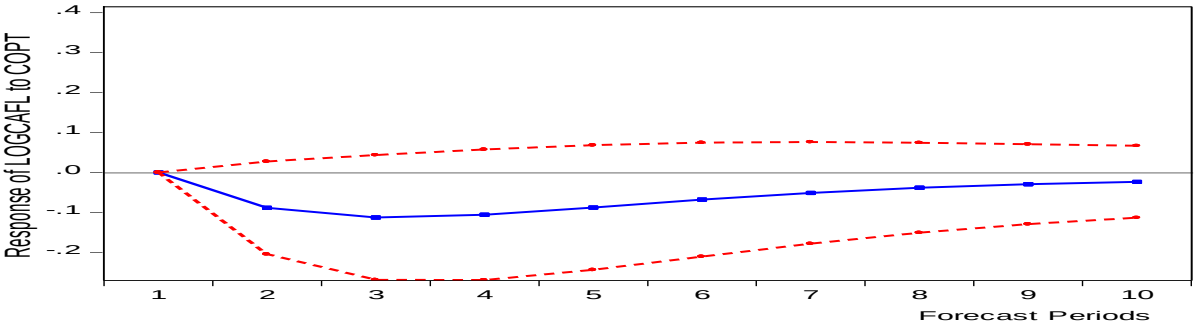
would spread away from the equilibrium indicating no reverting response to the positive region. As such, the permanent shock pose no revert to an increase or fall to the positive region if dwindling issues concerning foreign aid in Nigeria are not addressed. This contradicts the postulation that capital flight has a long-term positive response. Thus, this could be a confirmation that efforts made by Nigeria government towards tackling foreign aid led corruption have not met the sufficiency required to yield positive results in the long run. This suggests a negative response of capital flight to innovations in foreign aid and this relationship is long-lived.



Source: Author's Computation from E-views 10 Output

Figure 6: Response of Corruption to Innovation in Foreign Aid

Result in Figure 6 shows that a one SD innovation to foreign aid would pose a positive and temporal shock to corruption in the beginning of short run (period one) within the positive region throughout the short run. The positive response was significant and continues steadily to the long run period. From the result, an innovation in foreign aid would have positive response corruption significantly at the middle of the short term up to the beginning of the long run temporally; this would be consistent to the end of the long run (the 10th period). This implies that the more innovations in foreign aid, the more corruption cases in the country; this is feasible in Nigeria.



Source: Author's Computation from E-views 10 Output

Figures 7: Response of Capital Flight to Innovation in Public Expenditure

Figures 7 estimates indicate that a one Standard Deviation (SD) innovation in public expenditure would initially pose an insignificant and negative response from capital flight in the short run. But an insignificant negative response was displayed temporally within the long run period. The temporal steady decrease in the negative response posed to revert in the long to generate positive response from public expenditure. This implies that in Nigeria, an innovation to public expenditure presents a Short run negative response from capital flight but with a reverting ability in the long-run to positive response. Continuous efforts in public expenditure could influence capital flight gradually to positive response in a long run in Nigeria.

Table 6: Forecast Error Variance Decomposition Results of Capital Flight using the Public Expenditure Route

Period	S.E.	LOGCAFL	LOGPEXT	LOGAID
1	0.18	0.52	99.47	0.00
2	0.24	12.17	84.93	2.88
3	0.29	20.48	73.98	5.52
4	0.32	25.34	67.26	7.38
5	0.35	28.20	63.09	8.69
6	0.37	29.95	60.39	9.64
7	0.39	31.08	58.55	10.35
8	0.40	31.85	57.25	10.89
9	0.41	32.38	56.29	11.31
10	0.42	32.77	55.58	11.64

Source: Extract of Author's Computations from E-views 9.

As show in table 6, an innovation to capital flight in the first and second period would account for 0.52% and 12.17% variation in public expenditure. In the 3rd, 4th and 5th period, an innovation in capital flight would cause 20.48%, 25.34% and 28.20% variance in public expenditure respectively in the short run. The long run percentage variation in public expenditure due to innovations in capital flight is at 29.95%, 31.08%, 31.85%, 32.38% and 32.77% from the 6th, 7th, 8th, 9th and 10th periods respectively.

Also, public expenditure would pose higher declining values of safe innovation from the short run to the long run period. From the 1st period to the 5th period of the short run, public expenditure would account for 989.47%, 84.93%, 73.98%, 67.26% and 63.09% safe variation respectively. The long run safe variations would present 60.39%, 58.55%, 57.25%, 56.29% and 55.58% in period 6,7,8,9 and 10 respectively. The innovations in foreign aid would account for 2.88% variation in corruption in the 2nd period and then increase to 5.52%, 7.38%, and 8.69% in the 3rd, 4th and 5th of the short run periods respectively. In the long run, foreign aid would account for 9.64%, 10.35%, 10.89%, 11.31% and 11.64% variation in foreign aid respectively.

Table 7: Residual Test Results of SVAR Model for the Public Expenditure Route

Test Statistics	**DF**	**Probability**	**Decision**
Serial Correlation CHSQ	2	0.0261	No serial correlation
Heteroskedasticity CHSQ	2	0.8270	Series are Homoscedastic
Test of Normality (Jarque-Bera)	2	0.0000	Normally distributed

Source: *Extract of Author's Computations from E-views 9.*

Result of SVAR test as presented in Table 7 shows that the probability values based on 2 lag selection criteria was significant at 5 per cent level. This implies that the data set is free from serial errors. The heteroskedasticity result reveals that the series are homoscedastic while normality test indicates that the data used are normally distributed.

Discussion of Findings

The results from the SVAR model revealed a significant response of foreign aid to capital flight through the public expenditure route, indicating that capital flight responds positively to foreign aid through the public expenditure route in Nigeria. This finding agrees with the conclusions of Asongu and Jellal (2014) that capital flight has a positive effect on foreign aid. From

theoretical postulations, capital flight should consist of short-term capital movements only. However this study differ that public expenditure is an efficient route for the transmission of foreign aid to capital flight.

Also, the result of the study conducted by Edet (2020) showed that capital flight established a negative and significant effect on domestic investment in Nigeria. This suggests that, foreign aid funds meant for public expenditure are likely to be siphoned and staked in foreign banks in form of capital flight.

Conclusion and Recommendations

The study concludes that public expenditure route is an efficient route for the transmission of foreign aid to capital flight in Nigeria. Thus, foreign aid has the potentials to influence capital flight in both short-run and long-run through the public expenditure route. The following recommendations were therefore made:

i. Foreign aid should be encouraged as a model for the promotion of public expenditures in Nigeria. However, funds meant for capital expenditure should be transparently allocated and the handlers subjected to integrity test to ensure an effective strategy for the promotion of public expenditure is insulated from capital flight.

ii. The Federal ministry of finance, Ministry of Economic planning and the Central Bank of Nigeria should discount the causal effect of foreign aid on capital flight and also the causality between capital flight and foreign aid in Nigeria from their estimation of economic behaviour for effective economic policy.

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