Financial flows and sectoral performance in Nigeria: Trend analysis and causal effect

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Abstract. *This study investigates the causal impact between financial flows and sectoral performance for selected sectors of the Nigerian economy using monthly data that ranges between January, 2008 and October, 2022. While Toda-Yamamoto causality test is applied, further extension is done on the trend analysis among flow variables, performance indices and some macroeconomic variables of the economy. The variable that measures sectoral performance is constructed as an index and is found to align with other measures of performance. The findings from this study are plausible. One, external financial flow and exchange rate nexus is suggestive that they are prone to external shock. While the effect of financial crisis constitutes an insignificant threat to external financial flow, that of COVID-19 crisis suggests that external flow is shock-specific. Again, further evidence reveals that the fundamental nexus between interest and internal financial flows is still held. In nearly all these sectors, higher interest rates are associated with falling internal financial flows. On the causality, there is evidence of unidirectional causality that runs from performance to flow in agricultural sector, indicating that foreign investors in the agricultural sector usually make necessary assessments before making any investment choice. As for the internal financial flows, evidence supports unidirectional causality between internal financial flow and performance indices for agricultural and manufacturing sectors, which suggests that performance dictates volume of loan. This study thus offers important policy implications for investors.*
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1. Introduction

Financial flows are necessary variables needed for improving the sectoral performance, with extended impact on the performance of the aggregate economy. While foreign flows could be very volatile, especially for the receiving country, they are nevertheless recognized as formidable coordinates of financial

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globalization and a source that contribute to improving performance (Adegboye, Osabohien, Olokoyo & Mathew, 2020). As much as the importance of external flow has thus been emphasized, the contribution of internal flows (which can be seen as credit flow) from the banking sector is equally important when explaining sectoral performance. For some time in the past, bank credits stood as a determinant of US industrial growth which further establishes the relationship between credit assistance and performance of the real sector of the economy (Hasan, Liu and Zhang, 2016). In this regard, bank credit is a channel to propagate monetary policy and serves as a source that generates productive investment which by implication gives way for improving the performance of various sectors of any economy.

Emphasising further, internal financial flow plays a complementary role in developing economies with external financial flows in ensuring growth and development of the economy. World Bank Reports (2015) points that external financial flows into developing countries are estimated to have increased by 3.3% in 2012 with subsequent higher rise in following years. This perhaps may have necessitated the reason for much discussion among scholars and policy makers on financial flows (Carp, 2014; Jayazuriya & Leu, 2017; Anetor, 2018; Abur, 2020). It could further suggest that much importance is attached to it as a way to achieve necessary growth for the economy. Improvement in financial flows would then be expected to promote economic performance. Notwithstanding this, flows have important implication for development of the economy and improvement of every sector which are very critical for enhancing performance (Zamani & Tayebi, 2022).

Literature on external financial flows-economic growth/performance nexus is numerous and their outcomes are found with mixed results. One strand of this literature focuses on establishing the link between capital inflows and economic growth in either a country-level studies or cross countries research analysis. Some of these works provide insights into growth-capital inflows nexus (Leblebicioglu & Madariaga, 2015; Combes, Adamsa & Klobodu, 2017) while other extend the nexus to causal analysis between economic growth and external financial flows (Obansa & Maduekwe, 2013; Kapingura, 2017). Other related works examined the relationship between flows and growth by giving consideration to a transmitting variable such as bank supervision, financial markets, sound economic policy and human capital (Neamdis, 2018; and Su & Nguyen, 2020). The outcomes from these studies have not been conclusive. While there is evidence that external financial flows promote economic growth (Leblebicioglu and Madariaga, 2015; Combes, Ouedraogo and Plane, 2018) others held that the negative impact from external flows on growth could be neutralized by the extent of bank supervision, development of financial market, information and communication technology and presence of human capital development (Agbloyor, Abor, Adjasi & Yawson 2014; Neamdis, 2018; Adedoyin et al, 2020; Dinh Su & Nguyen, 2020). Also, aside from not reaching conclusions for studies on causality, the possible outcome from sector-level studies has not been graciously evaluated.

By extension, prior studies on the role of internal financial flows with respect to economic performance either with emphasis on sector-level studies or aggregate economy can also be categorised into three strands. The first strand looks into the causality between flows from financial institutions and economic growth (Guas & Mohapatra, 2020; Oyebowale, 2020) while the second strand considered the impact of financial flows on the aggregate economy (Mamman & Hashim, 2014). The other strand of literature prioritized the sectoral analysis of bank flows vis-à-vis the sectoral performances (Toby & peterside, 2014). Again, the findings from these researches have not reached any conclusion. On the causality, Oyebowale (2020) documents unidirectional causality running from flows to growth while the result from Guas & Mohapatra (2020) give evidence of bi-directional relationship. Also, while Toby & Peterside (2014) account for a weak but significant correlation between bank lending and performance of agricultural sector to economic growth, Schertler, Buch and Westernhagen (2006) concluded that flows from banks could only manifest on the sectoral performance after exceeding a particular threshold. However, as much as some of these studies have been carried out long ago which probably require some form of rethinking evaluation for the nexus, the inconclusive nature of their outcomes, especially with respect to causality, essentially call for further evaluation. When the knowledge of which particular variable

causes another and of the direction of such causal effect is known between financial flows and sectoral performance, then the direction of policy stance can be well formulated for economic progress. This gives an implication that this area needs further exploration and will be plausible particularly at sector level.

However, in this analysis, effort is taken to examine the possible causal implication between financial flows and sectoral performance for the selected sectors of the Nigerian economy. On the financial flows, this study considered two types of flows: the flow within the economy and the flow from outside of the economy. The flow within is proxied by using internal flows from deposit money banks into sectors of the economy while aggregate capital inflow is used to capture external financial flow. The data for these variables largely occur in monthly frequency. This essentially calls for the necessity to measure sectoral performance with the same frequency. This is not available for the Nigerian economy. In a way to circumvent this possible hindrance, an index of performance was constructed at both sectoral and aggregate level. In its construction, consideration is given to three important economic units: the household, the firm and the government. By implication, this study employs data on: consumer price index which measures strength of the economy from the angle of prices; stock market capitalization which signals the ease to raise capital by different sectors of the economy and; central government security which gives the basis for the government to access necessary funds to control the economy. While this index is really plausible for this study, its construction takes some clues from earlier indices on global economic activities/performance (Lewis, Mertens, Stock & Trivedi, 2022; Wegmuller, Glocker & Giggia, 2023). However, our attention on the Nigerian economy presupposes the status of this economy which stands as one of the key economies in the sub-Saharan African region. With its population stance, the economy receives more foreign investment from various parts of the world. It then becomes a necessity to establish how its sectoral performance stands in causing investment flows into the country.

As a prelude to the estimation of this study, the outcome of the finding can be summarized as follows. Important implication from external financial flow-exchange rate nexus is suggestive of the fact that they are prone to external shock. The impact of the financial crisis constitutes an insignificant threat to external flow, given the fact that external financial flows in the early part of this analysis are still very high despite the trending financial crisis of the time. However, there was an obvious fact in the time of COVID-19 crisis to suggest that external financial flow is shock-specific. Again, further evidence reveals that the fundamental nexus between interest and internal financial flow is still held. In nearly all these sectors, higher interest rates are associated with falling credit flows. On the causality, there is evidence of unidirectional causality that runs from performance to agricultural sector. In other words, there is a glaring fact that performance causes external financial flows in the agricultural sector, which holds that foreign investors in the agricultural sector usually make critical assessments before making any investment outlet. As for the credit flows, evidence supports unidirectional causality between credit flow and performance indices for agricultural and manufacturing sectors. By implication, the extent of sectoral performance is found to dictate the volume of loan that is granted accordingly.

Immediately after this introduction is the section on literature review where attention is paid to related review on financial flows and economic growth. In the next section, a methodological approach to estimating the analysis is discussed which essentially takes the stance from Toda-Yamamoto. In section 4, the study discusses financial flows variable and sectoral performance in a stylized form where those variables are discussed alongside macroeconomic variables. However, while section 5 presents the finding of causality among variables of concern for agriculture and manufacturing sector, section 6 presents the conclusion of the study.

2. Literature review

In this section, the focus is to examine the causal effect between the financial flows and sectoral performance for the Nigerian economy. It is common to believe that financial flows in terms of investment finance into the sectors will contribute to economic performance via sector. By implication, an investment

plan that is rooted from the flow of funds has every capacity to incite growth. Thus, the growth impact in the economy through investment routes can be attributed to financial flows. At the same time, the previous sectoral performance can significantly explain why much consideration is placed on such sectors with financial flows. In other words, the behaviour of multinationals in making investment plans is often motivated by the historical performance of the sectoral composition of the economy. They often place consideration to better returns and this can only be evaluated through their performance. Hence, the flow of investment funds into the sector can equally be explained through the pattern of previous sectoral performance. So, while causal effect is possible from flows to performance, the same can also go from performance to flows. Several studies in the literature have examined this nexus and other related topics. In this study, we take a brief review of some of these findings.

Aizenman et al. (2013) primarily examine the relationship between economic growth and international capital inflows where the inflows were disaggregated into various components such as FDI, FPI, equity and short-term debts. The data was annual spanning the period 1990 to 2010 and the methodology was regression analysis. The finding from these cross countries study was rather striking. While the relationship between FDI and economic growth was found to be larger and robust, the one between growth and equity was rather unstable and smaller. However, the study further found evidence for a negative relationship between short-term debt and economic growth.

The work by Obansa and Maduekwe (2013) concentrated more on the causality among the variables as used in the study. They investigated the impact of agricultural financing on economic growth for Nigeria with annual data from 1981 to 2002. The OLS and granger causality results give account for bidirectional causality between agricultural financing and economic growth. Further analysis suggests that investment productivity through foreign private loans, foreign investment, stocks and share capital will be more appropriate than other channels. Recently, in another related study, Muhammad (2017) investigated how foreign inflows affect the resource gaps of Sudan economy and its effect in stimulating the economy. The study adopted Granger causality and VECM for the data from 1978 to 2015. The result from the analysis revealed that economic growth has positive relationship with foreign aid and deficit arising from current account while the long-run relationship with government deficit, resource gap and FDI with economic growth is negative. On the causality, the study found one-directional causality which runs from investment saving gap to GDP and also from the government budget deficit to GDP. In the same study, there exists a bidirectional causality between GDP and current account deficit. The study later called for government control of policy and provision of infrastructure for the attraction of foreigners in the country.

In furtherance of external financial flows related works, Kapingura (2017) investigated the causal effect between external financial inflows and growth in the SADC region using annual data spanning between 1980 and 2012. The study adopted Granger causality in a panel data model. The results therein revealed that there is bidirectional causal effect between economic growth and external financial inflows in the region. In further account, cross border bank flows were found to have no significant causal effect with economic growth. Also, Official Development Assistance (ODA) and remittances revealed a one directional causal effect from the two components of the capital to economic growth. Talking on causality, this work lends credence to the work of Obansa & Maduekwe (2013) and Muhammed (2017). However, while Obansa and Maduekwe (2013) focused on causality between economic growth and agricultural financing, the study Muhammad (2017) was on causality between investment-saving gap and economic growth.

In a more recent analysis, Su and Nguyen (2020) investigated the relationship between disaggregated components of foreign financial flows, human capital and economic growth in developing countries of Africa where they employed system GMM estimation technique of fixed effect panel quantile regression. The data for the analysis is annual from 2002 to 2017 and the result shows that foreign financial flows are correlated in a different direction with human capital while further influencing economic growth among African countries. The setback from many of these studies is found in their failure to emphasize the

stance from the sectoral angles. As much as it is important to view the lens of flow-growth nexus in the dimension of sectoral contribution, effort of prior investigation has been very limited.

On the issue of internal financial flow captured through bank lending in Nigeria, Toby and Peterside (2014) analysed the role of banks in financing the agricultural and manufacturing sectors in Nigeria. The data used for the study was annual from 1981 to 2010 and the methodology for estimation was multiple regression analysis. The result from the finding shows significantly weak correlation between commercial bank lending and the contribution of agriculture to GDP. However, further work by Yakubu and Affoi (2014) during the same time period examines the role of bank credit in economic growth of Nigeria and found that bank credit has significant impact on the economic growth in Nigeria. In a related study, the investigation by Akinwale (2018) was on finding the nexus between bank lending and growth for the Nigerian economy between the period of 1980 and 2016. Cointegration relationship among the variables was established and the result further found that bank lending reverts economic growth. Basically, the hypothesis by Greenwood and Jovanovic established that as bank lending rate decreases, economic growth tends to increase. And it is statistically significant at 1% level. The study recommended that policy that will reduce bank lending should be put in place to boost economic growth in Nigeria. Also, Kolapo, Oke and Olaniyan (2018) investigate the connection between deposit money banks' credit to private-public sectors and economic development in Nigeria over the period 1970-2016 using Toda and Yamamoto Granger causality test. The results revealed that Deposit Money Banks' credit to government sectors leads to economic development in Nigeria.

The study by Oyebowale (2020) equally provided empirical evidence on the determinants of bank lending in Nigeria. The study covered data from 1916 to 2016, and the findings indicate that while there is no causal relationship between other explanatory factors and bank lending in Nigeria, expansion in broad money Granger-causes rise in bank lending. Additionally, this study demonstrates that increases in bank lending in Nigeria are Granger-caused increases in the loan-to-deposit ratio and inflation. Also, the ingenious study by Saeed, Abdeljawad, Hassan and Rashid, (2023) where they employed panel VEC model, gave consideration to the use of variables such as bank investment, innovation, lending capability, and interest margin vis-à-vis their impact on growth. This study reveals that innovations and bank investment have significant impact in determining economic growth. While many of these studies have been done for causal implication between growth and flows, less attention is paid to sectors of the economies. At the same time, disaggregated series for measuring performance were not considered. This makes the present effort a crucial step in the right direction.

3. Methodology

In this subsection, the attention is to evaluate the causal effect between flows and performance using the approach of Toda-Yamamoto (1995). The approach gives consideration to estimation of the VAR model in levels which by implication reduces the risks that could result from identification of integration orders (Amiri and Ventelou, 2012). The traditional usual granger causality is not considered as it does not have a standard distribution when the series data is particularly integrated or cointegrated. In T-Y approach, estimation of augmented VAR (k + dmax) model is applied with k representing the optimal lag length for the based-level VAR model while dmax indicate maximum order of integration in the VAR model. While this causality test essentially involves the determination of both optimal lag length and maximum order of integration using appropriate lag length criterion, it also extends to using modified wald test procedure for the VAR (k) model to estimate the causality, where the model lag length of ($p = k + $dmax) is now considered (Adriana, 2015). The idea in equation (3.16) is more valuable to explain this connection in term causal implication among the variables. The technique for estimating Toda-Yamamoto will be formally presented in the section under the technique of estimation.

In order to account for the causal effect between financial flows and sectoral performance, the approach of Toda-Yamamoto (1995) shall be used. The bivariate causality approach for this model is however presented as follows:

$$scf_{t,i} = \alpha_{1,0} + \sum_{i=1}^{k} \delta_{1i}.scf_{t-i} + \sum_{i=k+1}^{k+dmax} \delta_{2i}.scf_{t-i} + \sum_{i=1}^{k} \beta_{1i}.sp_{t-1} + \sum_{i=k+1}^{k+dmax} \beta_{2,i}.sp_{t-1} + \epsilon_{1t}$$

$$sp_t = \alpha_{2,0} + \sum_{i=1}^{k} a_{1i}.sp_{t-i} + \sum_{i=k+1}^{k+dmax} a_{2i}.sp_{t-i} + \sum_{i=1}^{k} b_{1i}.scf_{t-1} + \sum_{i=k+1}^{k+dmax} b_{2,i}.scf_{t-1} + \epsilon_{2t}$$

$$sdf_t = \alpha_{3,0} + \sum_{i=1}^{k} z_{1i}.sdf_{t-i} + \sum_{i=k+1}^{k+dmax} z_{2i}.sdf_{t-i} + \sum_{i=1}^{k} d_{1i}.sp_{t-1} + \sum_{i=k+1}^{k+dmax} d_{2,i}.sp_{t-1} + \epsilon_{3t}$$

$$sp_t = \alpha_{4,0} + \sum_{i=1}^{k} n_{1i}.sp_{t-i} + \sum_{i=k+1}^{k+dmax} n_{2i}.sp_{t-i} + \sum_{i=1}^{k} p_{1i}.sdf_{t-1} + \sum_{i=k+1}^{k+dmax} p_{2,i}.sdf_{t-1} + \epsilon_{4t}$$

$$(1)$$

In equation 1, scf is sectoral external financial flows, sp is sectoral performance while sdf sectoral domestic flows. Subscript t is for the time and i, for the sector considered which in this case is limited to agricultural and construction sectors. This model presents bivariate causality between financial flows (both external and internal flows) and sectoral performance for each of the sectors considered.

The first part of the equation where the dependent variable is scf represents sectoral foreign flow while second with sdf represents sectoral domestic flows which are modelled along with sectoral performance. As indicated earlier, the k is the optimal lag length that will be obtained from different lag selection criteria and $dmax$ in the maximum order of integration that will be obtained from classic ADF. The wald test will then be applied for the first k coefficients matrices using standard chi-square statistics. Given that $\beta_1 = vec(\beta_{11}, \beta_{12}, ..., \beta_{1k})$ be the vector of the first k VAR coefficients, the null hypothesis that scf does not Granger cause sp becomes $H_0: \beta_{1i} = 0, i = 1, ..., k$. Also, similar hypotheses hold other equations as follows: (2) $H_0: b_{1i} = 0, i = 1, ..., k$ (3) $H_0: z_{1i} = 0, i = 1, ..., k$. (4) $H_0: n_{1i} = 0, i = 1, ..., k$ which respectively indicate that sp does not granger cause scf, sdf does not granger cause sp and sp does not granger cause sdf.

4. Stylized facts. Financial flows into agricultural sectors

In this section, financial flows into the agricultural sector are considered. These financial flows are essentially grouped into two: external financial flows from outside the country and internal financial flows from deposit money banks which are directly going into this sector. In figure 1 below, external financial flow into the agricultural sector is shown alongside real exchange rate for Nigeria between 2008 and 2022 (on average of 3 years). While agricultural external financial flow is measured in billion-naira, real exchange is in real terms. The trend in external financial flow is an upward trend from 2008 to the end period of 2022. In 2008 to 2010, agricultural external financial flow was on the average around 2 billion naira and by the end of 2016, it has risen to a close of 10 billion naira. During this period, the trend of real exchange rate was on fast decline indicating an appreciation of naira. In the beginning of 2008, the rate in real terms was around ₦95 per $1 and by the end of 2016 it has appreciated to around ₦75 per $1. This period really signifies a period of trade boom for the Nigerian economy. While currency appreciation was experienced, there was significant improvement in the volume of flows into the agricultural sector for the country.

However, periods after that result in substantial increase in real exchange rate while external financial flows into the sector equally improves during this time. As of the beginning of 2017 and up to the

end of 2020, there was substantial increase in both the agricultural external financial flows and appreciation of real exchange rate. While agricultural external financial flow takes value of over 30 billion naira on the average of 3 years between 2017 and 2020, the real exchange rate stands at ₦91 per $1. In the later period of 2020 to 2022, there was significant decrease in the flow to a low of around 18 billion naira. This can possibly be attributed to COVID-19 pandemic which greatly affected the entire economies of the world.at this period with significant pause in trading activities. This however constituted strengthening the Nigerian currency as there was little pressure on the dollar for trade activities. As a form of emphasis, the exchange rate in real terms at this time was significantly reduced (an appreciation of naira) to slightly over ₦70 per $1. This further gives an implication of low trade volume which largely resulted in low foreign flows into the country.

Figure 1. Co-movement between agricultural external financial flows and real exchange rate
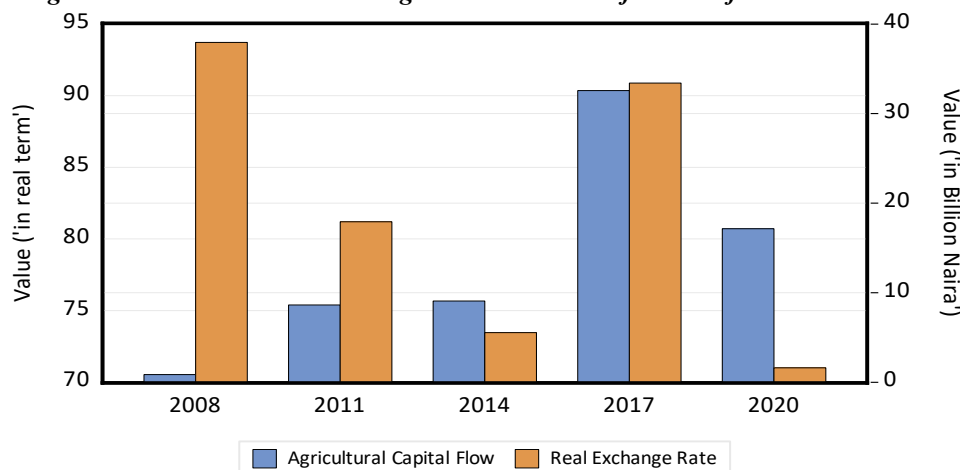
Source: Authors' construction using data from Central Bank of Nigeria

In figure 2, co-movement trend between agricultural internal financial flow and interest rate is shown. The figure essentially shows an upward trend for the two variables. At the end of 2010, internal flow to the agricultural sector was just around 0.2 billion naira while interest rate was slightly higher than 21%.
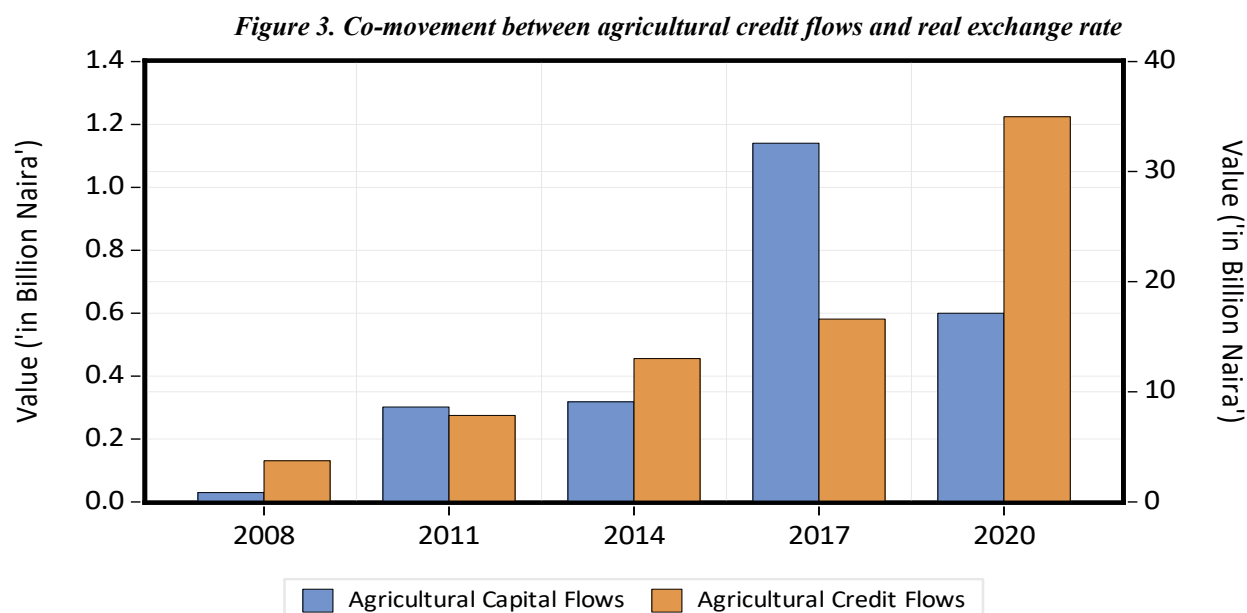
Figure 2. Co-movement between agricultural credit flows and real exchange rate
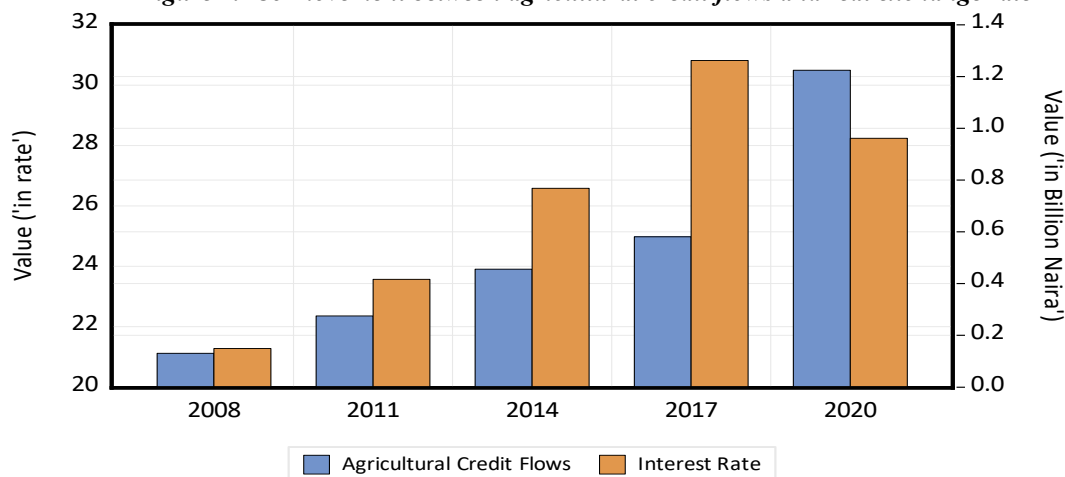
Source: Authors' construction using data from Central Bank of Nigeria

With further increase in interest rate in subsequent periods till the end of 2020, internal financial flow increases at a low rate to the highest of around 0.6 billion naira. This is at the time the interest rate was very close to 32%. This is really enough to discourage borrowing for investment purposes. Importantly, interest rate and borrowing are related. While it constitutes a return to the bank for their customers' portfolio, it largely constitutes a cost on the part of the investor. So, when it rises, there is likelihood that investors will lower their borrowing especially when the market activities are very low to pay off for the rising cost. This however explains why a fall in the rate on the average between the end of 2020 to the late of 2022 to around 28% leads to higher internal financial flows into the sector to 1.22 billion naira which is highest for the periods under consideration. Apparently, agricultural activities enjoyed a boom after the COVID-19 pandemic and one of the pointers to this fact is rising flow of internal financial flows into the sector.

In figure 3, agricultural external and internal financial flows are compared. In terms of values, external financial flows into the sector were largely higher than internal financial flows. However, by trend movement, internal flows appear to be more stable and were found to be on a rising trend. While it was around 0.2 billion at the end of 2010, the value was over 1.2 billion in October, 2022. Despite being low, it was rather stable and gives some confidence that it can be easily accessed for investment purposes. As for the external financial flows, the impact of external factors on this flow is largely conspicuous. While this flow continues to rise at a higher rate especially the periods between 2014 and 2020, it was halted by the pandemic when it suddenly fell from over 30 billion naira to around 18 billion naira. This gives an indication of instability and possibility of posing a series of threats to business success in the face of no alternative.

Figure 3. Co-movement between agricultural credit flows and real exchange rate

Source: Authors' construction using data from Central Bank of Nigeria

In figures 4 and 5, external and internal financial flows are compared alongside the index of performance. The main reason for this step is to gauge these flows with a constructed index to have an insight on the particular movement in these variables in relation to the performance of the sector. In figure 4, at the initial stage in the year 2008 up to 2010 external flows were stable with slight increase in 2009. At these periods, the sector performance slightly falls and later picks up afterwards. While the performance indicator for the sector continues on a rising trend, there were elements of volatility in the external financial flows and this stance was more visible 2016, 2018 and periods between 2019 to 2021. At each of these times, the agricultural performance index was found on a lower trend which really gives an implication that

volatility in the flows will constitute a threat to the performance of the sector. In figure 5, trend internal financial flows and index of performance suggest that the two variables move in the same direction. The two variables enjoy upward trends with slightly ups and downs. These ups and downs are noticed to manifest initially in the internal flows and before a similar trend appears in the index of performance. This is indication that manifestation of any policy to impact this sector may not be instantaneous but rather need some lagged periods.

Figure 4. Co-movement between agricultural performance index and Agricultural external financial flows
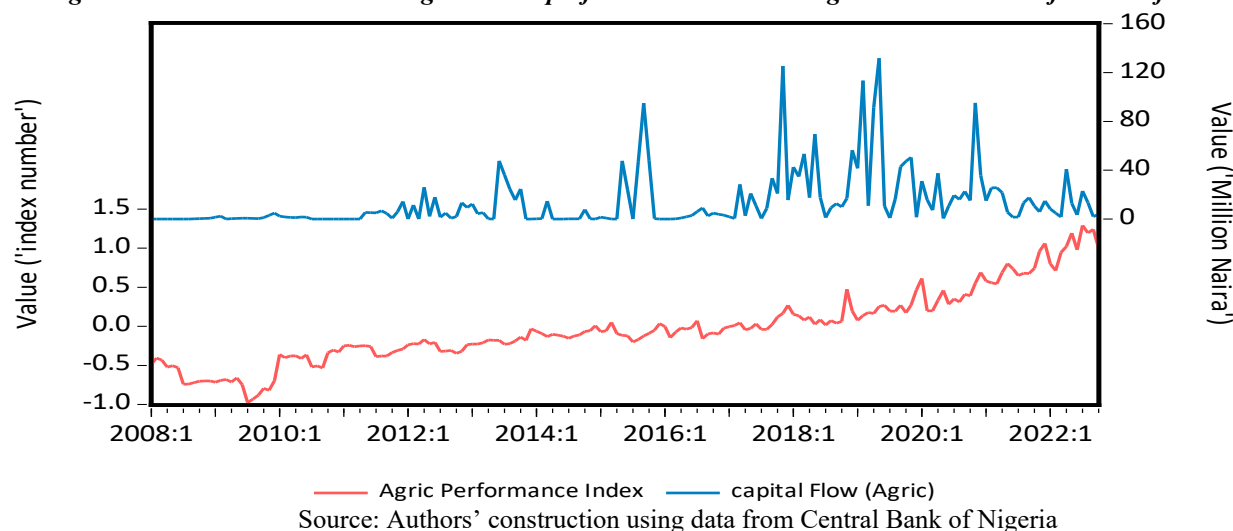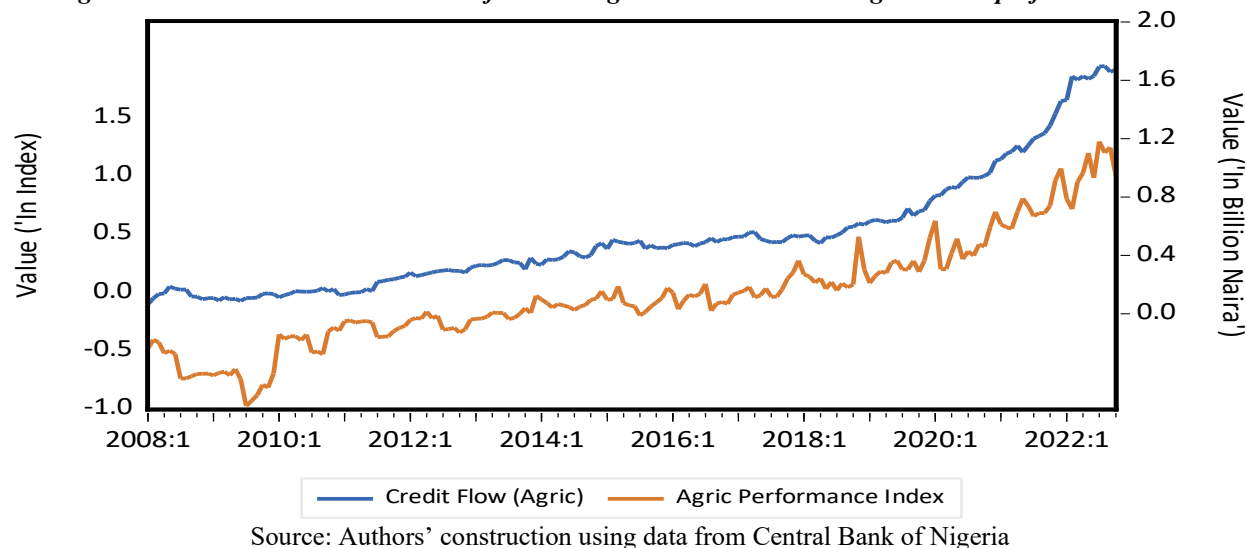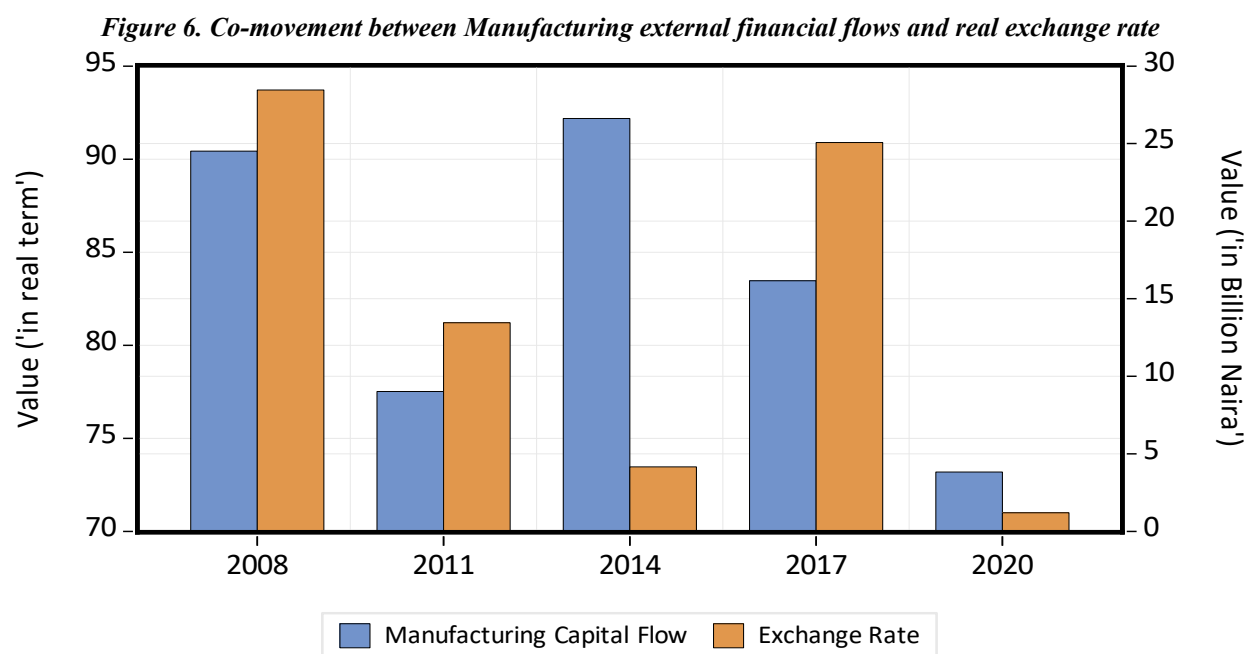

Source: Authors' construction using data from Central Bank of Nigeria

Figure 5. Co-movement between credit flow into Agricultural Sector and agricultural performance index

Source: Authors' construction using data from Central Bank of Nigeria

Financial flows into manufacturing sectors

The link between manufacturing sector and exchange rate is further explored by taking cognizance of possible connection between external financial flows into the sector and existing real exchange rate in the country. In figure 6, there is evidence of huge external financial flows into the manufacturing sector with rising exchange rate in the early period of this analysis (2008 to 2011). At this time, manufacturing external financial flows was put around 25 billion naira while the real effective exchange rate was around $95 per naira. This gives some implication of depreciation of naira and it occurs when the financial crisis

of the time was trending. In the later period, the crisis has been much engulfed into various parts of the world and its effect is much visible in this trend. In the periods between 2011 and 2014, there was low external financial flows into this sector and at the same time the real effective exchange rate was equally low, indicating an appreciation of naira and low pressure on dollar for exchange rate. Precisely, external financial flow was around 8 billion naira and real exchange rate was put at ₦82. While this rate further reduces to ₦73 on average between years 204 and 2017, there was unprecedented influx of flow into this sector with an amount of 27 billion naira. This rising flow importantly signals total economic recovery since the incidence of the financial crisis. However, the immediate period after sees a slight fall in external financial flow and a depreciation of local currency. This was not too long when COVID-19 pandemic set in and its overall effect is very obvious in this period. While flow was put to a low of ₦3 billion, real exchange rate was just around ₦73 per dollar. This indicates that there is globally low economic activity in the world.

Figure 6. Co-movement between Manufacturing external financial flows and real exchange rate

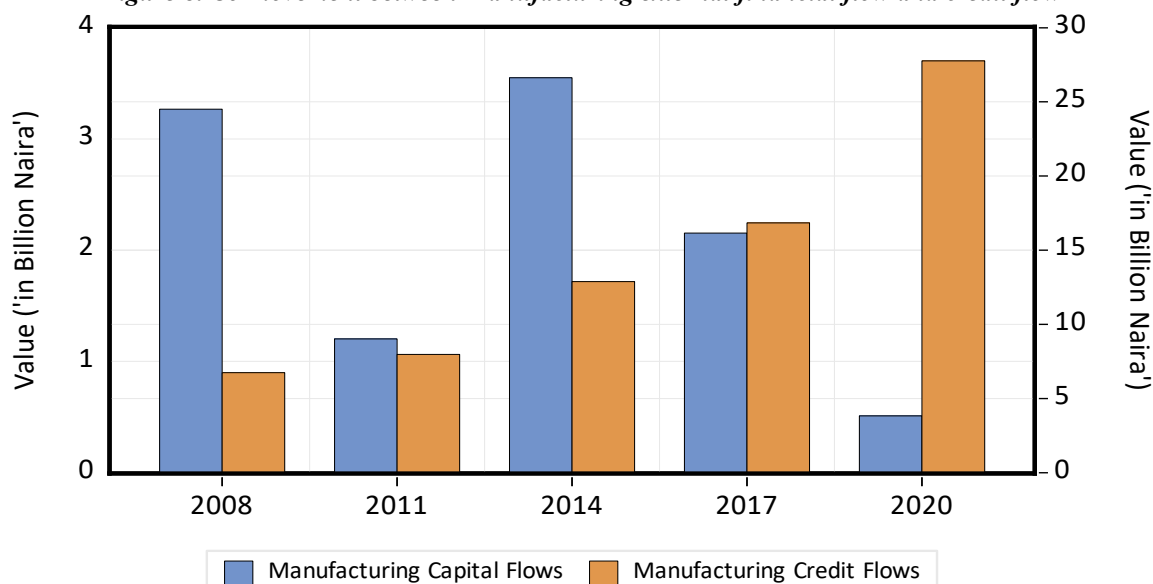Source: Authors' construction using data from Central Bank of Nigeria

In figure 7, the co-movement between internal flow into the agricultural sector is examined alongside the existing interest rate. All things being equal, interest rate and credit flows often move in opposite directions and by implication, interest rate movement dictates the volume of these flows into the sector. The trends in the figure above reflect this stance. While manufacturing internal flow in the period between 2008-11 is around ₦1 billion, interest rate is low on the average of 21%. When it rises in the 2011-14 to 23.5%, internal flow does not change significantly in relation to what is obtained in the earlier period. However, in the subsequent periods, particularly in the periods 2017-20 and 2020-22, higher interest rate contributes to low flow in the former and to high flow in the latter. Specifically, at an interest rate of 28%, the sector secured flows of around ₦4 billion than ₦2.2 billion in the previous period when the rate was 31%.

Figure 7. Co-movement between manufacturing credit flows and interest rate
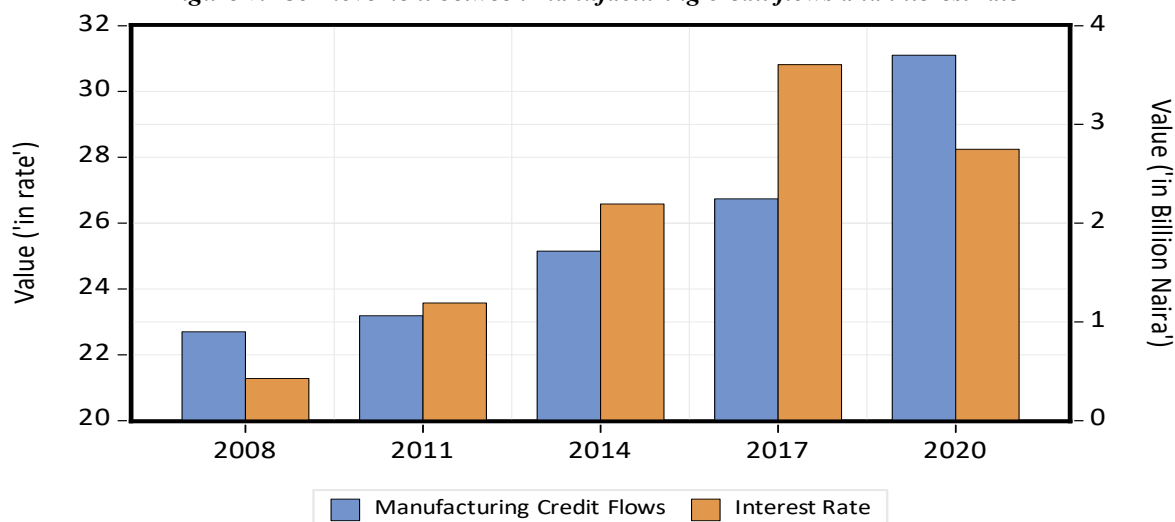
Source: Authors' construction using data from Central Bank of Nigeria

In figure 8, the flows are compared (both external and internal flows). It is very obvious that external financial flows are much more than the internal flow except in the periods that follow any economic friction such as global financial crisis and COVID-19 pandemic.

Figure 8. Co-movement between Manufacturing external financial flow and credit flow
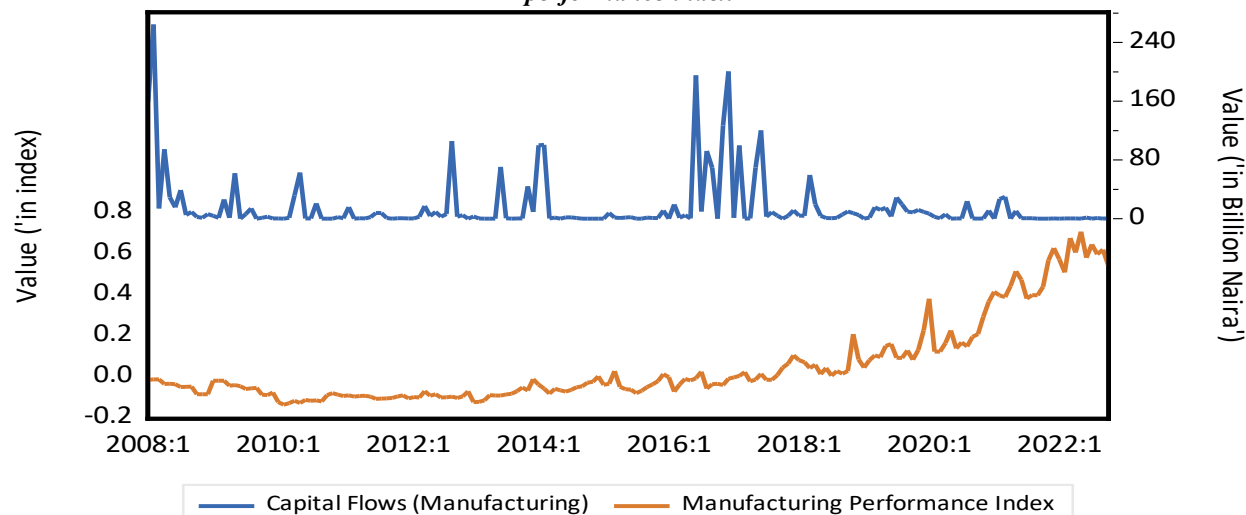

Source: Authors' construction using data from Central Bank of Nigeria

This is evident in periods 2011-14 and 2020-22 where internal flow has a higher trend than external flow. To give an instance, in the period 2014-17, while external financial flows are around 28-billion-naira, internal flow only stands at a low of 1.5 billion only. However, at a later time after the waves of COVID-19 pandemic in 2020-22, external financial flow to the manufacturing sector was less than 5 billion naira when credit flow stood at its peak of around 4 billion naira.

In an attempt to explain the connection between financial flows and the manufacturing sector for the Nigerian economy, further exploration is done by giving cognizance to the trend of external financial

flows into this sector in relation to manufacturing performance index. In figure 9, there is an indication that the flows and performance move in the same direction, especially in the early and the late period of analysis. The impact of technical recession of 2018 due to weakness in trade and manufacturing activities in the graph and it continues till the period after. Aside from this, the experience of COVID-19 equally gives some element of volatility and upward trending of the flows. At each time, the performance index is much more responsive which gives some suggestion of a close relationship between the two variables.

Figure 9. Co-movement between external financial flow into manufacturing sector and manufacturing performance index

Source: Authors' construction using data from Central Bank of Nigeria

Figure 10. Co-movement between internal financial flow into manufacturing sector and manufacturing performance index
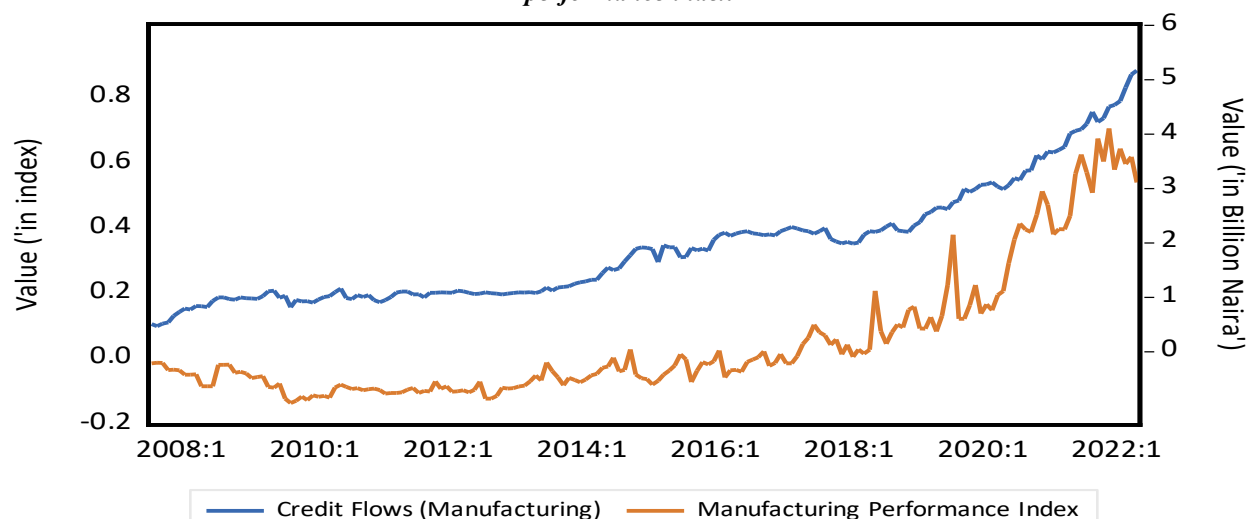
Source: Authors' construction using data from Central Bank of Nigeria

Also, in figure 10, the same analysis is presented to support the connection between internal flows and the sector's performance. In this stance, there is evidence of upward trending in the flow and in each period, the performance index moves in the same direction. This trend further gives the basis to believe that higher internal flows translate to improving performance.

5. Results

Summary statistics

A formal test for any econometric analysis is to ascertain the behaviour of the data. In this study, several variables are considered for the analysis. The first category are external and internal flows. These variables are presented for the raw values in table 1. They are equally presented for all the four sectors that this study considered. In the second category, variables of economic performance indices are also reported. As a way to provide the salient information for all these variables, their average values, skewness, kurtosis and Jarque-Bera statistics are presented. Further examination about the data for each variable is made by giving consideration to raw data for capital and credit flows into the selected sectors. Under this presentation, the manufacturing sector has the highest mean value of ₦56, 346, 965.00 than the agricultural sector. The standard deviation values for each variable in this stance are extremely high which suggest that external financial flow variables are likely to exhibit high volatility. By skewness, they are positively skew, having longer tails and the statistics for kurtosis indicate that all of them are leptokurtic having values greater than the threshold of 3 for normal height.

Similar stance is applicable for internal flow with the agricultural sector having lesser value of ₦525, 397.30. In terms of dispersion, they exhibit greater values. Aside from being positively skewed, the kurtosis values for this series range around the threshold for agriculture with values of 4.3 while value for manufacturing is below 3. Again, J-Bera statistics for all the variables under this category suggest some element of normality distribution given that its probability value is significant. Similar to the above information, the constructed indices of performance are further described on the basis as presented above. The entire series takes values between 0 and 1 in absolute terms. Further close evaluation indicates that both manufacturing has positive mean values of 0.0533, while the average values for the agricultural sector is negative. They are all relatively dispersed. The arising implication suggests that the sectors' performances are in close comparison. In terms of skewness, they all take height relatively above the normal rate. Again, the series are normally distributed.

Causal impact between financial flows and economic performance

The main objective set by this study is to investigate the causal impact between variables of economic performance index by sector and that of financial flows. Investigating the causal impact among variables is very essential. It is much needed to give direction to policy makers which by implication serves as guide for policy formulation. In a way to implement this, there are various methodological approaches that are available to take care of this stance. These include: Granger causality test, Toda-Yamamoto approach and Fourier granger causality test. In the present exercise, Toda-Yamamoto test is employed owing to its various benefits that have been discussed in the section under methodology. More importantly, the study considers performance indices of two selected sectors together with external financial flows and internal financial flows. In the estimation provided in panel A of table 2, the causal impact between external financial flow and economic performance indices is shown. According to this result, there is evidence of unidirectional causality that runs from performance to the agricultural sector. In other words, while it is glaring that performance causes external financial flows in the agricultural sector, the stance for the manufacturing sector is only suggestive of no causal effect. The arising implication holds that many foreign investors in the agricultural sector usually undergo some serious pre-assessment before making an investment outlet.

Table 1. Summary statistics

Variable	Mean	Minimum	Maximum	Std Deviation	Skewness	Kurtosis	J-Bera	P-Stat	Obs
Variables on Sectoral External financial flows (CF)									
Agricultural	13610633.0	132000000.0	2500.0	22893484.0	2.8883	12.5025	917.20	0.0000	178
Manufacturing	56346965.0	380000000.0	130000.0	65561640.0	2.6925	11.4074	739.31	0.0000	178
Variables on Sectoral internal financial Flow (CrF)									
Agricultural	525397.3	1698268.0	65134.4	400292.2	1.3641	4.3309	68.3365	0.0000	178
Manufacturing	1059028.0	1883436.0	310849.0	448995.1	0.1144	1.7280	12.3872	0.0020	178
Variables on Sectoral Economic Performance Indices (EPI)									
Agricultural	-0.0180	1.2908	-0.9755	0.4603	0.6341	3.4188	13.005	0.0015	178
Manufacturing	0.0533	0.7061	-0.1349	0.2038	1.6760	4.7808	105.053	0.0000	178

Note: *, ** and *** indicate level of significance at 10, 5 and 1 percent respectively. Also, RX is real exchange rate, NX is nominal exchange rate and BE is Bank efficiency which is calculated as the ratio of loan to deposit. The raw outputs from the EViews software for the results are provided in the appendix.
Source: Authors' compilation using EViews output

Table 2. Causality: flows and performance

Sector	Null Hypothesis	Lag	Chi-square	Null Hypothesis	Lag	Chi-square
T-Y Causality between external financial flow and Sectoral performance						
Agriculture	External financial flows do not cause performance	10	12.871	Performance does not cause External financial flows	10	23.4302***
Manufacturing	External financial flows do not cause performance	6	5.009	Performance does not cause External financial flows	6	1.2267
T-Y Causality between Credit flow and Sectoral performance						
Agriculture	Credit Flows does not cause performance	4	7.2534	Performance does not cause Credit Flows	4	10.7613 **
Manufacturing	Credit Flows does not cause performance	2	1.6993	Performance does not cause Credit Flows	2	7.7066**

Note: the null hypothesis is that 'there is no granger causality' and which holds when Chi-sq-stats are not significant, otherwise we reject it and accept the alternative hypothesis.
Source: Authors' compilation using EViews output

In the second panel, further effort is made to give account of causal implication between credit flows and performance indices of selected sectors in the Nigeria economy. In the estimation, a causality test between the variables is examined. The implication of the outcome gives some evidence that supports unidirectional causality between credit flow and performance indices for agricultural and manufacturing sectors. The first evidence suggests that performance causes credit flows in both mentioned sectors. By implication, extent sectoral performance will dictate the volume of loan that will be granted accordingly. This is typical of normal behaviour of deposit money banks in the country. Before credit is granted to any investors, the banks often ensure that the intended investors have satisfactory ability to pay back the loan, otherwise, other subsequent loans will not be considered.

Discussion of finding: flow and sector's performance in Nigeria
The issue of causality among variables is necessary. While it serves as a form of pretest which accounts for the relationship between or among variables, the outcome therefore gives guidance on policy stance for any variables of concern. In this study, effort is made to find causality between financial flows and sector performance for the Nigerian economy. According to the outcome of the results, causality is found between sector's performance and external financial flow for the agricultural sector, suggesting that previous sectoral performance influences investors to make investment choices into the sector. However, the opposite was the case for the construction sector. In this sector, it is the external financial flows into the sector that influences performance of the sector. While this unidirectional causality is established in these sectors, albeit in the opposite direction, causality between external financial flow and performance in manufacturing and Oil sector is absent. This outcome has been previously established. In the findings of Obansa and Maduekwe (2013), bidirectional causality was found between agricultural financing and economic growth. The finding clearly indicates that investing in the sector presupposes growth of the sector and the same stance is established in the other direction. The submission by Muhammed (2017) further gives evidence on the causality between external financial flow that emanates from capital account and growth for a low-income country like Sudan. Aside from the aforementioned findings, estimation by Kapingura (2017) in the SADC region attest to the outcome of the present study. In particular, Kapingura established the causal impact between external financial inflows growth for the SADC countries. However, while this causal impact was emphasized for the aggregate economy, the case of this study is established for the sectoral outcome. This account is more plausible for the economy and in a way gives insight to economies with similar features.

Again, the causal impact is extended to flows with the economy and sectoral performance. While consideration is given to four important sectors of the economy, the causal impact between credit flow and performance is only established for agricultural and manufacturing sectors. This causal impact is unidirectional and it runs from performance to flows, nuancing the stance that granting of credit by the banks is premised on the sector performance. Previous studies evident that credit flow can Granger cause growth of the economy. Specifically, the study by Kolapo et al (2018) submit that bank credit causes economic development for the Nigerian economy. Indirect evidence is also found in the work of Oyebowale (2020) where growth in bank credit was found to cause growth in loan-deposit ratio with extended impact of economic growth. While this evidence is found for the Nigerian economy, similar evaluation by Vaithilingam et al (2014) for Malaysia indicate that bank credit has a direct causality to economic growth. At the same time, the indirect causality between bank lending and growth performance is established. This submission essentially shows that the present outcome is more confirmatory to the established fact, albeit for the sector of the economy.

6. Conclusion

In this study, effort is made to investigate the causal impact between financial flows and sectoral performance for selected sectors of the Nigeria economy which are agricultural and manufacturing sectors. This study uses monthly data that range between January, 2008 and October, 2022. The causal impact is thus examined through the Toda-Yamamoto causality test. It is considered over traditional granger causality given the fact that it gives consideration to endogeneity features that may be inherent in a series. The study further pays attention to trend analysis among flow variables, performance indices and some macroeconomic variables of the economy. The variable that measures sectoral performance is constructed as an index and is found to align with other measures of performance. The constructed index occurs in monthly frequency and it makes it more appealing to have a robust evaluation and this frequency align with frequency of other variables as used in this study.

The findings from this study are plausible. One, the connection between external financial flow and exchange rate nexus is suggestive of the fact that they are bound to be affected by external shock. The impact of the financial crisis constitutes an insignificant threat to external flow, given the fact that external financial flows in the early part of this analysis are still very high despite the trending financial crisis of the time. However, there was an obvious fact in the time of COVID-19 crisis to suggest that external financial flow is shock specific. Again, further evidence reveals that the fundamental nexus between interest and internal financial flow is still held. In nearly all these sectors, higher interest rates are associated with falling credit flows. On the causality, there is evidence of unidirectional causality that runs from performance to agricultural sector. In other words, there is a glaring fact that performance causes external financial flows in the agricultural sector, which holds that foreign investors in the agricultural sector usually undergo some serious assessment before making an investment outlet.

As for the credit flows, evidence supports unidirectional causality between credit flow and performance indices for agricultural and manufacturing sectors. By implication, the extent of sectoral performance is found to dictate the volume of loan accordingly. While it is observed that performance causes external financial flow in the agricultural sector, it is then recommended that the government should prioritize policy that leads to improvement in the agricultural sector. This will further lead to an increase in external flow of funds into the sector. Again, the typical behaviour of deposit money banks is upheld as credit flow is found to be conditioned on prior performance of the sectors especially for agriculture and manufacturing.

On this basis, it is advised that every effort should be made either by the government or the stakeholder to ensure a positive outlook of these sectors in a way to ensure adequate flow of funds into them/in a way for the sector to attract internal flow. As the study found a closed connection between credit flows and interest rate, it becomes a necessity that monetary authority makes more effort to stabilize interest rate which in a way ensures lower cost of borrowing for investment purposes. Additionally, stabilization of key macroeconomic variables should be prioritized. Foreign investors are often enticed to a stabilized economic environment. However, it is worthy to note that this study is not without any limitations. More importantly, the data scope only covers 2008 to 2022 which may not really account for deeper investigation about the subject matter. In that regard, it is suggested that future research focus should rather extend the scope in terms of year coverage and further consideration may be given to panel analysis.

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