Financial Development and Cross-Border Financial Flows to Nigeria

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Abstract

This study evaluates different perspectives of financial development and how they impact on variants of international financial flows to Nigeria for the period ranging from 1986 – 2019. Financial liberalization that started in Nigeria in 1986 and COVID-19 outbreak that shut down the world economy, led to the choice of the research period. Three indices of financial development such as banking sector development, stock market development and bond market development are constructed with the aid of principal component analysis (PCA). The controlled variables are exchange rates, inflation and interest rates spread. The study employs Autoregressive Distributed Lag (ARDL) model in its estimation. The results shows that, in the long-run, banking sector and stock market development indices have negative and significant impact on FDI. The long-run, bond market development index has positive and significant impact on

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FDI. The investigation reveals that BSD, SMD and BMD have significant and positive impacts on Net FPI flow in the short-run. While in the long-run the index for banking sector development (BSD) has negative and insignificant impact on FPI. Stock market development (SMD) index has positive and insignificant impact on FPI, while, Bond market development (BMD) index has positive but significant impact on PFI. The study concludes that financial development significantly influences cross-border financial flows to Nigeria especially in the long-run. The study recommends that financial intermediation by the banks should be strengthened and credit facilities made available to investors at reduced lending rate. Furthermore, institutional quality of Nigerian stock market should be improved to reduce variations in cross-country financial flows which are best explained by fundamentals like quality of institutions, access to foreign export markets, international price risk mitigation and an ideal macroeconomic policy.

Keywords: Foreign Portfolio Investment, Foreign Direct Investment, Bank Borrowing, Financial Development, Principal Component Analysis, Financial Intermediation

1. INTRODUCTION

Financial flows between nations include foreign direct investment, portfolio investments, transfer payments and bank borrowing. Studies have shown that well-functioning and deep financial systems are critical factors and main drivers of economic prosperity and wellbeing (Matei, 2020: 655; Fuinhas, Filipe, Belucio and Marques, 2019: 2). According to Tsaurai and Makina (2018: 245), financial development may trigger

private investments through better accessibility of corporate organizations to financing. Kapidani and Luci (2019: 89) suggest that access to external finance is a prominent determinant of international capital flows, especially foreign direct investment and foreign portfolio investment flows. Studies such as Islam, Khan, Popp, Sroka and Olah (2020: 20) and Nobakht and Madani (2014: 30) have clearly shown that lack of financial development either in the financial markets or banking sector restricts the preparedness of an economy from reaping the benefits accruing from capital flows such as foreign direct investment and foreign portfolio investment.

The linkages between financial development and capital flows might prove to be beneficial to a resource-scarce economy like Nigeria seeking foreign capital to augment its low savings. Unfortunately, Nigeria scarcely receives the minimum of 5-6% recommended for foreign direct investment inflows to Gross Domestic Product (GDP) while foreign portfolio investment inflows continues to decline in recent years (Fig. 1 & Fig. 2).

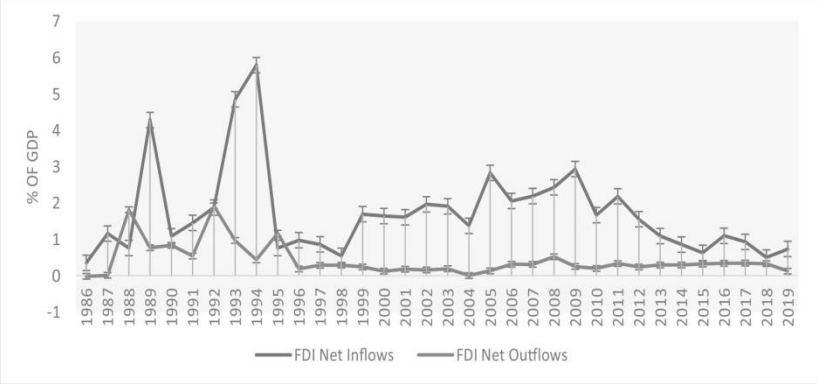

Fig. 1: Trend of FDI flows in Nigeria, 1986-2019.

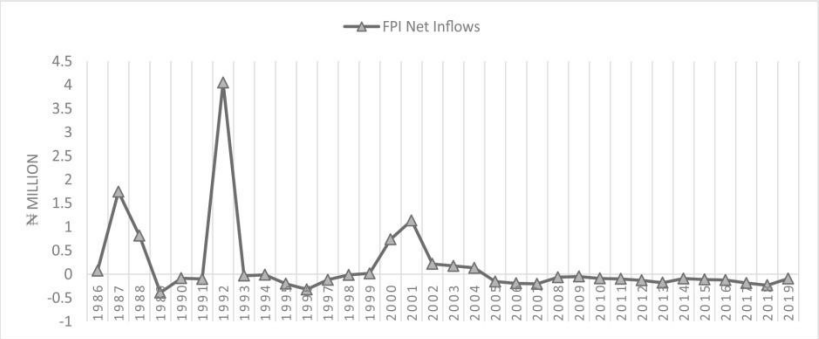

Fig. 2: Trend of FPI flows in Nigeria, 1986-2019

During the period 1986 – 2019, capital flows to Nigeria appeared to be downward trending due to its poor macroeconomic and ailing financial sector amidst the unstable oil prices, the financial liberalization of 1986, lack of financial reforms, global financial crisis of 2008-2009 and economic recession of 2016 (World Bank, 2020: 13).

Figure 1 reveals that despite FDI to GDP ratio increasing to 5.79% in 1994, the values that followed afterwards have been very low, especially after the global financial crisis of 2008-2009. Though, there was slight increase in FDI to GDP ratio in 2016, this did not continue due to the economic recession experienced in Nigeria in the second quarter of the same year. Likewise, Figure 2 shows that after net foreign portfolio inflows recorded its highest value of ₦4.05 billion in 1992, significant decrease was recorded, though, the trend increased persistently but slightly from ₦0.02 billion in 1999 to ₦1.14 billion in 2001(World Bank, 2020: 89). Afterwards, net foreign

portfolio flows into Nigeria turned negative due to several economic crisis faced by the country.

With emphasis on the notable aspects of the financial sector (Banking system, stock market and bond market) that are vibrant and dominates the entire financial system in Nigeria, the present study uses three (3) financial development indicators to assess the influence of banking sector development, stock market development and bond market development. The major goal of this study is to empirically analyze the influence of financial development on cross-border financial flows to Nigeria from 1986 to 2019 that includes years of financial liberalization, political instability and economic crisis.

Significance of the study to the Banking Industry

A sizeable proportion of cross-border financial flows are intermediated by the banks. These flows are likely to be undermined when the financial environment of the recipient economy deteriorates. The findings of this study therefore have important implications for mobilizing private finance and regulating financial system in the following areas in Nigeria:

1. The findings of the study will help to strengthen macro-prudential regulations which will enhance financial stability.
2. The study points to the need for stronger regulation of cross-border banks, including closer cross-border supervisory cooperation, because of the rising importance of regional banks in Africa.
3. Capital-account regulations could be an important

part of the macro-prudential toolkit. Avoiding excessive borrowing in the sovereign and private bond markets will help avoid unsustainable debt levels and the creation of unsustainable fiscal liabilities that could lead to problems with debt repayments.

4. The study will assist international financial institutions to reorient their mandates to focus on business models which will add value by creating significant and unique value chain. These will include accelerating the development of bankable projects and exploring activities that would attract investment into agriculture and manufacturing.
5. The understanding of financial development and cross-border financial flows nexus could assist international financial institutions create more securities that are attractive to pension and insurance funds investors and provide better hedging instruments to mitigate currency and political risk.

Limitations of the study

The constraints faced in this study are associated with the selection of variables. This is because literature on cross-border financial flows identified myriad of factors within the scope of pull and push factors. Hence a model containing many of the variables would likely lead to multi-collinearity which in turn will result to spurious regression outcome (Tellez-Leon & Ibarra, 2019). To overcome this limitation the study employed new variables that are constructed as linear combinations or mixtures of the initial cross-border financial flows indices

(Principal components). Principal components are new variables that are constructed as linear combinations or mixtures of the initial variables. Principal Component Analysis (PCA) is a dimensionality-reduction method that is often used to reduce the dimensionality of large data sets, by transforming a large set of variables into a smaller one that still contains most of the information in the large set.

Other limitations encountered in the course of the study include finance and difficulty in sourcing data especially during these hard times of COVID-19. This limitation was managed through perseverance and adherence to all COVID-19 protocols.

2. LITERATURE REVIEW

2.1 Conceptual Framework

A prominent factor in enhancing the cost-benefit tradeoff from international financial flows is that banks usually play a critical role in intermediating fund flows. Banks behave in different ways from other financial markets participants (Brunnermeier, De Gregorio and Eichengreen, 2012; 2). Practically, a sizeable proportion of cross-border financial flows are intermediated by the banks. These funds are likely to reverse rapidly when financial environment of the host economy deteriorates. Without a global regulatory framework, there could be danger that policy measures that are in the interest of a nation take priority over the international optimal policy. To buttress this point, Brunnermeier *et al.,* (2012: 4-5) stated that foreign regulators may not compel their banks to recapitalize but instead permit them to dispose foreign assets and withdraw from international markets. They also cited a second scenario through ring fencing where each country makes attempts to

acquire the assets of weak multinational banks before the other countries thereby endangering a possibly viable bank.

Efficient financial market amid easy financial accessibility attracts foreign capital. This is informed by the fact that financial market efficiency, removal of information constraints as well as easy access to information technology, and the presence of new financial products and services act as prominent factors that attract foreign capital, especially FPI in the economy (Qamruzzaman and Wei, 2019: 89).

The conceptual framework for this study is presented diagrammatically in Figure 3. Figure 3 captures the interaction between cross-border financial flows and the financial sector indicators. The macroeconomic variables are included conceptually as control variables capable of influencing the financial system and the economy.

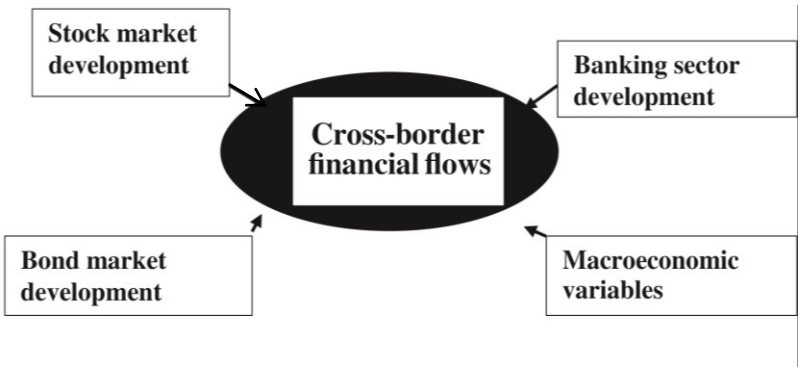

Fig. 3: Conceptual Framework

Source: Conceptualized by the researchers

2.2 Theoretical Underpinning

Schumpeter's (1911: 601) pioneering work on finance-growth nexus stated that a well-developed financial system stimulates growth in technological innovations and advancement by redistributing resources from surplus units to deficit units of the economy. This study is underpinned by the supply leading hypothesis of financial development. The supply-leading hypothesis postulates that money related advancement is the major determinant of financial development. Supply leading entails two prominent functions: to channel financial resources from low-growth sectors to high-growth sectors and to facilitate and promote an entrepreneurial response in the high-growth sectors (Patrick, 1966: 179). This reveals that establishment of functional financial institutions and the services exist before there is demand for them. Consequently, efficiency and development of domestic financial institutions such as banks and financial markets play crucial roles in economic stability that attracts foreign investors in an economy. Bank-based financial institutions accelerate foreign capital inflows by facilitating financial transactions with efficiency and effectiveness (Worldwide Governance Indicators, 2019). Financial openness towards foreign banks allows financial market development in the host economies, which in turn, positively motivates foreign investors to channel their investments to an economy with well-developed financial sector because higher financial integration forces investments towards countries' with well-structured financial sector (Giannetti and Ongena, 2012: 171).

2.3 Review of Related Literature

Kamasa (2020: 276 - 280) investigated the impact of financial reforms on foreign direct investment (FDI) in Ghana. A composite index for financial sector reform was constructed comprising various reform policies that were implemented between 1987 and 2016. The Autoregressive Distributed Lag (ARDL) bounds test was applied to establish cointegration between variables. The study controlled for other covariates that affect FDI such as trade openness, exchange rate, gross domestic product per capita, inflation to avoid the possibility of endogeneity and serial correlation. Results from the analysis reveal that reforms aimed at deepening the financial sector boosted FDI inflows. The results reveal that competitive reforms have the highest impact on FDI followed by privatization reforms with positive and significant elasticity coefficients. Behavioral based reforms reveal a positive effect on FDI.

Islam *et al.,* (2020: 19-22) investigated the nexus between financial development and FDI for seventy-nine (79) Belt and Road Initiative (BRI) countries as they are entering a new height of integration, international trade, and mutual development. The empirical findings of conventional and robust estimators show that financial development of BRI host countries attracted significant FDI, while the institutional quality played a significant role in moderating this relation. The in-depth analysis offers the insight that development of financial markets is less attractive to FDIs.

Sasmaz and Gumus (2018: 30-35) examined the impact of the interaction between banking sector development and FDI on

economic performance in Turkey from 1960-2017. The Zivot-Andrew approach to unit root test is applied. The Autoregressive Distributed Lag (ARDL) is the major tool used to analyze the data and the Toda-Yamamoto causality test is conducted. From the ARDL output, the interaction between banking sector development and FDI inflows causes positive effect on economic growth. The Toda-Yamamoto causality test results identify a unidirectional causality from banking sector development to FDI and economic growth.

Nwosa (2015: 370-376) ascertains the linkages between capital inflows and stock market development for the period spanning from 1986 to 2013 in Nigeria. Capital inflow is categorized by foreign direct investment (FDI) and foreign portfolio investment (FPI) while stock market development is measured by market capitalization, turnover ratio and value traded ratio. The study uses error correction modeling techniques. From the estimation, it is revealed that market capitalization and value traded ratio are the most significant variables that influences foreign portfolio investment while none of the stock market development variables significantly influence FDI in the long-run. The short-run estimation shows that market capitalization is the sole variable that significantly influences both foreign direct investment and foreign portfolio investment, while value traded ratio only has significant influence on FDI.

2.4 Gap in Literature

First, the prior studies like Kamasa (2020: 276 - 280); Qamruzzaman and Wei (2019: 100-108); Tsaurai and Makina (2018: 250-254) investigated the linkages between financial development and FDI inflows while net FDI outflows was

ignored. Hence, this study looks at the aspect of financial development as it affects FPI outflows to bridge this gap. Secondly, none of the prior studies investigated how net FPI flows have been affected by financial development which is also a research gap this study aims to fill.

3. DATA AND METHODOLOGY

3.1 Data and Model Specification

The analytical framework for this study is in line with the methodology employed by Destek, Sinha and Sarkodie (2020: 5-7), but it is modified to capture and test the influence of financial development on cross-border financial flows to Nigeria.

The major empirical model is constructed as expressed in equation (1) as follows:

$$CF_t = \beta_0 + \beta_1 BSD_t + \beta_2 BMD_t + \beta_1 SMD_t + \beta_1 EXR_t + \beta_1 INF_t + \beta_1 IRS_t + \varepsilon_t \quad . \quad (1)$$

Where,

t and ε_t Represents time period and stochastic term. CF Denotes cross-border financial flows (FDI inflows, FDI outflows and net FPI). BSD, BMD, SMD, EXR, INF and IRS indicate banking sector development, bond market development, stock market development, exchange rate, inflation and interest rate spread respectively. The annual data spanning 1986–2019 were collected. The variables used for constructing the financial development index and net FPI were obtained from CBN statistical bulletin while FDI inflows and outflows were sourced from WDI.

3.2 Techniques for Data Analysis

Autoregressive Distributed Lag (ARDL)

This study applied the autoregressive distributed lag (ARDL) approach proposed by Pesaran *et al.* (2001: 289-300) to estimate the validity of the co-integration between variables and to determine both the long-run and the short-run coefficients of the variables. The ARDL technique allows variables that are stationary in levels [I(0)] or first-differenced form [I(1)] to be integrated in a single model. The relevant ARDL procedure of equation 1 can be expressed as follows:

$$\begin{aligned}\boldsymbol{\Delta CF_t} = \delta_0 &+ \sum_{j=1}^{p}\left(\delta_{1j}\Delta CF_{t-j}\right) \\ &+ \sum_{j=0}^{p}\left(\delta_{2j}\Delta(BSD)_{t-j}\right) + \sum_{j=0}^{p}\left(\delta_{3j}\Delta BMD_{t-j}\right) \\ &+ \sum_{j=1}^{p}\left(\delta_{4j}\Delta SMD_{t-j}\right) + \sum_{j=1}^{p}\left(\delta_{5j}\Delta EXR_{t-j}\right) \\ &+ \sum_{j=1}^{p}\left(\delta_{6j}\Delta INF_{t-j}\right) + \sum_{j=1}^{p}\left(\delta_{7j}\Delta IRS_{t-j}\right) + \\ \beta_1(BSD)_{t-1} + \beta_2(BMD)_{t-1} &+ \beta_3(SMD)_{t-1} + \beta_4(EXR)_{t-1} + \\ \beta_5(INF)_{t-1} + \beta_6(IRS)_{t-1}\,\varepsilon_t \quad (2)\end{aligned}$$

where, Δ and P indicate the difference operator and lag length, respectively. According to equation (2), the null hypothesis of no co-integration between variables is tested against the alternative hypothesis. The optimal lag length (p) in equation (2) was chosen with Schwarz information criteria (SIC). If

there is evidence of co-integration in the model, the long-run ARDL equation is estimated as follows:

$$\boldsymbol{CF_t} = \beta_1(BSD)_{t-1} + \beta_2(BMD)_{t-1} + \beta_3(SMD)_{t-1} + \beta_4(EXR)_{t-1} + \beta_5(INF)_{t-1} + \beta_6(IRS)_{t-1}\ \varepsilon_t \quad (3)$$

Finally, short-run coefficients of the variables are estimated with error-correction model (ECM) expressed in equation 4 as follows:

$$\boldsymbol{\Delta CF_t} = \delta_0 + \sum_{j=1}^{p}(\delta_{1j}\Delta CF_{t-j}) + \sum_{j=0}^{p}(\delta_{2j}\Delta(BSD)_{t-j}) + \sum_{j=0}^{p}(\delta_{3j}\Delta BMD_{t-j}) + \sum_{j=1}^{p}(\delta_{4j}\Delta SMD_{t-j}) + \sum_{j=1}^{p}(\delta_{5j}\Delta EXR_{t-j}) + \sum_{j=1}^{p}(\delta_{6j}\Delta INF_{t-j}) + \sum_{j=1}^{p}(\delta_{7j}\Delta IRS_{t-j}) + ECM_{t-1} \quad 4)$$

where, the error-correction term ECM_{t-1} denotes the speed of adjustment parameter and the expected sign of this coefficient should be negative with statistical significance.

Principal Component Analysis (PCA)

In the initial stage of the data analysis, Principal Component Analysis (PCA) was applied. Principal components represent new variables that are constructed as linear combinations of the initial variables. These mixtures are done in a way that the novel variables (i.e., principal components) are not correlated and the information associated with the initial variables is compressed into the first components. PCA tries to put

maximum possible information in the first component, then maximum remaining information in the second and so on. Geometrically speaking, PCA gives information concerning the data that explains **maximal amount of variance**, that is, the lines that contain most information of the data. The Principal Component Analysis (PCA) which is used to generate banking sector development (BSD), bond market development (BMD) and stock market development (SMD) is based on the following steps:

1) **Standardization:** The reason for this step is to standardize the range of the continuous initial variables so that each one of them contributes equally to the analysis. That is, if there are large variations between the ranges of initial variables, those variables with larger ranges will dominate over those with lower ranges, which will lead to biased results. So, transforming the data to comparable scales can prevent this problem. Mathematically, this can be done by subtracting the mean and dividing by the standard deviation for each value of each variable. All the variables are transformed to the same scale after standardization.
2) **Covariance matrix computation:** This is to show how the variables of the input data vary from the mean with respect to each other, or in other words, to see if there is any relationship between them because variables may be highly correlated in such a way that they give redundant information. To identify these correlations, the covariance matrix is computed. The covariance matrix is computed as "*p x p"* system matrix (where *p* represents the number of dimensions) that has

the covariance entries associated with all possible pairs of the initial variables.

3) **Compute the eigenvectors and eigenvalues of the covariance matrix to identify the principal component.** Eigenvectors and eigenvalues represent the linear algebra concepts that are computed from the covariance matrix in order to show the *principal components* of the data. Eigenvectors associated with the covariance matrix are actually *the directions of the axis where there are most variance* (most information) called Principal Components. Eigenvalues are the coefficients linked to eigenvectors, which reveal the *amount of variance associated with each principal component.* By ranking the eigenvectors in order of their eigenvalues, highest to lowest, the principal components in order of significance are given.

4) **Feature vector:** Computation of the eigenvectors and ordering them by their eigenvalues from highest to lowest reveals the principal components in order of significance. In this step, the aim is to choose whether to keep all the components or remove those of lesser significance (low eigenvalues), and form with the remaining ones a matrix of vectors called *feature vector*. Therefore, feature vectors are matrix that has eigenvectors that one decides to keep. This makes it the first step towards dimensionality reduction, because if one chooses to keep only $\boldsymbol{p}$ eigenvectors (components) out of $\boldsymbol{n}$, the final data set will capture only $\boldsymbol{p}$ dimensions.

5) **Recast the data along the principal component axes:** In this last step, the objective is to use the feature

vector constructed using the eigenvectors of the covariance matrix, to reorient the data from the initial axes to the ones represented by the principal components (hence the name PCA). This is done by multiplying the transpose of the initial data by the transpose of the feature vector.

4. RESULTS AND DISCUSSION

4.1 Principal Component Analysis (PCA)

Building on the reasons advanced by Destek *et al.,* (2020: 8), this study used principal component analysis (PCA) to develop a set of financial development indices which includes three sub-indices. The first phase of the analysis is focused on the construction of sub-indices such as banking sector development (BSD), stock market development (SMD) and bond market development (BMD) of financial development using principal component (PCA) analysis. The outcome of the PCA is as displayed in Table 1: BSD index was constructed with deposit money banks' assets (DMBASST_GDP), financial sector deposits (FSDPST_GDP), liquid liabilities of banks (LIQLIAB_GDP) and private sector credit (PSC_GDP). SMD index was constructed with market capitalization (MCAP-GDP), turnover ratio and value of shares traded-to-GDP (VST_GDP). BMD index was developed with variables such as domestic public sector debt-to-GDP (DPUBS_GDP), debt of private sector-to-GDP ratio (DPRVS_GDP) and international public debt-to-GDP ratio (INTLPDS_GDP).

Regarding BSD index, the eigenvalues of the PCA indicate that the PCA 1 (first principal component) is the optimal PCA as it

explains approximately 90.96% of the standardized variance. The individual contributions of DMBASST_GDP, FSDPST_GDP, LIQLIAB_GDP and PSC_GDP in PCA1 were the weights used to obtain the BSD index.

For SMD index, about 81.37% of the standardized variance was explained by the PCA1 (first principal component). Here, the individual contributions of MCAP_GDP, TURNOVER and VST_GDP in PCA1 were the weights used to construct the SMD index.

In the case of BMD index, the first principal component analysis (PCA1) explained approximately 62.08% of the standardized variance and the individual weights of DPUBS, DPRVS and INTLPDS were applied in constructing the BMD index.

Table 1: Principal component analysis

Banking Sector Development (BSD) Index				
	PCA 1	**PCA 2**	**PCA 3**	**PCA 4**
Eigenvalues	3.638362	0.293382	0.059675	0.008581
Proportion	0.9096	0.0733	0.0149	0.0021
Cumulative proportion	0.9096	0.9829	0.9979	1.0000
Variables	**Vector 1**	**Vector 2**	**Vector 3**	**Vector 4**
DMBASST_GDP	0.485376	-0.674101	0.366487	0.419149
FSDPST_GDP	0.517800	-0.236394	-0.212069	-0.794372
LIQLIAB_GDP	0.485159	0.647659	0.586569	-0.033084
PSC_GDP	0.510797	0.265035	-0.690399	0.438397

Stock Market Development (SMD) Index				
	PCA 1	**PCA 2**	**PCA 3**	**PCA 4**
Eigenvalues	2.441183	0.503267	0.055550	--
Proportion	0.8137	0.1678	0.0185	--
Cumulative proportion	0.8137	0.9815	1.0000	--
Variables	**Vector 1**	**Vector 2**	**Vector 3**	**Vector 4**
MCAP_GDP	0.552342	-0.695608	0.459399	--
TURNOVER	0.546866	0.718291	0.430110	--
VST_GDP	0.629171	-0.013662	-0.777147	--
Bond Market Development (BMD) Index				
	PCA 1	**PCA 2**	**PCA 3**	**PCA 4**
Eigenvalues	1.862276	0.949757	0.187967	--
Proportion	0.6208	0.3166	0.0627	--
Cumulative proportion	0.6208	0.9373	1.0000	--
Variables	**Vector 1**	**Vector 2**	**Vector 3**	**Vector 4**
DPUBS	0.696277	0.020635	0.717476	--
DPRVS	-0.428561	0.813808	0.392494	--
INTLPDS	0.575789	0.580767	-0.575479	--

Source: Computed by the Author, 2021, Using E-Views 10.0

The graph (Fig. 3) displays the trend of BSD, SMD and BMD indices as constructed with the principal component analysis. The time plot shows that all the indices (BSD, SMD and BMD) fluctuated significantly. For instance, at the inception of the Structural Adjustment Programme (SAP) that triggered financial liberalization in 1986, all the indices trended upwards except SMD which could be due to the fact that the Nigerian stock market was just acclimatizing with foreign financial

markets. In periods of economic crisis such as the global financial crisis of 2008-2009, it can be seen that all the indices recorded negative values but the SMD rose more rapidly than the BSD and BMD indices probably due to quantitative easing embarked upon in the United States which created much liquidity and pushed capital, through portfolio investments, to emerging market economies and developing economies in need of financial resources. Similarly, the economic recession that hit Nigeria in the second quarter of 2016 significantly undermined the stock market as the SMD index trended below zero though BMD trended downwards but remained positive as the government raised debt instruments to generate funds towards resuscitating the economy from the recession. This clearly shows that financial development in Nigeria has not been stable.

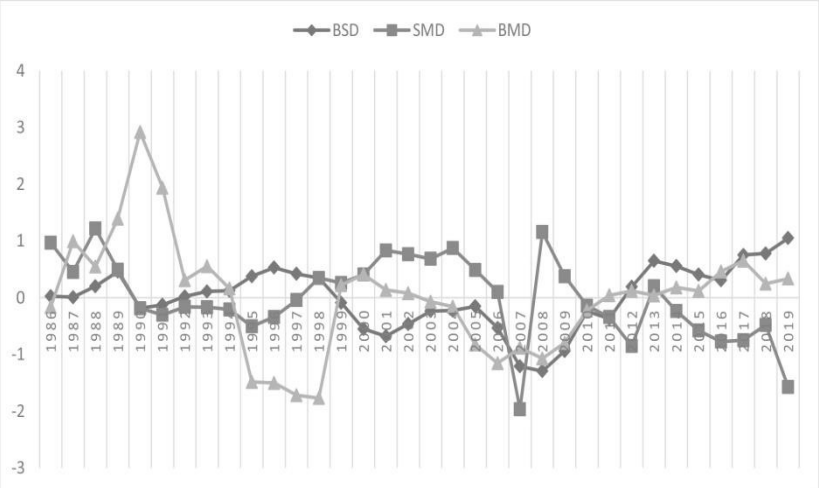

Fig. 3: Time plot of financial development indices

Source: Computed by the Author, 2021, Using E-Views 10.0

4.2 Test of Stationarity

The stationary properties of the data are examined using Dickey & Filler and Philipp & Perron unit root test to show the order of integration. The unit root results have been summarized in Table 2. The variables are of mixed level of integration, that is, I(0) and I(1). This situation, according to Paseran, Shin & Smith (2001: 289-300) necessitates the application of the Autoregressive Distributed Lag (ARDL).

Table 2: Unit root test results

	ADF based unit root test		**PP based unit root test**	
Variable	**I(0): Level**	**I(1): 1st Difference**	**I(0): level**	**I(1): 1st Difference**
FDIINF	-4.3530 {0.0080}	-	-4.2433 {0.0105}	-
FDIOTF	-1.8941 {0.6334}	4.9284 {0.0043}	-5.1967 {0.0010}	-
FPI	-9.6858 {0.0000}	-	- 12.1301{0.0000}	-
BSD	-1.7299 {0.7143}	- 4.3320{0.0087}	-1.4517 {0.8258}	-4.2212 {0.0113}
SMD	-4.2283 {0.0109}	-	-4.2406 {0.0105}	-
BMD	-3.85645 {0.0271}	-	-2.4240 {0.3613}	-5.2387 {0.0009}

EXR	-2.3310 {0.4064}	-4.1589 {0.0131}	-1.6374 {0.7558}	-3.9109 {0.0232}
IFR	-4.3544 {0.0022}	-	-2.8080 {0.0680}	-6.8693 {0.0000}
IRS	-3.2340 {0.0268}	-	-3.1727 {0.0308}	-

Source: Computed by the Author, 2021, Using E-Views 10.0
Note: Figures in parenthesis { } represents the p-values

4.3 ARDL Estimation

The results of the bounds test for the three models are presented in Table 3:

Table 3: ARDL bounds test

Ho: no long-run relationship				
$\boldsymbol{FDIINF = f(BSD, SMD, BMD, EXR, IFR, IRS)}$				
Test statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	7.225400	5%	2.27	3.28
K	6	1%	2.88	3.99
$\boldsymbol{FDIOTF = f(BSD, SMD, BMD, EXR, IFR, IRS)}$				
Test statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	5.698274	5%	2.27	3.28
K	6	1%	2.88	3.99
$\boldsymbol{FPI = f(BSD, SMD, BMD, EXR, IFR, IRS)}$				

Test statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	11.71932	5%	2.27	3.28
K	6	1%	2.88	3.99

Source: Computed by the Author, 2021, Using E-Views 10.0

Note: I(0) and I(1) represents lower and upper bounds values

The outcome of the ARDL bounds test indicates that the test for the three models is highly significant at 1% level. This is because the value of the F-statistics 7.225400, 5.698274 and 11.71932 are greater than the upper bound, that is, I(1) and lower bound, that is, I(0) critical values. This situation warrants that the null hypothesis of "no long-run relationship" or "no co-integration" is rejected irrespective of whether the series associated with the variables are at level, that is, I(0) or first difference, that is, I(1) or a blend of both. Based on this premise, the presence of long-run relationship between capital flows (FDIINF, FDIOTF and FPI), financial development indicators (BSD, SMD and BMD) and macroeconomic variables (EXR, IFR and IRS) is confirmed.

The long-run coefficients under the ARDL framework are presented in Table 4: From the long-run estimation, it is seen that the index for banking sector development (BSD) has negative coefficients across the models. This indicates that a unit increase in BSD caused a reduction of 0.86 units, 0.19 units and 0.08 units in FDINF, FDIOTF and FPI, respectively.

However, BSD has statistically significant impact on FDIINF and FDIOTF while its impact on FPI was statistically insignificant.

Table 5: Long-run estimates of the ARDL model

	FDI inflows (FDIINF)	**FDI outflows (FDIOTF)**	**Net FPI flows (FPI)**
Variable	**Coefficient & {Prob.}**	**Coefficient & {Prob.}**	**Coefficient & {Prob.}**
BSD	-0.86 {0.00}	-0.19 {0.00}	-0.08 {0.20}
SMD	-0.29 {0.04}	-0.17 {0.00}	0.01 {0.88}
BMD	0.07 {0.43}	0.13 {0.00}	0.28 {0.00}
EXR	-0.00 {0.06}	-0.00 {0.06}	-0.00 {0.00}
IFR	0.04 {0.00}	-0.01 {0.04}	0.01 {0.22}
IRS	0.11 {0.02}	-0.08 {0.00}	0.06 {0.00}
C	-0.10 {0.86}	1.58 {0.00}	-0.38 {0.19}

Source: Computed by the Author, 2021, Using E-Views 10.0

Note: Figures in parenthesis { } are the probability values

The measure of stock market development (SMD) index shows that both DFIINF and FDIOTF are negatively impacted while FPI is positively impacted. For instance, across the models, the coefficient of SMD implies that FDIINF and FDIOTF decreases by 0.29 units and 0.17 units respectively due to a unit

increase in SMD. On the other hand, a unit increase in SMD causes an increase of approximately 0.01 units in FPI. SMD index is statistically significant in influencing FDIINF and FDIOTF but statistically insignificant in attracting FPI inflows. For all the variants of capital flows, bond market development (BMD) index exert positive impact all through. For FDIINF, the estimated coefficient of BMD indicates that a unit increase in the BMD index brought about 0.07 unit increase in FDINF. BMD index causes FDIOTF to rise by approximately 0.13 units. For PFI, a one unit increase in BMD causes FPI to increase by approximately 0.28 units.

The ECM reveals the speed of adjustment from shock and its coefficient is expected to be negative, statistically significant and with a value between 0 and 1 (Paseran *et al.,* 2001: 289-300). The results of the error correction model (ECM) are presented in Table 5.

Approximately 4%, 26% and 44% of short-run shock/disequilibrium/discrepancies in the FDIINF, FDIOTF and FPI models are corrected every year. The Adj. R-squared of the ECM shows that the indicators of financial development and macroeconomic variables accounted for approximately 82%, 97% and 91% of the total variations in the various components of capital flows (FDINF, FDIOTF and FPI) respectively while the remaining unexplained variations are due to the error term.

Table 5: Error correction model (ECM)

	FDI inflows (FDIINF)	**FDI outflows (FDIOTF)**	**Net FPI flows (FPI)**
Variable	**Coefficient & {Prob.}**	**Coefficient & {Prob.}**	**Coefficient & {Prob.}**
CF(-1)*	-1.69 {0.00}	-1.32 {0.00}	-2.87 {0.00}
D(BSD)	-0.30 {0.43}	-0.26 {0.00}	0.45 {0.03}
D(SMD)	-0.47 {0.00}	-0.08 {0.01}	0.06 {0.04}
D(BMD)	0.53 {0.02}	0.17 {0.00}	0.34 {0.04}
D(EXR)	-0.05 {0.04}	-0.09 {0.03}	-0.01 {0.04}
D(IFR)	0.04 {0.00}	0.00 {0.12}	0.04 {0.00}
D(IRS)	-0.02 {0.62}	-0.02 {0.01}	0.12 {0.00}
ECM(-1)	-0.04 {0.01}	-0.26 {0.02}	-0.44 {0.01}
R-squared	0.86	0.98	0.94
Adj. R-squared	0.82	0.97	0.91
Durbin-Watson stat	2.49	2.48	2.52

Source: Computed by the Author, 2021, Using E-Views 10.0

Note: Figures in parenthesis { } are the probability values

The negative and statistically significant CF(-1)* across the models show that previous years' FDIINF, FDIOTF and FPI cause significant impact on current year's capital flows.

4.4 Diagnostic Tests

The diagnostic tests of the ARDL model are presented in Table 6.

Table 6: Diagnostic Tests

FDIINF model		
Tests	*Statistic*	*Prob.*
Serial correlation	3.127376	0.0714
Heteroscedasticity	1.444009	0.2311
Jarque-Bera	1.8812	0.3903
FDIOTF model		
Tests	*Statistic*	*Prob.*
Serial correlation	0.890889	0.4358
Heteroscedasticity	1.067952	0.4562
Jarque-Bera	0.5221	0.7702
FPI model		
Tests	*Statistic*	*Prob.*
Serial correlation	2.064346	0.1733
Heteroscedasticity	1.827444	0.1375
Jarque-Bera	0.0822	0.9597

Source: Computed by the Author, 2021, Using E-Views 10.0
Note: Null hypothesis is accepted if $p > 0.05$

The results presented in Table 6 demonstrate that the ARDL model passes the diagnostic tests. There is no evidence of autocorrelation and heteroskedasticity at 5% confidence level and that the model passes the test for normality.

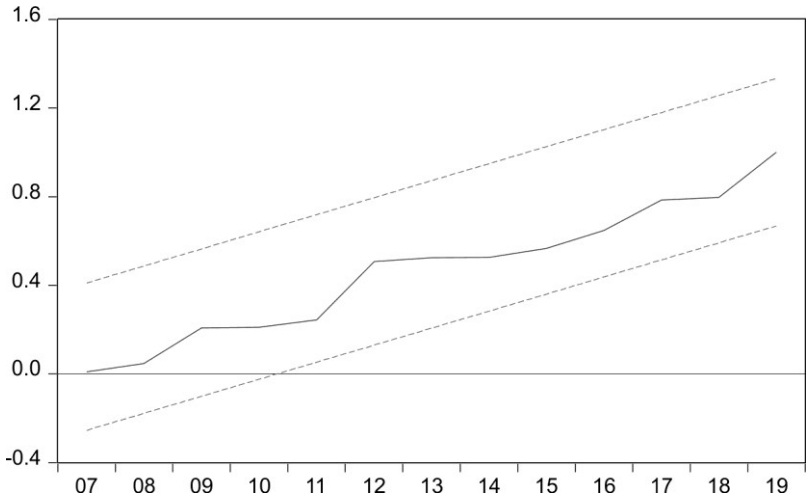

Fig. 4 CUSUM test for FDIINF estimation

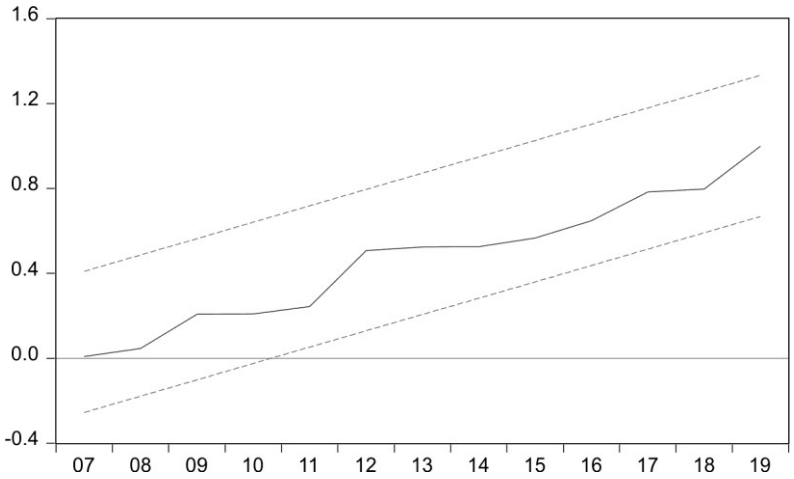

Fig. 5 CUSUMSQ test for FDIINF estimation

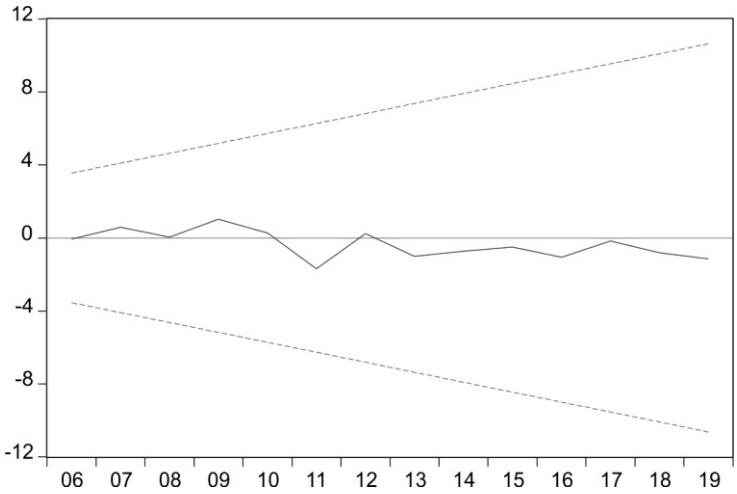

Fig. 6 CUSUM test for FDIOTF estimation

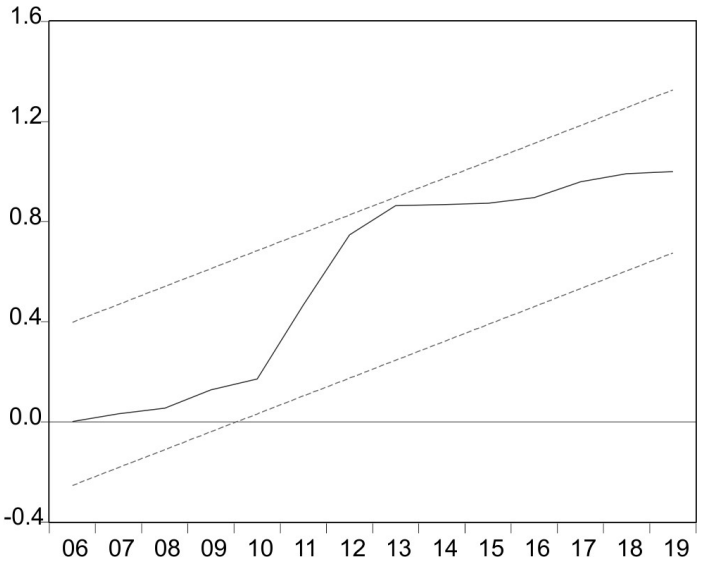

Fig. 7 CUSUMSQ test for FDIOTF estimation

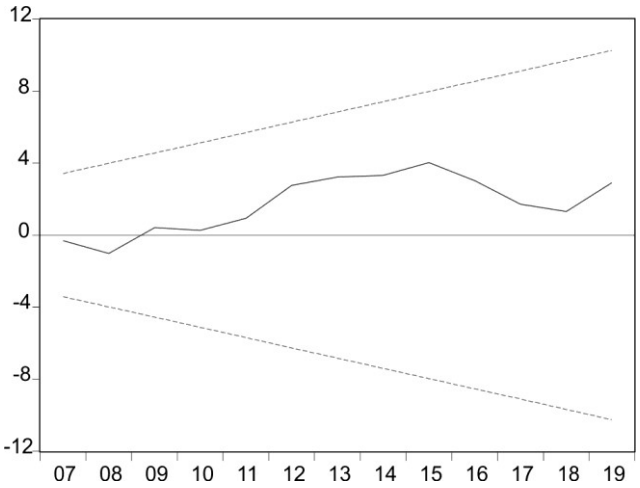

Fig. 8 CUSUM test for FPI estimation

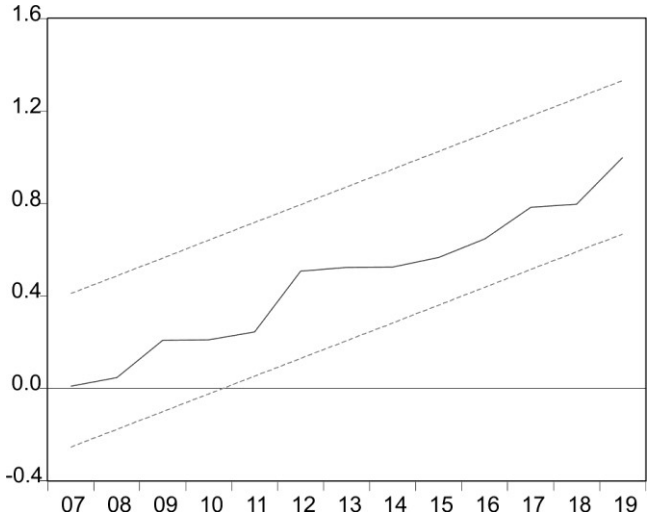

Fig. 9 CUSUMSQ test for FPI estimation

Source: Computed by the Author, 2021, Using E-Views 10.0

To test the stability of the ARDL estimates, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) are applied. Graphical representation of CUSUM and CUSUMSQ are presented in Figures 4 to 9 respectively. The plots of both CUSUM and CUSUMSQ are within the boundaries, proving the stability of the ARDL estimation. The model appears to be stable and properly specified given that none of the two tests statistics is outside the critical bounds.

4.5 Discussion of Findings

The findings of this study show that in the short-run, BSD has negative and insignificant impact on FDIINF, while, it had negative and statistically significant impact on FDIOTF. Though, few studies used BSD in measuring financial development but studies such as Qamruzzaman & Wei (2019: 100-108); Tsaurai and Makina (2018); and Sasmaz and Gumus (2018) found positive impact of BSD on FDI inflows in developing economies and Turkey, respectively. This contradicts the findings of this study and may be due to economic differences. BSD has significant and positive impact on Net FPI flow in the short-run. This indicates that time lag exists in financial intermediation by the banks. From the long-run estimation, it is seen that the index for banking sector development (BSD) has negative coefficient. These findings show that the Nigerian banking system is lagging behind in terms of development, thus discouraging foreign investors who may have already well-developed banking sector in their home countries.

SMD index has significant impact on components of capital flows (FDIINF, FDIOTF and FPI) in the short-run. It is seen

that while the SMD index exerts negative impact on FDIINF and FDIOTF, its impact on FPI is positive. This could be attributed to some uncertainties that may be associated with investments in the early stages. In the long-run, stock market development (SMD) index has positive and insignificant impact on FPI. This could be attributed to the fact that Nigeria being a developing market economy and highly integrated with advanced markets is often exposed to risk and susceptible to financial shocks in the global financial system through various transmission mechanisms as experienced during the global financial crisis in 2008/2009 and the recently COVID-19 induced financial crisis. Studies such as Tsaurai & Makina (2018) and Amissah (2018: 244-254) found a significant positive impact of stock market development in emerging countries and Ghana respectively. On the other hand, Nwosa (2015: 369-376) reveals that SMD significantly influences FPI through increase in market capitalization and value traded ratio. The contradiction between the findings of Nwosa (2015: 369-376) and that of this study could be attributed to the choice of financial development variables.

BMD impact on FDIINF is insignificant. This could be due to the fact that yield on Nigerian bonds are often low compared to those of advanced countries, thus foreign investors may not often subscribe to them but rather choose to issue such securities in their home countries, thus increasing FDIOTF as indicated by the results. BMD index positively and significantly impact on FPI in the short-run. This could be due to the fact that issuance of bonds helps both private and public to raise funds that are often invested in viable investments that eventually stabilize the economy, thereby attracting foreign

investments. In the long-run, Bond market development (BMD) index also exerts positive impact on PFI. The statistically significant and positive impact of BMD on FPI is generally attributed to the fact that government often float bonds in foreign currency (especially, the US Dollar) in the international financial markets, thus eliminating the risk of exchange rate as the US Dollar rate is more stable than the Nigerian currency (Naira) which makes Nigeria a destination for FPIs. However, the studies reviewed did not consider BMD in their analysis.

The study controlled for the impact of macroeconomic variables such as exchange rate (EXR), inflation rate (IFR) and interest rate spread (IRS) because capital flows may bypass financial development indicators as it makes its way into a country because of other factors apart from the level of the financial development (Sanusi, 2002: 1). EXR has positive and significant impact on FDIINF, FDIOTF and FPI in the short-run, implying that exchange rate influences capital flows amidst financial sector development indicators. On the other hand, interest rate spread (IRS) tends to impact positively and significantly on FPI flows while its impacts on FDIINF and FDIOTF are negative, and insignificant in the case of FDIINF. The inclusion of macroeconomic variables in financial development – capital flows model has been supported by Kamasa (2020: 271-284).

5.0 CONCLUSION AND RECOMMENDATIONS

This study evaluated different indices of financial development and their impact on foreign portfolio investments in Nigeria from 1986 to 2019. The investigation revealed that BSD, SMD and BMD have significant and positive impact on Net FPI flow

in the short-run. While in the long-run the index for banking sector development (BSD) has negative and insignificant impact on FPI. Stock market development (SMD) index had positive and insignificant impact on FPI, while, Bond market development (BMD) index also exerts positive but significant impact on PFI. The results show that, in the long-run, banking sector and stock market development indices has a negative and significant impact on FDI inflows and outflows, while, bond market development index has positive and significant impact on FDI outflows. Based on the findings, the study concludes that financial development significantly influences cross-border financial flows in Nigeria especially in the long-run. The study therefore recommends:

1. Financial intermediation by the banks should be strengthened and credit facilities made available to investors at reduced the cost of borrowing - interest rate.
2. The institutional quality of Nigerian stock market should be improved to reduce variations in cross-border financial flows which are best explained by fundamentals like quality of institutions, access to foreign export markets, international price risk and an ideal macroeconomic policy.
3. Policies that will strengthen the value of the naira should be pursued to reduce foreign exchange rate risk.

6.0 CONTRIBUTION TO KNOWLEDGE

1. The studies reviewed used variables such as market capitalization-to-GDP ratio, bank assets-to-GDP ratio, deposits-to-GDP ratio, private sector credit-to-GDP ratio and money supply-to-GDP ratio to measure

financial development. These measures are inappropriate for capturing financial development as all these variables are highly correlated. To measure financial development, this study used the principal component analysis to develop indices for banking sector development, stock market development and bond market development in Nigeria so as to reduce the likelihood of multi-collinearity in the analysis.

2. The study analyzed the financial development–capital flows nexus in a disaggregated way.
   Separating the financial development indicators into sub-segments like banking sector, the stock market, and the bond market, and separately investigating the effectiveness of these sectors allows for more consistent policy implications (Destek *et al.,* 2020: 1-14).
3. The long-run and short-run association between financial development and capital flows was analyzed and a comprehensive financial development index based on principal component analysis was developed for Nigeria.

7.0 Suggestions for further studies

The world is dynamic and cross-border financial flows are being influenced by myriad of factors such as national restrictions, borrowing, social welfare schemes, technological advancement and insecurity. These factors can increase or undermine cross-border financial flows. This study empirically analyzed the influence of financial development on cross-border financial flows to Nigeria from 1986 to 2019 based on foreign direct investments and foreign portfolio investments. The study therefore suggests that further studies should

consider the inclusion of Debt and Transfer payments as cross-border indicators and insecurity as a control variable that may determine international financial flows.

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