

DO BANKING SECTOR REFORMS CAUSE ECONOMIC GROWTH?: EMPIRICAL EVIDENCE FROM AFRICA'S LARGEST ECONOMY

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Abstract

This paper employed time series data on relevant empirical diagnostics to examine banking sector growth-led nexus within the context of Africa's largest economy, Nigeria. Diagnostics established stationarity of banking sector indicators and control variables at first difference. Findings showed no causal relationships between banking sector reforms and economic growth in the short-run and that, though liberalisation in particular did not Granger-cause growth of the economy during the study period, banking sector reforms caused growth of the real sector of the Nigerian economy. Hence, the caveat was that long-run growth effects of banking sector reforms on real sectors of economies are functions of policy targets of such banking or financial sectors reform strategies. Consequently, articulation of banking and financial sectors reforms within long-run rather than short-run perspectives and complementarity of liberalisation were recommended.

Keywords: Banking Sector Reforms, Economic Growth, Diagnostics, Dynamic Stochastic Model, Empirical Evidence

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1 Introduction

All over the world, banking sectors are important components of the financial systems of the economies. The sectors are very strategic in the developmental processes of national, continental and global economies. Specifically, the sectors have been the strategic launch pad for the successful development of the economies of the emerging markets. The success stories of the emerging economies have been attributed mainly to effective mobilization of surplus funds from household-dominant units to productive investor-dominant but deficit units of the economies by their banking sectors. As the effective transmission channels between the funds-surplus but idle units and funds-deficit but actively productive and investing units, the banking sectors assumed greater responsibilities of oiling hubs of the economies for enviable growths and subsequently developments with positive outcomes that have improved the welfare of the citizens. Drawing from these, it suffices to say that the banking sector of any economy provides effective developmental linkages for different units, especially

the key sectors of any economy, to attain high level of specialization, expertise, mass production and economies of scale. Corroborating this, Merton and Bodie (1995) noted that the banking system naturally influences allocation of resources across space and time to ameliorate any market frictions. The sector may, therefore, be considered as a powerful moving spirit behind sustainable growth and development of economies.

The Nigerian banking industry has been facing various challenges from the periods preceding the Structural Adjustment Programme (SAP) of 1986. Hitherto, the regulatory authorities shielded managements of distressed from being sanctioned. The managements were often given clean bill of health certificates contrary to their actual status that the managements of such banks actually depended on loans to remain in the clearing house (Ajayi, 2005). The tacit support from some segments of the regulating authorities, especially the Central Bank of Nigeria (CBN) enabled such banks to remain 'afloat' at the expense of transparency, solvency and soundness; not considering the dire consequences of

underperformance of the banking sector on the entire economy (Falaiye, 2014).

Enabling political and socio-economic social environments are pre-requisite conditions for effective and efficient functioning banking sector. Security threats to life, property and investment occasioned by the insurgency in some parts of country, particularly the North-East, are detrimental to optimal operations of Nigeria's the banking sector. Aside the security threats which have necessitated the on-going efforts to curtail insurgency, pockets of bank robberies equally pose signals that are detrimental to expansion of banking operations in the country.

For its financial intermediary role, banking sector, the world over, is the lubricating hub of any other real economic and business activities as well services. Thus, it is a strategic driver of growth and development processes of nations, irrespective of the development stage of an economy. This justifies the need for constant regulation, supervision and examination of the sector's institutions, activities and operations. In this regard, Sanusi (2012) explains that the sector draws more attention of the regulatory authorities in the form of reforms aimed at ensuring its stability, accountability, commensurate public confidence and positioning for international competitiveness. Therefore, from time to time, the government initiates necessary reforms through legitimate regulatory authorities. Banking sector reform has been described as a set of policy measures designed to transform the financial system and its structures with a view to achieving a deregulated market-oriented system within an appropriate regulatory framework. The reform incorporates market-based procedures for monetary control, promotion of healthy competition in the entire financial system, and the relaxation of restrictions on capital flows (Okorie and Uwaleke, 2010). Falaiye (2014) explains it as the deliberate efforts by the regulatory authorities to put in place, policy measures aimed at providing the required framework that could cause shifts in the economy from the position of weakness to that of strength through efficient resource management geared towards attaining set goals as sustainable economic growth and development as well as improving the welfare of the vast majority of citizens.

Therefore, in the light of such perennial problems as distress, poor management of deposits and credit facilities, overtrading and poor corporate governance that were hitherto prevalent in Nigerian the banking industry, especially the deposit money banks (DMBs), several reforms have been undertaken to ameliorate the challenges and reposition the Nigerian banking sector for domestic, continental and global competitiveness.

However, available literature suggests that the extent to which the reforms have impacted on, deepened and repositioned, the sector to engender sustainable growth and development of the economy

has not been sufficiently researched and documented. Consequently, this paper is intended to investigate the effects of the reforms of the banking sector on the economy of Nigeria from the perspectives of short-run dynamics and medium-to-long run relationships. The analysis progresses from the proposition that the reforms had no significant effects on the economy during the study periods. The paper has five sections. Following this introduction is section two, which is the review of literature. The methodology employed in the paper is discussed in section three. Analysis and discussions are done in section four, while section five presents summary, conclusion and recommendations.

2 Literature Review

Conceptual Issues

In any economy, the banking sector is considered as the pivot around which the developmental processes of other sectors and economic activities revolve. Aside intermediary function, banks are deposit-accepting financial institutions. Their intermediary functions position them as both money and capital market institutions. Thus, from a global perspective, the banking sector is the pivotal industry that spins other economic and business activities through its intermediary function. I Bank of Nigeria Sanusi (2012) It the component of financial intermediaries that act as principal agent for various customers by assuming liabilities and acquiring claims from services rendered (Sanusi, 2012). Banking service is the process whereby banks derive profits through asset transformation by selling liabilities with a set of characteristics like combination of liquidity, risk and size return; and utilizing the proceeds to buy assets with different set of characteristics (Mishkin, 2012). This means that a saving deposit held by the depositor might provide platform for a bank to extend mortgage loan which becomes an asset to the bank.

Falaiye (2014) considered banking system as the structural network of institutions that offer financial services within a country, performing various functions depending on their nature such as commercial banks taking deposits from the surplus units and granting them as loan to deficit but productive units. Investment banks specialize in capital market issues and trading while the central banks issue currency and set monetary policy guidelines. The intermediary function of the banks provides the engine that drives the economy. Hence, Mashele (2008) argues that banks are universally the crucial component in the process of financial intermediation which intermediary function is subsumed under financial intermediation. Financial intermediation is the process whereby a financial system mobilizes financial resources, mainly as savings from diverse sources, and converts them into credit which is channeled into capital formation, portfolio investment and consumption (Mashele,

2008). This means that banks accept liquid deposits from surplus units and transform them into medium- and long-term finance which is extended to deficit units. The deposit-taking banks generally account for a greater proportion of the funds raised by the private sector for productive investment. Mobilization and prudent allocation of financial resources ensures that savings are used productively. Falaiye (2014) conceptualises reforms as changes that are needed to be implemented either on the supply side of an economy to improve efficiency, productivity and competitiveness or a combination of important sectors such as banking, education and health.

Economic growth is an increase of national income per capita. Its broader concept includes increase in Gross domestic product (GDP), Gross national product (GNP) and National income (NI). Further, it may include national wealth as well as production capacity, expressed both in absolute and relative sizes per capita. It may also encompass functional modifications of the economy. It is the process of measuring the sizes of national economic activities, where macro-economic indicators, especially the GDP per capita, are often used as measures of the standard of living (Falaiye, 2014). Economic development, on the other hand, engenders economic, social, quantitative and qualitative changes with cumulative durable increase in real national product (Haller, 2012). A purposeful development must raise living standard of the people and engender opportunities for higher incomes. Therefore, economic development is multidimensional; it involves changes in social structures, popular attitudes, and national institutions as well as acceleration of economic growth (Todaro and Smith, 2011). It engenders increased infrastructural development that is capable of creating enormous opportunities to enhance further positive growth and improved living standard.

The Need for Banking Sector Reforms

Banking reforms are generally aimed at addressing issues such as governance, risk management and operational inadequacies. The vortex of the reforms is about firming up capitalization. Schumpeter (1911) notes that a well-developed and efficient banking sector is strategic to national development, and observable lapses in terms of the sector's inability to perform its intermediation functions might always attract attention of the regulatory authorities in form of reforms. Reforms are embarked upon to improve structural deficiencies in any system to achieve better performance in terms of productivity and growth (Falaiye, 2014). Reform is the key to unlocking faster economic growth in developed countries much as emerging markets (Global Research, 2012). Uchendu (2005) avers that banking sector reforms and its sub-component, bank consolidation, resulted from deliberate policy response to correct perceived or

impending banking sector crisis and subsequent failures. A banking crisis might be triggered by the preponderance of weak banks characterized by persistent illiquidity, insolvency, under-capitalization, high level of non-performing loans and weak corporate governance. Adeyemi (2005) noted that the Nigerian banking system was highly oligopolistic with remarkable features of market concentration and leadership. Top ten banks in Nigeria controlled more than 50% of the aggregate assets, more than 51% of the aggregate deposit liabilities and more than 45% of the aggregate credits. Thus, the system was characterized by Small-sizes fringe banks with very high overhead costs, low capital base averaging less than \$10 million or ₦1.4 billion, heavy reliance on government patronage (with 20% of industry deposits from government sources (Lemo, 2005) as in (Adeyemi, 2005). The relative ease of entry into the market due to the then low capital base and unhealthy competition that existed in the market necessitated some banks going into rent-seeking and non-banking business, which are not related to core banking functions (Adeyemi, 2005). Some undertook such business like trading in foreign exchange, government treasury bills and sometimes indirect importation of goods through surrogate companies.

Nigerian Banking Sector and Reforms

The banking sector in Nigeria like others in the developing countries has become the target of reforms since the commencement of the Structural Adjustment Programme in 1986. Sanusi (2012) explains that economic reforms in which banking is embodied are undertaken to ensure that every part of the economy functions effectively to ensure the achievement of macroeconomic objectives of price stability, full employment, high economic growth and internal and external balances. It is also to properly reposition the banks in particular to carry out their intermediation functions aimed at ensuring that the Nigerian economy becomes one of the 20 largest economies in 2020. Consequently, some notable reforms were implemented to protect depositors in the wake of distress in the Nigerian banking sector. These included establishment of Nigerian Deposit Insurance Corporation (NDIC), backed by Decree No. 23 of 1988. The NDIC provides coverage for depositors against possible bank run. Others were withdrawal of public sector funds from commercial banks to forestall unhealthy competition in savings mobilization, promulgation of the CBN Act No.24 of 1991 and the Bank and other Financial Institutions Act (BOFIA) No. 25 of 1991, granting more bank licenses in 1992 and bank merger and acquisition arrangements line with global trend. In addition series of monetary reforms were embarked to stabilize the economy and induce the emergence of market-oriented financial sector for effective mobilization of savings and efficient resource allocation.

Okonjo-Iweala and Osafo-Kwaako (2007: 15) describe the state of the banking sector before 1999 democratic rule in Nigeria as “weak and fragmented, often financing short-term arbitrage opportunities rather than productive private investments, and that the roots of the sector’s weakness was, the poor management of the liberalization during the structural adjustment program of the 1980s.” Banks consolidation, a reform strategy, was introduced in May 2004 to strengthen the banking sector and improve availability of bank credit to the private sector. The reform required each deposit money bank (DMB) to raise its minimum capital base from about US\$15 million or ₦2 billion to US\$192 million or ₦25 billion by the end of 2005. Implementation of the consolidation exercise caused banks to consider mergers and acquisitions as strategic options. As a result, number of DMBs reduced to 25 from the 89 pre-consolidation figures. Subsequent phases of the consolidation exercise further reduced the numbers of DMBs to 24 and 19.

Phases of Banking Consolidation as Reforms Strategy

There has been five distinct phases of the consolidation exercise: Five distinct phases of banking sector reforms that culminated to the 2004-2005 consolidation can be identified. The First was the 1986-1993 periods during which the sector was deregulated by shrinking Federal and states holdings in the banks, which followed the Indigenisation Policy of the 1970s, and to allow substantial private sector participation. The Second was the re-introduction of regulations during the 1993-1998 periods. This had the consequential effect of distress in the banking industry. The Third Phase was 1999-2003 periods during which liberalisation and adoption of Universal Banking were the reform strategies. Universal banking option allows the banks to engage in all aspects of retail banking and non-bank financial markets. The fourth phase covered 2004-2008 periods during which consolidation was the main strategic thrust to correct the structural and operational weaknesses that constrained the banks from efficiently playing the catalytic role of financial intermediation. From the exercise, the aggregate capital base of the consolidated banks rose by 439.4 percent during 2003-2009, while deposit level rose by 241 percent. Yet, there was no positive reflection in the flow of credit to the real sector of the economy; growth rate of credit fell while actual credit did not reflect the proportionate contribution of the sector to the gross domestic product. The Fifth Phase, 2009-date, the policy thrust has been to sanitise the sector and prevent its collapse.

Part of the reform strategy of the CBN during this Phase is the re-classification of the banks, in 2010, into three categories - Regional, National and International. The conditions for a bank to qualify for

any of the categories were contained in CBN Guidelines Numbers 01, 02 and 03 of 2010. The Guidelines spelt out the scope, condition and minimum standards for commercial and merchant banks regulations. The Guidelines also spelt out the scope of banking activities & Ancillary Matters, capital base required for licensing of commercial and merchant banking, respectively, as well the repeal of the hitherto Universal Banking Model. For a commercial bank under the Regional Category, the required capital base is ₦ billion. For the National Category, the required capital base is ₦25 billion, while ₦50 billion is the required capital for license under the International Category. These were in line with global best practices.

Theoretical Issues

Different perspectives characterise theoretical literature on the role of financial development, especially banks, in economic growth and development process (Raghbendra, 2003). These emanate from frictions, differences in laws, regulations and policies across economies. The effect of financial development on growth has been an issue of theoretical subjectivity and, thus, different implications for resource allocation and economic welfare. Some have argued that growth results largely from real sector of an economy, induced by such factors as savings, investment and technological progress (Harrod, 1939; Domar, 1947; Solow, 1956 and Swan, 1956). Another perspective is that increase in the demand for financial services, induced by economic growth, drives the development of financial institutions and practices such that demand for more financial institutions, products and services increases as an economy experiences growth (Robinson, 1952). Essentially, therefore, enterprise leads while finance follows – financial services are provided as a reaction to the demand for corporate firms. Hence, finance follows entrepreneurial activity. Financial markets begin to grow as economy approaches the intermediate stage of the growth process and develop once the economy becomes matured (Kuznets, 1955). Finance is the handmaiden to enterprise, responding to the demand for the particular types of financial services generated by economic development (Luintel and Khan, 1999).

There is yet the finance development-led growth perspective, which considers financial development to influence economic growth (Raghbendra, 2003). Two groups propagate this view in the literature. One considers financial development as a precondition for economic growth while the other emphasises that sophisticated financial systems help invigorate the climate for rapid economic growth provided there are no impediments to economic development. The advocates (McKinnon, 1973; Shaw, 1973; Fry, 1978; and Kapur, 1976) maintain that financial development plays a key role in the process of economic growth.

The proponents of the last perspective identified by Raghbendra (2003) are Keynes (1936), Krugman (1998) and Singh (2008). They consider financial development to be an obstacle to economic growth owing to inherent instability in the financial system. They argue that intervention role of government in the working of financial markets contradicts the position canvassed by McKinnon (1973) and Shaw (1973), and emphasise that state intervention represses formal markets and, therefore, stunts economic growth.

Endogenous growth literature supports the argument that financial development has positive impact on the steady-state growth (Bencivenga et al., 1995; Greenwood and Jovanovic, 1990). However, this paper identifies three theories relevant to financial deepening and economic growth – Financial Repression, Financial Liberalisation and Endogenous Growth. Shighudwana's (2008) financial repression theory, as in Falaiye (2014), is an offshoot of McKinnon (1973) liberalization theory. Financial repression is the imposition of controls on financial markets. Theory of financial repression explains that it leads to negative real interest rates. That is, interest rates falling below their equilibrium level due to state intervention in the financial market. Many developing economies experienced phenomenon during the credit crunch of the 1980s (Shighudwana, 2008) as in Falaiye (2014). The theory posits that repression has negative impacts on financial structure and development.

McKinnon's (1973) theory posits liberalization of financial markets allows financial deepening, which induces increases in the use of financial intermediation by savers and investors. It then monetises the economy to allow efficient flow of resources among people and economic institutions over time. Subsequently, savings are encouraged, constraint on capital accumulation is reduced, and allocative efficiency of investment is improved by transferring capital from less productive to more productive sectors. Ultimately, efficiency and investment level are expected to rise with financial development induced by liberalization.

Endogenous growth theory identifies innovation as the determinant of real growth, and emphasises the importance of finance as the oil hub of the real economy (Thiel, 2001). In this regard, (Levine, 1997; 891) notes that "financial institutions developed out of the need to deal with the transaction costs and overcome information problems". The institutions influence the real economy by enhancing capital accumulation and innovation. The theory aligns with the traditional (neo-classical) growth theory that capital accumulation is the endogenous determinant of real growth. The endogenous theory reached similar conclusions with the McKinnon (1973) and Shaw (1973) propositions by explicitly modeling such services as risk sharing and liquidity, which are provided by financial intermediaries. The theory suggests that intermediation has positive effect on

steady growth (Greenwood and Jovanovic, 1990; Shan et al., 2001), while government intervention in financial system has a negative effect on economic growth (King and Levine, 1993b; Ghali, 1999).

Pagano (1993) explained that, under the endogenous growth model, development of financial sector might affect economic growth through increased productivity of investments, reduced transaction costs via increased savings channeled into productive investments, and either promote or reduce saving. The endogenous growth model addresses some of the 'weaknesses' associated with the McKinnon-Shaw (1973) hypothesis through economic growth in the steady state (Greenwood and Jovanovic, 1990).

Empirical Evidence

Most studies have examined the finance-growth nexus from such perspectives as long-run impacts, significance or otherwise of impacts of finance on growth or vice versa, components of financial system such as banks or stock markets, and the direction of causality, if any. Some of the studies consider stage of economic development. Interestingly, theoretical underpinnings provide a launch pad for the studies (Levine, 1997; 2005). Therefore, empirical studies employ such methods such as time series (Murinde and Eng, 1994; 2005), cross-sections and panel data techniques (Lyons and Murinde, 1994; Odedokun, 1998; Erdal et al., 2007; Wooldridge, 2011), to investigate functional relationships suggested by theories. The studies investigated the finance-growth relationships for Singapore, Ghana, Nigeria, Malaysia and Northern Cyprus, respectively.

Based on different statistical methods and data, the studies produced remarkable but conflicting results. The studies mainly found that countries with well-developed financial systems grow faster, particularly those with large, privately owned banks that channel credit to private sector. Thus, they provided empirical evidence that level of banking [financial] sector development exerts varying influences on economic growth.

A study by Demetriades and Hussein (1996) on 16 countries found a bi-directional causality between financial development and economic growth for some of the countries but unidirectional causality from economic growth to financial development in other countries. On the conviction that bivariate VAR tests "suffer from omitted variable problems and lead to erroneous causal inferences" Luintel and Khan (1999) employed multivariate VAR tests and theoretical over-identifying restrictions to study finance-growth causality in 10 countries during 1952-2001 periods. The study found a bi-directional causality between financial development and economic growth in the countries. In a similar study for China during the 1952-2001 periods, Liang and

Teng (2006) found a unidirectional relationship from economic growth to financial development.

Arestis et al. (2005) employed time-series data on dynamic heterogeneous panel techniques to examine the relationship between financial structure and economic growth. The results showed that financial structure and financial development in some of the countries studied have strong impact on economic growth. A related study by Abu-Barder and Abu-Qarn (2008) employed the method of augmented vector auto-regression (VAR) to investigate the causal relationship between financial development and economic growth in six Middle Eastern and North African countries – Syria, Israel, Algeria, Egypt, Morocco and Tunisia. The results showed strong support for the hypothesis that finance leads to growth in five of the six countries, while Israel showed a weak causality from economic growth to financial development. Stefani (2007) employed co-integrated VAR model on Brazilian data sets for the periods 1986-2006, and found a positive and significant relationship between finance and growth, with financial development being the driving force in Brazil. Handa and Khan (2008) used the technique of vector error correction model on time series data sets on 13 countries to investigate finance-growth causality. The study found a unidirectional causality from economic growth to financial development in Bangladesh, Sri Lanka, Brazil, Malaysia, Thailand and Turkey. Rousseau and Sylla (1999) expand Rousseau's (1998) examination of role of finance in growth of economy of the United States to include stock markets. Using a set of multivariate time series models that related measures of banking and equity market activity to investment, imports and business incorporations over the 1790-1850 periods, they found strong support for the theory of "finance-led growth".

Ghirmay (2004) employed bi-variate VAR model to examine the causal relationship between financial development and economic growth in 13 sub-Saharan African countries. The study found finance-led economic growth in 8 countries but a bidirectional relationship in the others. Similarly, Agbetsiafa (2004) found unidirectional causality from financial development to economic growth in seven African countries, thereby lending credence to finance-led growth hypothesis. Odhiambo's (2007) study on 3 sub-Saharan African countries found causal relationship from economic growth to financial development in Kenya and South Africa, but a unidirectional relationship from finance to economic growth in Tanzania. However, Atindehou et al. (2005) used time-series data for the periods 1960-1997 but found weak causal relationship between financial development and economic growth for 12 West African countries in their study, except Mauritania which showed a unidirectional causality from finance to growth.

From the foregoing, it is obvious that literature is not only replete with ample theoretical but

controversial postulates but also empirical evidence. However, empirical studies on the relationship between banking sector reforms and economic growth has been relatively scanty in Nigeria.

3 Methodology

In line with the trends in literature (Demetriades and Hussein, 1996; McKinnon, 1988; Patrick, 1996; Jung, 1986), this paper employed time series data on such relevant diagnostics as unit roots and Johansen (1988) co-integration procedures, and Granger-type causality tests as well as error correction model (ECM) of the vector autoregressive (VAR)-type procedures to examine finance-growth relationships within the Nigerian context. Time series was preferred because cross-section regressions do not always reflect individual country's circumstances particularly in cases of financial institutions, policy regimes and effectiveness in governance (Arestis and Demetriades, 1997). Analysis was based essentially on quarterly data from Annual Reports and Statistical Bulletins of the Central Bank of Nigeria (CBN). Quarterly data were preferred because of data reporting method of the CBN, and the study is sector-specific. As such, the data were presumed reliable (Kuznets, 1955).

Data used in the analysis are real domestic product (RGDP) as indicator of economic growth, money stock-GDP ratio (M_2/GDP) as financial deepening index, bank credit to private sector-GDP ratio (BCP/GDP) as indicator of domestic credit to investing real sector, currency outside the banking system- M_2 ratio (COB/M_2) as indicator of banking habits of Nigerians, and deposit money banks' branches (BDMB) as indicator of financial liberalisation. These metrics of economic growth and banking sector reforms-induced developments were considered for robustness of analysis, and such have been used in some previous studies (Okorie and Agu, 2015; Gelb and Honohan, 1989; Roubini and Sala-i-Martin, 1992; King and Levine, 1993a; Nnanna 2004; Abu-Bader and Abu-Qarn, 2008, Balogun, 2007; Fadare, 2010; Ogun and Akinlo, 2011). Also considered were the control variables, trade openness (TOP) and investment-GDP ratio (IVST/GDP). The justification is that the more the banks finance real sector investments, the greater the domestic outputs and the more the tendency for the economy to open up more for cross-border trade.

Analytical Model

We specified the following dynamic stochastic model as a functional link between economic growth, on the one hand, and metrics of reforms-driven financial [bank] sector, on the other hand:

$$\Delta RGDP_t = \Delta[\alpha_0 + \alpha_1 \sum_{r=1}^{n=4} BSR_t + \beta_t \sum_{c=1}^{m=2} Z_t + \varepsilon] \quad (1)$$

where $\Delta RGDP_t$ is the change in economic growth (growth dynamics) in time period t , $\sum_{r=1}^{n=4} BSR_t$ is the aggregation of banking sector reform indices in time period t , $\sum_{c=1}^{m=2} Z_t$ is composite of the control variables in time period t , α_0 is growth autonomous component, α_{1t} and β_t are banking sector reforms sensitivity and control variables coefficients in time period t , respectively, while ε is the error term. Since the autonomous component, α_0 , is constant while the sensitivity coefficients, α_0 and β_t , are not constant over time, and given the characteristic assumption of a constant variance for ε , equation (1) becomes:

$$\Delta RGDP_t = \alpha_0 + \alpha_{1t} \Delta \sum_{r=1}^{n=4} BSR_t + \beta_t \Delta \sum_{c=1}^{m=2} Z_t + \varepsilon \quad (2)$$

where $\Delta RGDP_t$ is the change in growth of the economy during time period t , Δ

$$RGDP_t = \alpha_0 + \alpha_1(M_2/GDP)_t + \alpha_2(BCP/GDP)_t + \alpha_3(COB/M_2)_t + \alpha_4BDMB_t + \alpha_5TOP_t + \alpha_6(IVST/GDP)_t + \varepsilon_t \quad (4)$$

where a_i ($i = 1, 2, 3, 4$) are banking sector reforms sensitivity coefficients, and a_j ($j = 5, 6$) are sensitivity coefficients of the control variables. Each is a measure of the effect of the associated indicator on growth of the Nigerian economy during the study periods. ε_t is a vector of fitted residuals to accommodate disturbances or deviations from line of best fits for the respective time periods. The subscript descriptors of growth regressor variables in the model relate to specific time periods of the study span.

The indicators of banking sector reform, as well as the control variables, were expected to have positive effects and cause growth of the Nigerian economy during the study periods. That is, the sensitivity coefficients were expected to be positively signed, indicating more reforms greater growth of the economy and vice versa.

Time series data are often non-stationary owing to stochastic trend-induced unit roots. Therefore, we employed relevant diagnostics (Augmented Dickey-Fuller (ADF), 1979; Dickey-Fuller-GLS (DF-GLS), 1979); Ng-Perron, 2001; and Kwiatkowski, Phillips, Schmidt & Shin (KPSS), n.d.) to test for unit roots or stationarity, co-integration, and the order at which the variables were co-integrated. We employed Johansen's and Juselius' (1992) cointegration procedure to test for number of co-integrated vectors, i.e., trace and eigenvalue. Co-integration implies that Granger causality must exist in at least one direction (Granger, 1988), but does not indicate the direction of

$\sum_{r=1}^{n=4} BSR_t$ and $\Delta \sum_{c=1}^{m=2} Z_t$ measure aggregate changes in reforms ($r = 1$ to $n = 4$) and control variables ($c = 1$ to $m = 2$), respectively, in the economy during time period t .

This implies that change in growth of the economy depends on changes in the aggregation of the above reform indicators and the control variables over time plus their long-run mean, which is encapsulated in α_0 , plus the error term ε . However, we considered real domestic product (RGDP), banking sector reform indicators (BSR) and control variables (Z) from the data sources, which values were measured at specific points in time. Thus, the model assumed a static status as follows:

$$RGDP_t = \alpha_0 + \alpha_{1t} \sum_{r=1}^{n=4} BSR_t + \beta_t \sum_{c=1}^{m=2} Z_t + \varepsilon \quad (3)$$

Next, we substituted the reform indicators and control variables into equation (3) to obtain equation (4) below which we employed to analyse effects of banking sector reforms on the Nigerian economy.

causality. The variables were stationary at first difference, $I(1)$, and co-integrated. Therefore, we specified and estimated Vector Error Correction Model (VECM), which included the error correction term, to investigate dynamic behaviour of the model and speed of adjustment to long-run equilibrium from short-run disequilibrium. The VECM describes how the model adjusts in each time period towards long its long-run equilibrium state.

After we employed appropriate pre-test diagnostics (ADF, DF-GLS, NP and KPSS) and confirmed that all the reform indicators are stationary at first difference, $I(1)$, and integrated at the 5% level of significance, we then tested all variables we considered in this study for cointegration. The aim was to identify the number of stationary long-run relationships among the set of integrated variables. We carefully handled the choice of optimal lag length to avoid loss of degree of freedom. This was important in order to allow for standard normal error terms that would not suffer from non-normality, autocorrelation and heteroskedasticity test statistic. We computed the trace statistic and maximum Eigen value for cointegration of each vector, and derived normalized equations for long-run coefficients of each cointegrating vector. Further, we conducted vector error correction model (VECM) causality tests among the variables because they are $I(1)$ and cointegrated (Engle and Granger, 1987). VECM incorporates error correction mechanism, which measures the speed of

adjustment to long-run equilibrium. We employed Granger Causality Block Exogeneity/Wald tests to examine short-run causality, while we used the negatively signed coefficient of the Error Correction Model, ECM(-1), to examine the long-run causality. As shown in Table 3, we computed coefficients of four cointegrating normalized equations (models 1 to

4) to determine effect of each reform indicator on the economy.

4 Results and Discussions

We present diagnostic outcomes in the tables below and discuss empirical findings thereof.

Table 1. Unit Root Test at Level

Variable	ADF	DF-GLS	NG-PERON	KPSS
LNRGDP	-1.967b	-1.617b	-1.770b	0.169b*
M2/GDP	-2.527a	-2.869b***	-1.264b	0.369b
BCP/GDP	-3.003b**	-3.405b*	-1.202b	0.367b
COB/M2	-4.144a*	-4.723b	-0.856b	0.374b
BDMB	-0.135b	-0.384b	-0.449b	0.021b*
TOP	-5.522b*	-6.035b	-1.670b	0.277b
IVST/GDP	-8.654b*	-1.587b	-2.063b	0.422b
Unit Root Test at 1st Difference				
LNRGDP	-4.057a*	-3.777b*	-2.310b	0.169b*
M2/GDP	-7.366b*	-7.447a*	-2.486b	0.120a*
BCP/GDP	-7.743b*	-7.744b*	-1.767b*	0.116b*
COB/M2	-11.818b*	-10.497b*	-2.948b**	0.083b*
BDMB	-4.287b*	-4.178b*	-4.624bb*	0.095b*
TOP	-7.479b*	-6.941b*	-2.619b*	0.106b
IVST/GDP	-3.360b***	-1.409b*	-0.079b	0.239b

Note: ^a indicates model with constant but without deterministic trend. ^b is model with constant and deterministic trend. *, **, *** indicate that the series is stationary at 1%, 5%, and 10% level of significance, respectively.

Source: Own computations

As shown in Table 1, the growth and banking sector reform indicators (RGDP, M₂/GDP, BCP/GDP, COB/M₂ and BDMB) and control variables (TOP and IVST/GDP) were non-stationary at level; but became stationary at first difference, I(1), for ADF and DF-GLS unit root tests. This is consistent with Gujarati's and Porter's (2009) view that when a time series data has a unit root, the first difference of such a data set is stationary. At level, the null hypothesis of a unit root cannot be rejected at the 1% level of significance for any of the indicators. However, the indicators become stationary after differencing. Therefore, although the growth and reforms indicators are non-stationary, their growth rates are stationary. This implies that the indicators have unit roots but their growth rates have no unit roots. The growth and reform indicators as well as control variable (TOP) were also stationary at

first difference, I(1), for DF-GLS and NG-PERRON unit root tests respectively; except M₂/GDP and RGDP which were non-stationary for NG-PERRON test. Specifically, BCP/GDP, COB/M₂ and M₂/GDP were non-stationary at level, I(0), but were stationary at first difference, I(1), in the ADF and DF-GLS unit root tests, respectively. Growth and all reform indicators showed stationarity at level, I(0), for the KPSS unit root test. Most importantly, however, since the growth and reforms indicators were consistently stationary for three (ADF, DF-GLS and KPSS) out of the four unit root processes, and three (BCP/GDP, COB/M₂ and M₂/GDP) of the reforms indicator series were also stationary at first difference under three (ADF DF-GLS and NG-PERRON) tests, we conclude that all the indicators were first difference, I(1), stationary series.

Table 2. VECM - Granger-Causality/Block Exogeneity Wald Tests

Null Hypothesis Ho:	Chi-square (χ^2)	Prob
Δ LNRGDP does not Granger cause Δ RM ₂ /GDP	1.347953	0.5097
Δ RM ₂ /GDP does not Granger cause Δ LNRGDP	0.141340	0.9318
Δ LNRGDP does not Granger cause Δ RBCPGDP	0.050679	0.9750
Δ RBCPGDP does not Granger cause Δ LNRGDP	0.243408	0.8854
Δ LNRGDP does not Granger cause Δ RCOB/M ₂	2.117662	0.3469
Δ RCOB/M ₂ does not Granger cause Δ LNRGDP	1.759317	0.4149
Δ LNRGDP does not Granger cause Δ BDMB	0.253041	0.8812
Δ BDMB does not Granger cause Δ LNRGDP	0.214112	0.8985

Source: Own computations

Table 2 presents the short-run relationships between economic growth and indicators of banking sector reforms in Nigeria. First column of the table shows the null hypothesis; second column is associated Chi-square (χ^2) statistics for joint significance of each lagged endogenous variable in the equation, while column three shows the p-values. It is obvious from the table that in the short run real gross domestic product (LNRGDP) does not Granger-cause money supply-GDP ratio (M_2/GDP), as indicated by the high p-value of money supply, 0.5097. That is, economic growth does not Granger-

cause money supply relative to size of the economy. Similarly, money supply-GDP ratio (M_2/GDP) does not Granger cause real gross domestic product (LNRGDP). This shows that money supply relative to size of the economy does not Granger-cause real growth of the economy and vice versa. Similarly, the other indicators do not Granger-cause growth of real gross domestic product (RGDP), and vice versa. This supports the finding by Johannes et al., (2011) for Cameroon. Therefore, we conclude that, in the short-run, there is no causal relationship between banking sector reforms and economic growth in Nigeria.

Table 3. Cointegrating Normalized Equations of each Reform Indicator on the Economy

Dependent Variable: LNRGDP							
Model 1		Model 2		Model 3		Model 4	
BSR Indicator	Coefficient (Causal Effect)	BSR Indicator	Coefficient (Causal Effect)	BSR Indicator	Coefficient (Causal Effect)	BSR Indicator	Coefficient (Causal Effect)
M_2/GDP	-2.089 (0.5506)*	BCP/GDP	-29.1472 (6.737)*	COB/ M_2	-11.920 (4.4061)*	BDMB	0.004 (0.001)*
TOP	-16.482 (3.4724)	TOP	-35.009 (23.183)	TOP	-7.71 (2.7535)	TOP	-4.691 (4.476)
IVST/GDP	0.528 (1.2562)	IVST/GDP	44.962 (9.078)	IVST/GDP	1.409 (0.8268)	IVST/GDP	-2.663 (1.374)
Loading Factor	0.020 (0.001)*	Loading Factor	0.003 (0.001)*	Loading Factor	-0.007 (0.001)*	Loading Factor	0.56 (2.36)

Source: Own computations. Standard errors are in parenthesis. *Significant at 5%; p-value < 0.05

Table 3 is a summary of the causal effects (coefficients) of indicators of banking sector reforms (M_2/GDP , BCP/GDP, COB/ M_2 and BDMB) and the control variables (TOP and IVST/GDP) on growth of the economy. The coefficients of broad money supply relative to size of the economy (M_2/GDP), bank credit to private sector relative to size of the economy (BCP/GDP) and currency outside the banking sector relative to money stock (COB/ M_2) are statistically significant and negatively signed. Therefore, the indicators Granger cause growth of the Nigerian economy in the long-run. This shows that broad money supply, bank credit to private and currency outside the banking sector are channeled to productive investment to cause growth of the economy in the long-run. Therefore, these reform indicators had significant effect on real GDP and, thus, caused growth of the economy in the long-run. These are evidenced by the standard errors which are significant at the 5% level. P-value (0.001) of the loading factors further provides empirical evidence that the reforms indicators combined with the control variables significantly enhanced growth of the economy during the study period. Positive coefficient of BDMB, which is another indicator of banking sector reform, provides evidence that financial liberalisation did not Granger cause growth of the economy during the period. And the combined effect with the control variables did not significantly cause growth of the economy. Therefore we conclude that in the long-run, though liberalisation did not Granger cause growth,

banking sector reforms caused growth of the real sector of the Nigerian economy, and that the effect on real sector of the economy depends on the policy target of the reform strategy.

5 Summary, Conclusion and Recommendations

In the paper, we have examined the short-run and long-run growth effects of banking sector reforms on the economy of Nigeria for the 1980 to 2014 periods. Analysis was based on quarterly time series data from relevant sources. The data were variables considered appropriate indicators of economic growth and banking sector reforms within the context of the economy of Nigeria as Africa's largest economy and, thus, the economies of Africa by extension. Relevant methodological and statistical procedures were employed to analyse the data and ensure robustness and reliability of findings thereof, which were the launch pad for the conclusion and recommendations.

Findings from the statistical diagnostic showed that indicators of banking sector reforms in Nigeria were stationary at first difference. Based on our findings that growth of the economy did not Granger-cause any of the banking sector reform indicators, and vice versa, we concluded that causal relationships do not exist between banking sector reforms and economic growth in the short-run. We also concluded, on the basis of the cointegrating normalizing equations of the error correction model, that though

the reform policy of banking sector liberalisation did not Granger-cause growth of the economy during the study period, banking sector reforms caused growth of the real sector of the Nigerian economy. The caveat here, therefore, is that long-run growth effects of banking sector reforms on real sectors of economies are functions of policy targets of such banking or financial sectors reform strategies.

Consequently, the paper recommended that aims and objectives of reforming banking sectors in particular and financial markets in general should be articulated in the perspectives of long-run horizons rather than short-run horizons. Further, liberalisation should be a complementary rather than a driving strategy in any policy for the reform of the banking sub-sectors in particular, and financial sectors in general for the African Continent. Finally, the paper emphasised the need for periodic reforms of banking and financial sectors because of the long-run economic growth advantages of the reforming the sectors.

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