Bank Competition, Concentration and Economic Growth: A Panel Analysis of Selected Banks in the Nigeria Banking Industry

Okowa, Ezaal, Vincent, Moses Owede
University of Port Harcourt, Nigeria.

Abstract: **The role of financial development in the growth and development of developing economies have constituted a popular discourse among development and financial economist. Two key issues of interest in the discussion of financial are competition and concentration in the banking industry as key predictors of growth in every economy. This study therefore investigated the effect of concentration and competition in the Nigerian banking industry on economic growth with focus on the big-8 banks in Nigeria. Moreover, the implementation of the consolidation policy of the Central Bank of Nigeria in the year 2005 informed the choice of period (i.e., 2005-2019) selected for this study. While a positive concentration-growth nexus was found in the study, the study could not establish a positive competition-growth nexus in the Nigerian economy for the period under review. The increase in capital base as required by the consolidation policy has accounted for the level of concentration in the banking industry; and this has made it easier for banks to contribute significantly to the growth of the economy. Imperfect competition in the banking industry on the other hand has led to higher costs of loans that detain firms from new investments, thus slowing down the firms' expansions and productivity growth.**

***Keywords*: Competition, Concentration, Big-8, Growth**

I. INTRODUCTION

Increases in average income, as well as a reduction in income inequality, have been linked to greater financial development in recent decades. The literature on financial development and growth has recognized that the development of the financial sector is important at both the microeconomic and macroeconomic levels (King & Levine, 1993; Creel, Hubert & Labondance, 2015). Since the financial crisis, there has been an increase in the scrutiny of banking regulations around the world, which has heightened policy debates about the impact of concentration and competition on real sector outcomes in the banking industry (Beck, Levine & Loayza, 2014). According to this framework, researchers and policymakers have been particularly interested in the potential impact of financial market structure on access to finance, which could result in increased investment and aggregate output. According to organization theory, a competitive financial sector is required in order to maximize social welfare while also achieving the highest possible level of productivity. As a result, bank competition promotes economic development by lowering the cost of financing and by providing financial services to other industries that are required for their manufacturing processes. This point has also been made in more recent literature, which supports the claim (Amidu & Wilson, 2014; Rakshit & Bardhan, 2019). As a result of these theories, it is argued that competition in the banking sector promotes economic growth by increasing capital accumulation in a given economy. In contrast, the theories of competition fragility raise concerns about the economic role of increased bank competition, as it increases instability by eroding quasi-monopoly rent and discouraging banks from properly screening their borrowers. Increased bank competition is therefore detrimental to the economy (Jemeneze, Lopez & Saurina, 2007; Allen & Gale, 2004). As a result, a volatile financial sector has a negative impact on long-term economic growth and development (Owusu & Odhiambo, 2014). Banks play a critical role in the functioning of an economy, making the topic of banking sector competition particularly important. Bank competition is important because, according to some empirical studies, there is a strong relationship between the market structure of the banking industry and the rate of growth in the economy (Jayaratne & Strahan, 1996; Beck, Levine & Loayza, 2000).

The question of whether the provision of growth-inducing banking intermediation services is influenced by the structure of the credit market has received relatively little attention in the literature, despite its importance. The traditional argument holds that deviations from perfect competition are detrimental to growth because they are bound to result in inefficiencies in the allocation mechanism provided by the credit market, which in turn is detrimental to growth. However, in a second-best world, moving toward perfect competition does not imply that Pareto improvements will be achieved in the long run. There is therefore no reason why increasing the degree of competition and decreasing the degree of concentration in the credit industry would necessarily improve the efficiency of intermediation, to the extent that financial intermediaries emerge as a second-best response to the (informational) imperfections endemically associated with financial transactions (Deidda & Fattouh, 2005). As a result, Manove et al. (2001) and Gehrig (1998) find that competition in the credit industry has an ambiguous effect on the socially valuable screening activity carried out by financial intermediaries (Manove et al., 2001; Gehrig, 1998). Along the

same lines, Petersen and Rajan (1995) argue that monopolistic power facilitates the establishment of lending relationships, which in turn makes access to credit more convenient for firms in general. Citing Cetorelli and Peretto (2000) as an example of further development of this line of thinking, they propose a model in which the type of lending relationship that emerges in the context of competitive credit markets can have negative consequences for capital accumulation, whereas banks' market power can be beneficial for growth. Because banks can earn a rent from the information advantage generated by screening activities when they have market power, the argument goes, banks are more likely to engage in screening activities when they don't have market power. However, this rent is accompanied by the typical inefficiency in the quantities generated by monopolistic behavior that is associated with monopolistic behavior. The oligopolistic structure of the credit market allows for the optimal trade-off between the two effects to be achieved under specific conditions.

A considerable number of recent theoretical and empirical findings have opened-up a debate on the economic implications of banking sector competitiveness (e.g., Allen and Gale, 2004; Berger, Klapper & Turk-Ariss, 2008). Nevertheless, the positive outcome of competitive financial markets on their economies depends on the institutional environment in which these financial markets operate. The progressive agreement in the literature is that competition-related conduct of financial liberalization fosters economic development only if many preconditions have first been fulfilled (Fry, 1995). Then the question becomes essentially empirical with these undeniable predictions. Moreover, empirical tests of the relationship between market structure and growth offer mixed evidence. Petersen and Rajan (1995) offer evidence that firms are less credit constrained and face cheaper credit the more concentrated the credit market is. On the other hand, Cetorelli and Gambera (2001) find that, although some firms and industries benefit from greater banking concentration, the overall impact on industrial growth is negative. Black and Stranhan (2002) find that less concentration is associated with higher levels of newly created firms. This paper therefore seeks to study the relative impact of two key indicators of financial development (i.e., competition and concentration) on economic growth in Nigeria. To the best of our knowledge, ours is the first study to focus on the eight (8) major banks (hereafter referred to as the Big-8) in the Nigerian banking industry, investigate the relative impact of bank concentration and competition to study the role of banking system structure as a determinant of cross-bank variability in financial outreach for macroeconomic performance. The remainder of the paper is organized as follows. Section 2 provides a brief literature review. Section 3 discusses the data and presents the econometric methodology. We provide the main results and discussion in Section 4. Section 5 concludes.

II. LITERATURE

2.1 Competition and Economic Growth

Competition has been defined as a process of rivalry between businesses that seek to win the business of their customers over time (Whish, 2005). This definition was primarily concerned with increasing market share and increasing profits. Firms compete on the basis of the price or quality of the product in question. A perfectly competitive market, according to traditional industrial organization literature, consists of a large number of producers, each with a small market share and a low level of market concentration. Therefore, it is assumed that individual producers cannot influence or dictate the price of a product, either individually or collectively; as a result, they are considered price takers. Within the product line, products are homogeneous and cannot be substituted for one another. Furthermore, there are no barriers to entry into, or even continuing to exist in, the industry. Furthermore, there is an unhindered and unhindered flow of information between producers and their customers. For efficiency and to maximize social welfare, competition in the banking industry is necessary, but it is not sufficient in and of itself. Aside from that, the banking industry possesses specific characteristics that distinguish it from other industries, and, as a result, it is of particular importance to the economy as a whole. A dynamic process by which alternative opportunities are made available to potential customers and information about them is disseminated, according to Savage and Small (1967). (Savage & Small, 1967). The presence of competition means that the party with whom a business or an individual wishes to trade has alternative opportunities for exchange; the people who provide these alternative opportunities are referred to as competitors. Due to the fact that exchange involves two parties, there can be competition among buyers, among sellers, or among both. Most businesses sell to an excessive number of customers, though occasionally a business will deal with a single buyer, in which case its bargaining power will be reduced. Customers are provided with alternative opportunities through competition, in its most basic definition. Typically, businesses compete with their competitors by offering the same product at a lower price, offering a slightly different product with similar features, offering a radically improved product or innovation through successful promotion, in which a firm attempts to persuade customers to purchase its products rather than a competitor's, or by creating a completely new scheme of wants in the minds of customers. This type of behavior is what the competitive process is comprised of (Savage & Small, 1967). Murthy and Deb (2008) asserted that the industry's sustained growth and dynamics are not influenced by price changes alone. Growth occurs as a result of shifting fundamental conditions, and dynamics occurs as a result of sharing the new market that is created as a result of shifting fundamental conditions. The result is that rivalry among firms to control market share and internalize externalities is the primary driver of competition, rather than price adjustments, in the modern economy. Shaffer (1994) saw that a competitive market will produce an efficient

outcome as long as the price equals the marginal cost of production. So, an increase in the number of firms will result in more competitive behavior, such as lower prices and a reduction in the profitability of the firms. In addition, the structural conduct performance (SCP) approach says that a competitive market, which is caused by a low level of concentration in the market, will be better for everyone who is in it.

With the debate over the economic implications of bank competition, there has been a significant increase in research interest over the last two decades. According to economic theory, increased levels of competition in an industry are beneficial to the overall economy. This economic theory applies to all industries, including the banking industry. Because of this, it is widely accepted that banks with monopoly power charge higher interest rates to borrowers when making loans, while paying lower interest rates to depositors. As stated by Cetorelli and Gambera (2001), the economic ramifications of such an unregulated monopoly bank market are twofold. First, banks are discouraged from screening the quality of lenders because interest rates are above the average; second, the higher costs of loans discourage firms from making new investments, thereby slowing the expansion of the firms and the growth of their productivity. Increased interest rates would have a negative effect on capital accumulation in the economy, ultimately affecting overall economic growth in a negative direction (Cetorelli & Gambera, 2001). Recent empirical studies, such as those conducted by Amidu and Wilson (2014), have found that competition in the financial sector encourages banks to innovate, reduce product prices, and improve product quality, thereby increasing consumer choice and growth. According to Caggiano and Calice (2016), competition in the banking sector can have a positive impact on economic growth in two ways: first, it makes it easier for small and new businesses to obtain credit; and second, it allows financially dependent businesses to grow more quickly. Their argument is that the advancement of these technologies has an impact on economic growth. According to the research conducted by Claessens and Laeven (2003), which is a cross-country analysis, there is also no evidence that market power has any positive impact on access to financing. On the contrary, the findings of their cross-country study suggest that the intensity of competition is a critical factor in the development of the financial sector as well as the expansion of the economy. It is not addressed in their research what mechanisms may be at work to promote economic growth as a result of increased competition. They do, however, provide some evidence for the existence of allocative efficiency in the context of bank competition in general. Specifically, according to the findings of Liyanagamage (2014), there is a U-shaped relationship between competition and efficiency in the banking sector of developing countries. As a result, the efficiency of banks decreases with increasing competition until it reaches a critical point, after which it begins to increase. Also included in the study was some rather sparse evidence on the relationship between bank competition and economic growth in Sri Lanka for the period 1996–2018, which was provided by Liyanagamage (2021). The study examines the impact of competition in the Sri Lankan banking sector on economic growth as well as the mechanisms by which competition has an impact on economic growth in the country. The VEC model that was used in this study was designed to capture the short-and long-term effects of bank competition on economic growth in a way that was independent of one another. Panzar-Ross H-Statistics are used to assess the level of competition. According to the findings of the study, bank competition has a negative impact on economic growth in the short run, which is in opposition to popular belief. However, over the long term, this effect is significant and beneficial. Furthermore, the statistical findings of this paper reveal that increased bank competition stimulates economic growth by increasing interest rates and improving the efficiency of banks. As a result, these findings have important policy implications because they show how complicated competition-related behavior can be in countries that aren't rich.

There is evidence, according to some empirical studies, of a highly robust effect of the banking sector's competitiveness on real economic activities (Laeven, 2005; Ngare et al., 2014; Creel et al., 2015). Also, in 1998, Smith (1998) conducted a study on the cost of imperfect competition in banking in terms of macroeconomic performance and discovered that a higher level of bank competition both increases the level of income and reduces the severity of business cycles in a country. The author's concluding remarks make a strong case for the negative consequences that an imperfectly competitive banking market has on macroeconomic performance, and he goes on to argue that these consequences are worse than the effects that would occur if there were no banks. However, there is no general agreement in the literature on the optimal level of bank competition in a given market. In this regard, the findings of Liyanagamage (2018) highlight that there is no precise level of optimal bank competition in developing countries; rather, there is a minimum level of competitiveness that the banking sector should maintain in order to be efficient and financially stable.

According to the literature on the "competition fragility view," however, increased bank competition is deemed undesirable because it wears down market power, reduces profit margins, and results in a reduction in franchise value. The desire of banks to take on more risk in order to increase their profit margins will result in instability in the banking sector, which will eventually erode the positive outcome expected as a result of bank competition. The empirical findings of Jimenez et al. (2007), which were based on data on the Spanish banking system, concentration indices, and the Lerner index, provide support for the "competition fragility view." According to their findings, more competition is found to be associated with a higher-risk loan portfolio. By studying a large sample of Russian banks between 2001 and 2007, as well as by measuring bank competition with the Lerner index, Fungacova and Weill (2009) provide additional evidence in

support of this strong viewpoint. Their findings unambiguously demonstrate that increased bank competition is detrimental to the stability of the financial system. In their report, Beck et al. (2008) argued that the likelihood of a systemic bank crisis is lower in concentrated banking markets when compared to competitive banking systems. Therefore, this evidence calls into question the final outcome of bank competition on real-world economic activity. The empirical findings on bank competition are significantly different depending on how bank competition is measured. When conducting empirical studies on bank competition, different instruments have been used to determine the degree of competition. These instruments are essentially divided into two categories: structural and non-structural approaches. When evaluating bank competitiveness, structural approaches place a strong emphasis on the structure of the banking market. So they used concentration ratios or indices such as the Herfindhal-Hirschman Index, which measures the degree of market concentration, to measure market concentration. In the new empirical industrial organization (NEIO) literature, non-structural approaches to measuring competitiveness are built on the assumption that the market's structural characteristics are irrelevant in the measurement of competition. Among the non-structural approaches to quantifying competitiveness are the Lerner Index (1934), the Panzar-Rosse (PR) approach (Panzar & Rosse, 1982, 1987), and the Bresnahan-Lau method (Bresnahan, 1982; Lau, 1982).

2.2 Concentration and Economic Growth

In economics, the concept of concentration can be defined as the market power that determines whether a market is operating under conditions of monopolistic competition, pure monopoly, or oligopoly, as well as the extent to which these institutions are able to influence the market as a result of their practices and to achieve their goals and interests (Johnson & Stone, 1998). There are a number of indexes that are used to determine the degree of market concentration. The Concentration Ratio (CR) and the Herfindahl-Hirschman Index (HHI) are two of the most widely used indexes (HHI). Both indices are based on the market share of banks, which can be calculated based on various factors such as deposits, banking facilities, assets, sales, and so on. There have been a number of classical theories that have attempted to explain the relationship between banking concentration, investment, and growth in terms of the theoretical relationship between concentration and the interest rate (McKinnon, 1973; Shaw, 1973). Economic theories, such as Keynesian and Neoclassical economic theories, have always said that investment is good for the economy because it boosts capital accumulation, production, productivity, and job opportunities, among other things (Barro, 1991; Sala-I-Martin, 1997). This is because investment is a major driver of economic growth.Two contradictory hypotheses that have an impact on interest rates have been linked in recent literature to the relationship between banking concentration and investment as measured by the interest rate. The first is the traditional Structure-Conduct-Performance (SCP) hypothesis, which is the most widely accepted. According to this hypothesis, concentrated markets lead to an increase in the monopolistic influence of banks, which enables them to raise lending interest rates and/or lower deposit rates in order to maintain their competitive advantage. Using this practice, financial institutions can make more money, but it also lowers the level of consumer welfare in the market (Bikker & Gerritsen, 2018). The second hypothesis is the Efficient-Structure (ES) hypothesis, which states that increased efficiency of institutions leads to more competitive markets, which in turn leads to lower lending rates and/or higher deposit rates as a result of increased competition. This model says that when there is more money in the market, deposit interest rates for people who live in concentrated markets will be better than they are now (Martin-Oliver, Salas-Fumas & Saurina, 2008).

Jordanian economists Al-Tanbour and Awad-Warrad (2021) conducted an investigation into the impact of banking concentration on investment and economic growth in the country's economy. An annual sample covering the period from 1980 to 2018 is utilized in this study. With regard to Jordan, the study examines the effectiveness of the Structure-Conduct-Performance (SCP) hypothesis as well as the other Efficient-Structure (ES) hypothesis in terms of effectiveness. These tests, along with the Augmented Dickey-Fuller (ADF) and cointegration tests, are used to determine whether or not the following econometric techniques are appropriate: the Autoregressive Distributed Lag Bound test (ARDL), the fully modified OLS (FMOLS), and generalized methods of moments (GMM). The results of the estimation revealed a negative relationship between the concentration index and both investment spending and the rate of real economic growth in the short term. Following the study's findings, the Central Bank of Jordan recommended that new banks be permitted to enter the Jordanian banking market in order to reduce the impact of concentration on the market as much as possible and achieve competitive gains in the Jordanian banking sector. According to Tabak, Guerra, and de Souza Pealoza (2009), a new measure of concentration was developed by employing the Hirschman-Herfindahl-dual index, which was derived from the theory of duplication and applied to the data (HHI-dual). By analyzing semi-annual data from 2001 to 2004, this paper investigates the evolution of banking concentration in the Brazilian banking system. A Hausman test is used to determine the most appropriate estimation between random effect and fixed effect estimates based on loan and deposit itemization. As a result, it was determined that there is no compelling evidence that banking concentration results in anti-competitive behavior. Endogenous growth is represented by two sectors in Deidda and Fattouh (2005)'s model: a real sector in which the final good is produced, and a banking sector that acts as an intermediary between savers and firms. It has been discovered that banking concentration has two diametrically opposed effects on growth. On the one hand, the inducement of economies of specialization is beneficial to growth on the one hand, and on the other hand, it is detrimental. In contrast, it

results in a duplication of bank investment in fixed capital, which is detrimental to the expansion of the financial sector. The trade-off between the two opposing effects is ambiguous, and it can change over the course of an economy's growth and development process. The potential for nonlinearity and nonmonotonicity in the relationship between concentration and growth can be seen as follows: Furthermore, according to the findings of the study, banking concentration is only negatively associated with per-capita income growth and industrial growth in low-income countries. According to this finding, reduced concentration is more likely to stimulate growth in low-income countries than in high-income countries. Berger and Hannan (1989) used the OLS approach to test the Structure-Conduct-Performance (SCP) hypothesis and the concentration and price relationship in the banking sector. In 195 countries, they looked at 470 banks in 195 different banking markets. They tried to figure out how concentration and interest rates in the banking sector were linked.

2.3 The Nigerian Banking Industry: A Brief Overview

It was in 1894 that the African Banking Corporation opened a branch office in Nigeria, marking the beginning of the country's banking development in the 19th century. The British Bank for West Africa (BBWA), which is now known as First Bank of Nigeria PLC, was founded in 1967 but was later abandoned the following year. Native businesses in Nigeria grew quickly in the 1930s and 1940s, which led to a rise in the number of Nigerian-owned banks. This led to a rise in the number of Nigerian-owned banks. In the 1950s, the Nationalists pushed for the creation of a central bank for Nigeria, which was finally done in 1959 (CBN, 2013). They found that banks were important for trade, but the features of the bank looked like they were doomed to fail from the start, they said. They concluded that banks were discovered to be essential for trade. At some point in the late 1980s and early 1990s, the number of non-performing loans in banks rose. This led to a lot of financial problems for the banking industry at that time. A group of people in the banking industry were called "predatory debtors," because they were willing to abandon debt obligations with one bank in order to make new debt obligations with another bank. They were set up in 1993 to act as financial middlemen between the Central Bank of Nigeria (CBN) and licensed commercial banks. They make it easier for people to get money to buy things like stocks and bonds by giving short-term government bonds a chance to be discounted and refinanced. There have been 25 commercial banks and a Central Bank of Nigeria in Nigeria since 2005, when they were first set up.(CBN). Over time, the banks' deposits and profits, as well as their product offerings, have continued to grow at a rapid pace.

According to the Central Bank of Nigeria (CBN) and licensed under the Banking Act, there are 25 commercial (deposit money) banks in Nigeria. Banks play an important role in getting money to people who want to invest in profitable businesses. To make sure that the financial system and the economy work smoothly and efficiently, things like this are very important, so they are very important Banks must follow rules set by the Central Bank of Nigeria, such as minimum liquidity ratios and cash reserve ratios, in order to stay in business. A lot of commercial banks have opened or grown in Nigeria, with more branches and more services like loans and credit facilities, account opening, ATMs in strategic places, mobile banking, and more. These are just a few of the things that have happened. The First Bank of Nigeria Plc, the Union Bank of Nigeria Plc, and the United Bank of Africa PLC were the three largest banks in Nigeria before the 2008 financial crisis. In addition, two new generation banks took over for two old banks after the financial crisis of 2008. Zenith Bank, First Bank, and Guaranty Trust Bank PLC were the first three banks in Nigeria's banking industry to be set up, in that order. These financial institutions are collectively referred to as "the big three." There was a decline in the concentration of banks in Nigeria before the government started requiring them to merge. A lot of the newcomers didn't have a lot of money or a lot of good managers. In addition, there was insufficient regulatory oversight. All of these things led to some of the new banks that were set up after deregulation in 1986 to fail, which led to an increase in the number of banks from 29 to 90. By 2004, there were approximately 89 banks left in the country. Seven (7) banks were selected to serve as settlement banks for the entire industry. Standard Trust Bank PLC is one of the stronger new generation entrants, joining the "big three" and four other strong new generation entrants. To make sure that the industry's full potential is realized as the 2017 financial year nears, the Committee of E-banking Industry Heads (CeB1H) has asked banks and electronic payment (e-payment) service providers to work together in order to maximize the industry's potential. In a study sponsored by the world bank, Ardic, Helmann, and Nataliya (2011) looked at access to financial services and the "financial inclusion" movement around the world. They found that Nigeria did well in terms of how many households had access to a bank account. The findings were published in the journal Financial Inclusion. Nigeria got 21.0 percent of the votes from the next-11 (N-11) countries, which is more than the BRICS countries of Brazil and India, which got 39.7 and 48.0 percent, respectively. In 2016, the adult population grew at a faster rate than the banked population grew at a slower rate. The number of people who are financially excluded has increased from 36.9 million. Adult users of MFBs dropped from 2.6 million to 1.8 million, which shows that their role in formal financial inclusion has decreased over time. It was found out in a progress report that the challenges of getting to 80% on track stayed the same between 2014 and 2016. As a result, adults who had worked in the informal sector didn't move to the formal sector as quickly as they should have. In 2014, 60.5 percent of them moved to the formal sector, and in 2016, 58.5 percent moved to the formal sector. So, the financial sector's expected rise in GDP and fight against extreme poverty may not be as big as expected, or even be negative (Kama & Adigun, 2013), which is bad news for the country.

III. RESEARCH METHODOLOGY

The study employs an ex-post facto (after the fact) research design to gather information. Following the occurrence of an event, research is carried out using data that has already been gathered. On the other hand, ex-post facto research is a systematic empirical study in which the researcher does not control the independent variables in any way because the situation under investigation already exists or has occurred before the study began. The information used in this study comes from the Big-8 Banks and spans the years 2005 to 2019. However, while data from the annual report and statement of account of each of the eight (8) selected banks was used to calculate the competition and concentration indices, the other banking industry performance indicators and real GDP data were obtained from the Central Bank of Nigeria (CBN) 2019 Statistical Bulletin. Thus, the following variables were incorporated into the research project: Here, we'll talk about the dependent variable, real GDP, and the independent variables, which are the Competition Index, Concentration Ratio, Bank Assets, Deposit Liabilities, and Gross Earnings, as well as how they affect the dependent variable.

In order to measure the relative effect of competition and concentration in the banking industry on the growth of the Nigerian economy, the study reviewed the methodology of Tahir, Shahand, and Afridi (2016) who studied the nature of competition in the banking sector of Pakistan and Al-Tanbour and Awad-Warrad (2021) who investigated the impact of banking concentration on investment and economic growth in Jordan. A modified model that incorporates competition and concentration and other banking industry performance indicators was developed and estimated. The functional form of the model is expressed below:

$$gdp = f(bankconc, bankcomp, tassets, deposits, earnings) \quad 3.1$$

Where;

gdp = Real GDP at Constant price

bankcomp= Competition Index

bankconc= Concentration Index

tassets= Total Assets of the banks studied

deposits = Deposit liabilities (i.e., deposits held with the banks)

earnings = Gross earnings of the banks

The study of a cross-section of eight banks necessitated the use of panel data analysis. The general regression model of panel data can be expressed as follows:

$$y_{it} = \beta_0 + \beta_1 x_{it,1} + \beta_2 x_{it,2} + ... + \beta_k x_{it,k} + v_{it}, i = 1,...,T; k = 1,...,K \quad 3.2$$

Where;

i = unit of observation

t = period of time

k = indicates the *kth* explanatory variable

b_0 = intercept

$b_1, b_2, ..., b_k$ = coefficient of each explanatory variable

v_{it} = error term.

The so-called composite error term, vit, in Equation 32.1 can be decomposed into two components: a cross-sectional unit-specific error, a_i, and an idiosyncratic error, u_{it}.

$$v_{it} = a_{it} + u_{it} \quad 3.3$$

The cross-sectional unit-specific error, a_i, does not change over time and the idiosyncratic error, u_{it}, varies over the cross-sectional units and time (Baltagi, 2001; Greene, 2003; Griffiths, Hill & Judge, 1993; Gujarati, 2003; Maddala, 2001; Wooldridge, 2006). By separating the error terms into two halves, we can reduce the risk of omitted variable bias due to causes other than unit-specific measurements.

By incorporating Equation 3.3 into Equation 3.2, we can get the following equation:

$$y_{it} = \beta_0 + \beta_1 x_{it,1} + \beta_2 x_{it,2} + ... + \beta_k x_{it,k} + a_{it} + u_{it} \quad 3.4$$

Equation 3.4 is called as an error component model. Unobserved components include the temporal constant and unit-specific error, denoted by the letter a_i. The capacity of an individual when the unit of observation is an individual, and the distinct culture and institutions of a state when the unit of observation is a state are two examples of what can be observed. Despite the fact that such factors might be viewed as time-invariant, measuring them is extremely difficult. It is possible to classify the estimating methods of error component models according to how they treat the error term, a_i. This error is not distinguished from other forms of mistakes in the pooled OLS model, however, it is treated as a coefficient in the fixed-effects model and as a random variable in the random effects model, respectively (Baltagi, 2001; Greene, 2003; Maddala, 2001; Wooldridge, 2006). A fixed and random effect model will be used in this study. The Hausman test is used to figure out which of the two models is the best way to talk about what happened.

- *Panel Unit Root Test*

A first generation of models has analyzed the properties of panel-based unit root tests under the assumption that the data is independent and identically distributed (*i.i.d.*) across individuals. The firsts unit root tests are those of Quah (1992, 1994), Breitung and Mayer (1994), Levin and Lin (1992, 1993) and Levin, Lin and Chu (2002). In general, this type of panel unit root tests is based on the following univariate regression:

$$\Delta y_{it} = \rho_i y_{it-1} + z_{it}^{'} \gamma + u_{it} \quad 3.5$$

where i = 2,1, ..., N is the individual, for each individual t = 2,1, ..., T time series observations are available, z_{it} is the

deterministic component and u_{it} is a stationary process. z_{it} could be zero, one, the fixed effects (μ_i), or fixed effect as well as a time trend (t).

The null hypothesis is

$$\rho_i = 0 \forall i \qquad 3.6$$

The main difference between the proposed tests is the degree of heterogeneity considered under the alternative hypothesis. This study adopted the Levin, Lin and Chu (2002) test of panel unit root. Our choice of Levin, Lin & Chu (2002) panel unit root is owing to the fact it is the prominent method of determining the stationarity of panel data.

Levin and Lin (1992, 1993) and Levin, Lin and Chu (2002) (LLC thereafter) provide some new results on panel unit root tests. They generalize the Quah's model to allow for heterogeneity of individual deterministic effects (constant and/or linear time trend) and heterogeneous serial correlation structure of the error terms assuming homogeneous first order autoregressive parameters. They assume that both N and T tend to infinity but T increase at a faster rate, such that $N/T \to 0$.

They develop a procedure using pooled t-statistic of the estimator to evaluate hypothesis that each individual time series contains a unit root against the alternative hypothesis that each time series is stationary.

Thus, referring to the model (1.1), LLC assume homogeneous autoregressive coefficients between individual, i.e., $\rho_i = \rho$ for all i, and test the null hypothesis $H_0 : \rho_i = \rho = 0$ against the alternative $H_a : \rho_i = \rho < 0$ for all i.

Imposing a cross-equation restriction on the first-order partial autocorrelation coefficients under the null, this procedure leads to a test of much higher power than performing a separate unit root test for each individual.

The structure of the LLC analysis may be specified as follows:

$$\Delta y_{it} = \rho y_{it-1} + \alpha_{0i} + \alpha_{1i} t + u_{it},\ i = 1,2,...,N,\ t = 1,2,...,T. \qquad 3.7$$

where a time trend ($\alpha_{1i} t$) as well as individual effects (α_i) are incorporated. Note that the deterministic components are an important source of heterogeneity in this model since the coefficient of the lagged dependent variable is restricted to be homogeneous across all units in the panel.

u_{it} is assumed to be independently distributed across individuals and follow a stationary invertible ARMA process for each individual:

$$u_{it} = \sum_{j=1}^{\infty} \theta_{ij} u_{it-j} + \varepsilon_{it} \qquad 3.8$$

and the finite-moment conditions are assumed to assure the weak convergence in Phillips (1987) and Phillips-Perron's (Phillips and Perron, 1988) unit root tests.

- *Model Estimation Technique*

To estimate the growth model, we specify the following equation:

$$\ln(gdp_{it}) = \beta_0 + \beta_1 \ln(bankconc_{it}) + \beta_2 \ln(bankcomp_{it}) + \beta_3 \ln(tassets_{it}) + \beta_4 \ln(deposit_{it}) + \beta_5 \ln(earnings_{it}) + v_{it} \qquad 3.9$$

Where;

$\ln(gdp_{it})$ is the natural log of real GDP

$\ln(bankconc_{it})$ is the natural log of real bank concentration ratio

$\ln(bankcomp_{it})$ is the natural log of real bank competition index

$\ln(tassets_{it})$ is the natural log of total assets of banks

$\ln(deposit_{it})$ is the natural log of total deposit liabilities of banks

$\ln(earnings_{it})$ is the natural log of total earnings by banks

- *Fixed Effect Model*

The fixed effects model is widely used when we want to control for omitted variables that are constant over the period of time and vary across the units that is called unobserved heterogeneity or fixed effects, a_i. When we estimate the Equation 3.3 using the fixed effects model, it is assumed that the unobserved heterogeneity (a_i) is correlated with the explanatory variable (x_{itk}). Another important assumption is that the idiosyncratic error (u_{it}) is independent of the explanatory variable (x_{itk}) (Baltagi, 2001; Kmenta, 1997; Wooldridge, 2006). By eliminating the unobserved effect a_i, which implies reducing omitted variables biases, we can have more robust estimates. There are three widely used methods for eliminating the unobserved effect ai in panel data analysis. They are the first-difference model, the least squares dummy variables (LSDV) model, and the time-demeaning model. These methods are called as a more general term, the fixed effects model.

- *Random Effect Model*

When we analyze panel data, we use the fixed effects model to eliminate the unobserved heterogeneity (a_i) because it is assumed to be correlated with any of the explanatory variables (x_{itj}). However, when a_i is independent of each explanatory variable, the fixed effects model to eliminate ai results in inefficient estimators (Baltagi, 2001; Greene, 2003). The random effects model, also known as the variance components model, regards the unobserved heterogeneity (a_i) as random variables rather than fixed ones (Baltagi, 2001; Greene, 2003; Maddala, 2001). Therefore, the random effects model is appropriate when the cross-sectional units are randomly selected from a large population (Baltagi, 2001).

- *Hausman Test*

The Hausman Test (also called the Hausman specification test) detects endogenous regressors (predictor variables) in a regression model. Endogenous variables have values that are determined by other variables in the system. However, before you can decide on the best regression method, you first have to figure out if your predictor variables are endogenous. This is what the Hausman test will do. This test is also called the Durbin–Wu–Hausman (DWH) test or the augmented regression test for endogeneity. The Hausman test is sometimes described as a test for model misspecification. In panel data analysis (the analysis of data over time), the Hausman test can help you to choose between fixed effects model or a random effects model. The null hypothesis is that the preferred model is random effects; The alternate hypothesis is that the model is fixed effects.

- Post Estimation Diagnostic Tests

(a) Normality Test

The residual test of normality provides a histogram and descriptive statistics of the residuals, including the Jarque-Bera statistic. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic should not be significant.

(b) Panel Cross-Section Dependence Test

It is commonly assumed that disturbances in panel data models are cross-sectionally independent, especially when the cross-section dimension (*N*) is large. There is, however, considerable evidence that cross-sectional dependence is often present in panel regression settings. Ignoring cross-sectional dependence in estimation can have serious consequences, with unaccounted for residual dependence resulting in estimator efficiency loss and invalid test statistics. There are a variety of tests for cross-section dependence in the literature.

IV. RESULTS

4.1 Panel Unit Root Test

Table 4.1: Panel Unit Root Test Result

LLC Panel Unit Root Test			
Variable	Individual Effects LLC Test Statistics (p-values)	Individual Effects, Individual Linear Trends LLC Test Statistics (p-values)	Order of Integration
ln(gdp_{it})	-6.46***(0.00)	-1.52 (0.06)	I(0)
ln($bankconc_{it}$)	0.74(0.23)	-3.75***(0.00)	I(0)
ln($bankcomp_{it}$)	-9.33***(0.00)	-9.42***(0.00)	I(0)
ln($tassets_{it}$)	-4.32***(0.00)	-2.33***(0.01)	I(0)
ln($deposit_{it}$)	-7.17***(0.00)	-3.97***(0.00)	I(0)
ln($earnings_{it}$)	-6.36***(0.00)	-3.34***(0.00)	I(0)

Source: Authors' Computation

NB: * implies significance of test statistics at 5% significant error

Table 4.1 shows that the unit root test results were only present at levels. This is due to the fact that all the variables became stationary at levels. The Levin, Lin and Chu test statistic showed that Real GDP, banks' total assets, deposit liability, gross earnings and competition index (i.e. HHI) were all stationary at levels when tested under the assumption of individual effect. Moreover, only concentration ratio was stationary at levels under the assumption of individual effects and individual linear trend. This implies that the variables are integrated of order zero [I(0)]. By this, we conclude that a possible long run relationship could not be assumed. Hence the study proceeds to estimate the short run panel least square regression models (i.e., fixed and random effects).

Prior to the estimation of the panel regression, Hausman (1978) proved that it is important to

Table 4.2: Panel Regression Models

Dependent Variable = ln(gdp_{it})			
Variable	Fixed Effect Coeff. (p-values)	Random Effect Coeff. (p-values)	Hausman Test Chi-Sq. Statistic (Prob.)
ln($bankconc_{it}$)	0.59***(0.00)	0.61***(0.00)	
ln($bankcomp_{it}$)	-0.61***(0.00)	-0.65***(0.00)	
ln($tassets_{it}$)	-0.13***(0.00)	-0.13***(0.00)	0.00
ln($deposit_{it}$)	0.03 (0.19)	0.03 (0.19)	
ln($earnings_{it}$)	0.12*** (0.01)	0.11*** (0.00)	(1.00)
Constant	15.79*** (0.00)	16.15*** (0.00)	
R^2	0.9525	0.9510	
F-statistics	178.63***(0.00)	442.62***(0.00)	Decision:
Durbin Watson	1.70	1.74	*Fail to Reject H_0*

Source: Authors' Computation

NB: * indicates rejection of the null hypothesis at 5% significant error.

Hausman test- Fail to Reject H_0 = RE best explains model; Reject H_0 = FE best explains model.

The p-value (i.e., 1.00) of the Hausman test statistics implies that we fail to reject the null hypothesis. Therefore, we shall interpret our result based on the random effect model. The random effect model result shows that both bank competition index and total assets of banks had negative (i.e., coefficients are -0.65 and -0.13 respectively) and significant (i.e., p-values are 0.00 and 0.00 respectively) effect on economic growth. Bank concentration ratio and total bank earnings had positive (i.e., coefficients are 0.61 and 0.11 respectively) and significant (i.e., p-values are 0.00 and 0.00 respectively) effect on economic growth. Based on the magnitude of concentration ratio of the selected big eight banks' coefficient, one percent increase in concentration ratio led to 0.61 percent increase in growth rate in the Nigerian economy during the period under review. The structure of the banking industry in the Nigerian since the bank consolidation policy of the Central Bank of Nigeria has contributed to the growth of the economy during the period. A solid banking sector structure necessitated by growth in bank capitalization has impacted positively on the growth of the Nigerian economy. Moreso, magnitude of competition index coefficient shows that one

percent increase in competition index led to 0.65 percent decrease in growth rate in the Nigerian economy during the period under review. The level of competition among the big eight (8) banks in the banking industry in the Nigerian since the bank consolidation policy of the Central Bank of Nigeria has contributed negatively to the growth of the economy during the period. An inconsistent high level of competition, as shown in the data, has contributed to reduction in economic growth rate. The constant term was also positive and significant.

Some model statistics were also provided in table 4.2. Firstly, from the p-value (i.e., 0.00) of the F-statistic (i.e., 442.62), the study can reject the joint null hypothesis and concludes that the explanatory variables (including concentration and competition) have joint significant effect on the growth of the Nigerian economy. In other words, the increase in concentration ratio, competition index, banks assets, deposit liabilities and gross earnings among banks in Nigeria have joint effect on the growth of the economy. Secondly, the R-squared statistic of 0.9510 shows that 95.10 percent of the changes in economic growth is accounted for by the explanatory variables including concentration ratio and competition index; while 4.90 per cent is accounted for by other variables not captured by the study. Lastly, the Durbin Watson statistic (i.e., 1.74) of the random effect model indicates a negligible case of autocorrelation in the model as the value tends towards 2 than to 0. In other words, based on the rule of thumb, the study can conclude that the errors in observation did not affect subsequent observations in the data thus there is no autocorrelation.

Some post-estimation diagnostic tests were conducted on the estimated random effect model. First, the normality test result presented as figure 4.1 appeared bell-shaped and the p-value (i.e., 0.85) of the Jarque-Bera statistic (i.e., 0.33) is greater than 0.05. Hence, the Jarque-Bera statistic is not statistically significant. Based on the shape of the histogram and the significance of the Jarque-Bera statistic, we therefore conclude that the residuals are normally distributed. Moreover, the results presented in table 4.3 shows that the p-values of the three statistics (i.e., Breusch-Pagan LM, Pesaran scaled LM and Pesaran CD) are less than 0.05. This implies that a considerable evidence of cross-sectional dependence is present in panel regression model. Hence, the estimator has not suffered from efficiency loss and the test statistics are also valid.

Table 4.2: Cross-Sectional Dependence Test

S/N	Test	Statistic	P-value
1	Breusch-Pagan LM	334.3465	0.0000
2	Pesaran scaled LM	39.86823	0.0000
3	Pesaran CD	18.23045	0.0000

Source: Author's Computation

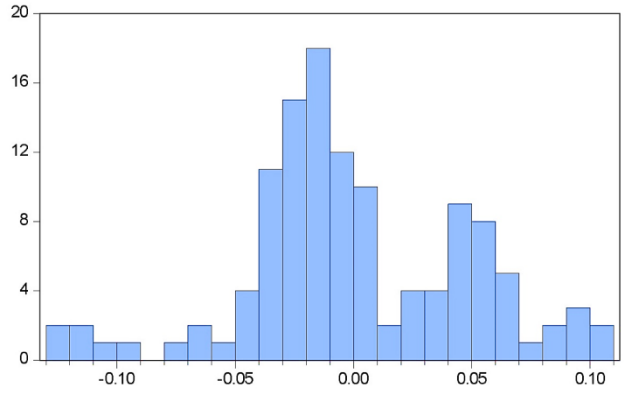

Figure 4.1: Histogram from Normality Test

Jarque-Berra Statistic = 0.33 | p-value = 085

V. CONCLUSION

The role the banking industry plays in the growth and development has been discussed mostly from the monetary policy perspective. Using a cross-section of the major deposit money banks in the Nigerian banking industry, our study offers new evidence on the relationship between the structure of the banking industry and economic growth in the Nigerian economy. We find that greater banking industry concentration is associated with increased in economic growth. This will mostly be owing to the fact that concentration will mean improved capital base, increased credit supply, growth in investment and economic growth. Our result implies that the big banks in Nigeria are making it possible for access to credit and economic growth. The finding on the relationship between concentration and economic growth does not align with findings of Al-Tanbour and Awad-Warrad (2021) who found concentration to have a negative effect on economic growth; but aligns with Deidda and Fattouh (2005) who found concentration to induces economies of specialization, which is beneficial to growth. While concentration in the banking industry has proven to be an invaluable contributor to growth of the Nigerian economy since the implementation of consolidation policy of the apex bank in the year 2005, the same cannot be said about the effect of competition in the banking industry on economic growth during the period of the study. Rather, competition in the banking industry has only contributed negatively to the growth of the economy. The unhealthy and imperfect competition has made it difficult for banking industry to contribute positively to economic growth. Our finding of the effect of competition on economic growth agrees with the findings of Cetorelli and Gambera (2001) who claimed that monopoly bank market could lead to higher costs of loans that detain firms from new investments, thus slowing down the firms' expansions and productivity growth; but does not agree with the findings of Caggiano and Calice (2016) who found that competition eases access to credit for small and new firms and helps financial dependent firms to grow faster.

REFERENCES

[1] Ajie, H.A., Ezi, C.T., Akekere, J., & Ewubari, D.B. (2006). Financial institutions market and contemporary issues. Port Harcourt: Pearl Publishers.

[2] Allen, F., & Gale, D. (2004). Competition and financial stability. Journal of Money, Credit and Banking, 36(3), 453-480.

[3] Al-Tanbour, K.N., & Awad-Warrad, T.M. (2021). The Impact of Banking Concentration on Investment and Economic Growth in Jordan. International Journal of Economics and Financial Issues, 11(1), 71-78.

[4] Amidu, M., & Wilson, J. O. S. (2014). Competition in African Banking: Do globalization and institutional quality matter? SSRN Electronic Journal. DOI: 10.2139/ssrn.2399050

[5] Ardic, O.P., Heimann, M., & Mylenko, N. (2011). Access to financial services and the financial inclusion agenda around the world: a cross-country analysis with a new data set. The World Bank Policy Research Working Paper Series 5537.

[6] Baltagi, B.H. (2001). Econometric Analysis of Panel Data, 2nd ed. New York: John Wiley & Sons.

[7] Barro, R.J. (1991). Economic growth in a cross section of countries. The Quarterly Journal of Economics, 106(2), 407-443.

[8] Beck, T., Levine, R., and Loayza, N., (2000). Finance and the Sources of Growth. Journal of Financial Economics, 58, 261-300. DOI: https://doi.org/10.1016/S0304-405X(00)00072-6

[9] Berger, A.N., Hannan, T.H. (1989). The price-concentration relationship in banking. Review of Economic and Statistics, 71(2), 291-299.

[10] Berger, A.N., Klapper, L.F., & Turk-Ariss, R. (2008). Bank Competition and Financial Stability. World Bank Policy Research Working Paper No.4696. DOI: https://doi.org/10.4337/9781785363306.00018

[11] Bikker, J.A., Gerritsen, D.F. (2018). Determinants of interest rates on time deposits and savings accounts: Macro factors, bank risk, and account features. International Review of Finance, 18(2), 169-216.

[12] Black, S., & Strahan, P. (2002). Entrepreneurship and bank credit availability. Journal of Finance, 67, 2807–2833.

[13] Breitung, J.M., & Meyer, W. (1994). Testing for Unit Roots using Panel Data: Are Wages on Different Bargaining Levels Cointegrated? Applied Economics, 26, 353-361.

[14] Bresnahan, T. F. (1982). The oligopoly solution concept is identified. Economics Letters, 10(1-2), 87-92. DOI: https://doi.org/10.1016/0165-1765(82)90121-5

[15] Caggiano, G., & Calice, P. (2016). Bank competition, financial dependence, and economic growth in the Gulf Cooperation Council. World Bank Group, Policy Research Working Paper No. 7687. DOI: https://doi.org/10.1596/1813-9450-7687

[16] Central Bank of Nigeria (2013). Financial inclusion in Nigeria: Issues and Challenges. Research Department Occasional Paper No-45.

[17] Cetorelli, N., and Gambera M. (2001). Banking Market Structure, Financial Dependence and Growth: International Evidence from Industry Data. Journal of Finance, 56(2), 617–648. DOI: https://doi.org/10.1111/0022-1082.00339

[18] Claessens, S., & Laeven, L. (2003). What drives bank competition? Some international Evidence. Journal of Money, Credit and Banking, 36(3), 563-583. https://doi.org/10.1596/18139450-3113

[19] Creel, J., Hubert, P., & Labondance, F. (2015). Financial stability and economic performance. Economic Modelling, 48, 25-40

[20] Deidda, L., & Fattouh, B. (2005). Concentration in the Banking Industry and Economic Growth. Macroeconomic Dynamics, 9, 198–219.

[21] Fry, M. (1995). Money, Interest, and Banking in Economic Development. Baltimore: The Johns Hopkins University Press.

[22] Fungacova, Z., & Weill, L. (2009). How market power influences bank failures: Evidence from Russia. BOFIT Discussion Papers, 12, 2009. DOI: http://dx.doi.org/10.2139/ssrn.1343173

[23] Greene, W.H. (2003). Econometric Analysis, 5th ed. Upper Saddle River, New Jersey: Prentice Hall.

[24] Griffiths, W.E., Hill, R.C., & Judge, G.G. (1993). Learning and Practicing Econometrics. New York: John Wiley & Sons.

[25] Gujarati, D.N. (2003). Basic Econometrics, 4th ed. New York: McGraw Hill.

[26] Jayaratne, J., & P. Strahan, (1996). The finance growth nexus: Evidence from bank branch deregulation. Quarterly Journal of Economics, 111, 639-670. DOI: https://doi.org/10.2307/2946668

[27] Jimenez, G., Lopez, J.A., & Saurina, J. (2007). How Does Competition Impact Bank Risk-Taking? Federal Reserve Bank of San Francisco Working Paper No.2007-23. DOI: http://dx.doi.org/10.2139/ssrn.965462

[28] Johnson, D.F., & Stone, G. (1998). Introduction to Economics. United States of America: Life Office Management Association, Inc.

[29] Kama, U., & Adigun, M. (2013). Financial Inclusion in Nigeria: Issues and Challenges. Central Bank of Nigeria Occasional Paper No. 45.

[30] King, R., & Levine, R. (1993a). Finance and Growth: Schumpeter Might Be Right. Quarterly Journal of Economics, 108(3), 717-737. DOI: https://doi.org/10.2307/2118406

[31] Kmenta, J. (1997). Elements of Econometrics, 2nd ed. Michigan: The University of Michigan Press.

[32] Laeven, L. (2005). Banking Sector Performance in East Asian Countries: The Effects of Competition, Diversification, and Ownership. World Bank and CEPR. DOI: https://doi.org/10.1016/j.intfin.2015.09.003

[33] Lau, L. J. (1982). On identifying the degree of competitiveness from industry price and output data. Economics Letters, 10(1-2), 93-99. DOI: https://doi.org/10.1016/0165-1765(82)90122-7

[34] Levin, A., & Lin, C.F. (1992). Unit Root Test in Panel Data: Asymptotic and Finite Sample Properties. Department of Economics, University of California at San Diego Discussion Paper, 92-93.

[35] Levin, A., & Lin, C.F. (1993). Unit Root Test in Panel Data: New Results. Department of Economics, University of California at San Diego Discussion Paper, 93-56.

[36] Levin, A., Lin, C.F., & Chu, C.S.J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. Journal of Econometrics, 108, 1-24.

[37] Liyanagamage, C. (2021). Bank Competition and Economic Growth: The short-run and long-run effects. International Journal of Finance & Banking Studies, 10(1), 20-32.

[38] Liyanagamage, H. D. D. C. (2018). Efficiency, Stability and Optimum Level of Bank Competition for Sustainable Development-A Study of Sri Lankan Banking Sector. OIDA International Journal of Sustainable Development, 11(09), 69-80. DOI: https://doi.org/10.4038/kjm.v4i1.7486

[39] Liyanagamage, H.D.D. C. (2014). Rethinking the nexus between competition and efficiency in emerging economies: Evidence from Sri Lankan banking sector. International Journal of Economics, Business and Finance, 2(5), 1 – 15.

[40] Maddala, G.S. (2001). Introduction to Econometrics, 3rd ed. New York: John Wiley & Sons.

[41] Martin-Oliver, A., Salas-Fumas, V., Saurina, J. (2008). Search cost and price dispersion in vertically related markets: The case of banks loans and deposits. Review of Industrial Organization, 33(4), 297-323.

[42] McKinnon, R.I. (1973). Money and Capital in Economic Development. Washington, DC: The Brookings Institution.

[43] Murthy, K.V.B., & Deb, A.T. (2008). Theoretical Framework of Competition as Applied to Banking Industry. Munich Personal RePEc Archive (MPRA) Paper No. 7465.

[44] Nelson, C. (2016). CeBIH seeks healthy competition for e-payment growth in 2017. Guardian Newspaper, Nigeria.

[45] Ngare, E., Nyamongo, E.M., & Misati, R.N. (2014). Stock market development and economic growth in Africa. Journal of Economics and Business, 74, 24-39.

[46] Owen, A.L., & Pereira, J.M. (2018). Bank concentration, competition, and financial inclusion. Review of Development Finance, 8, 1–17.

[47] Owusu, E. L., & Odhiambo, N. M. (2014). Financial liberalisation and economic growth in Nigeria: An ARDL bounds testing approach. Journal of Economic Policy Reform, 17(2), 164–177. DOI: https://doi.org/10.1080/17487870.2013.787803
[48] Panzar, J., & Rosse, J. (1982). Structure, conduct and comparative statistics. Bell Laboratories Economic Discussion Paper.
[49] Panzar, J., & Rosse, J. (1987). Testing for `monopoly' equilibrium. Journal of Industrial Economics, 35(4), pp. 443-456. DOI: https://doi.org/10.2307/2098582
[50] Petersten, M.A., & Rajan, R.G. (1995). The effect of credit market competition on lending relationship. Quarterly Journal of Economics, 110, 407-443.
[51] Quah, D. (1992). The Relative Importance of Permanent and Transitory Components: Identification and some Theoretical Bounds. Econometrica, 60, 107-118.
[52] Quah, D. (1994). Exploiting Cross-Section Variation for Unit Root Inference in Dynamic Data. Economics Letters, 44, 9-19.
[53] Rakshit, B., & Bardhan, S. (2019). Does bank competition promote economic growth? Empirical evidence from selected South Asian countries. South Asian Journal of Business Studies, 8(2), 201–223. DOI: https://doi.org/10.1108/SAJBS-07-2018-0079
[54] Sala-I-Martin, X.X. (1997). I Just Ran Four Million Regressions. National Bureau of Economic Research No. W6252.
[55] Savage, J., & Small, P. (1967). Introduction to Management Economics. London: Hutchison.
[56] Shaffer, S. (1994). Bank competition in concentrated market. Business review March/April.
[57] Shaw, E.S. (1973). Financial Deepening in Economic Development. New York: Oxford University Press.
[58] Smith, R. (1998). Banking Competition and Macroeconomic Performance. Journal of Money, Credit and Banking, 30(4), 793-815. DOI: https://doi.org/10.2307/2601129.
[59] Tabak, B.M., Guerra, S.M., & de Souza Peñaloza, R.A. (2009). Banking concentration and the price-concentration relationship: The case of Brazil. International Journal of Accounting and Finance, 1(4), 415-435.
[60] Whish, R. (2005). Competition Law. New York: Oxford University Press Inc.
[61] Wooldridge, J.M. (2006). Introductory Econometrics: A Modern Approach, 3rd ed. Mason, Ohio: Thomson South-Western.