

COLLUSIVE OLIGOPOLY IN THE NIGERIAN BANKING SECTOR

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Abstract: Banking is not really a competitive industry. In reality, it's more like an oligopoly -- a scenario in which an industry is controlled by a small number of firms. A competitive and efficient banking system is critical to the success of any economy. Apart from providing credit, it serves as a channel for managing system liquidity, and ensures compliance with regulatory guidelines. In Nigeria, monetary policy transmission has been distorted by activities of deposit money banks (DMBs), leading to high lending rates and costs of banking services. This study reviewed articles that utilises panel data analysis for monthly data from 2007 to 2014, for twenty banks. Reduced form interest revenue function was estimated and the H-Statistics were computed using the elasticity's of input prices. Measures of market power, namely market share, concentration ratios (CR) for the 3, 4 and 5 largest banks (CR3, CR4 and CR5) and Herfindal-Hirschman Index (HHI) are regressed on bank's profitability indicators. It was found that CR3, CR5 and HHI were positive and significant, indicating concentration and market power enhance banks profitability, further confirming the presence of oligopoly in the Nigerian banking industry. Therefore, policies on competition regulations should be formulated and enforced.

Keywords: Oligopoly, Market Structure, Banking Industry, Panel Data, Nigeria.

1. INTRODUCTION

Banking is not really a competitive industry. In reality, it's more like an oligopoly -- a scenario in which an industry is controlled by a small number of firms. An oligopoly is a lot like a monopoly, where one firm controls the whole show. Only in an oligopoly, you have two or more firms calling the shots, and they love to do things contrary to the notion of a free market, like, say, colluding to raise prices. There are a few common signs that tell you when competition has left the building in a given industry.

But the banking industry operates in a different universe. Charges for products and services and the costs of those products and services often have very little relation to each other. As commercial litigator Lloyd Constantine helpfully points out, banks were challenged by an antitrust lawsuit back in 1996 for charging dubious fees to stores for debit card transactions. They were forced to drop the fee from ₦65:00 per transaction to ₦50:00 per transactions in a month a fee Constantine says the Fed knew was still much too high. When ATM cards were first used at stores as debit cards, at first there was no fee because getting rid of checks was hugely profitable for banks. But, as Constantine puts it, "Bank of America, Chase and their Visa/MasterCard partners wanted to have their burgers and eat them, too." When Dodd-Frank Act ordered the Fed to find out whether the banks could justify high fees on the basis of the costs of processing debit card transactions, the Fed concluded that banks were grossly over charging: "After initially deciding that debit interchange fees should be lowered.

Risk of Failure:

In a free market, businesses fail; 33 percent of all new businesses fail within the first six months. Fifty percent of new businesses fail within their first two years of operation and 75 percent fail within the first three years. They fail for all kinds of reasons. Maybe they had a stupid business plan. Maybe they were underfunded. Or they weren't cost competitive. Or their management sucked. Whatever the reason, they fail. One day the business is there, and the next day it's gonzo. Again, the banking industry sails right past this free market logic.

We're all familiar with the term "Too Big to Fail," which sums up what happens nowadays to the biggest banks even when they commit fraud against consumers, poison them with toxic products, grossly neglect their duties to shareholders, and blow up the economy. They are rescued with public money. Yours and mine! That doesn't happen to Joe's Burger Joint. If Joe's restaurant had a management team that made stupid business decisions, picked customers' pockets, and sold burgers that made you throw up, then Joe would probably see a padlock on his door before too long.

The Nigerian banking industry has recently been consolidated to 21 banks from 89 banks through a wave of mergers, take-overs and acquisition (Moses et al, 2016). Consequently, a few deposit money banks (DMBs) have become extremely large, dominating in many core areas of business, such as branch network, asset size, volume of deposits and loans. This development has led to a new concentration structure, which in turn may have changed the land-scape of competition in the industry. In literature, concentration and competition have been identified as being inversely related (Giuliano, Giacomo and Andrea, 2007). A more concentrated banking system leads to a lower degree of competition, due to the unhealthy exercise of market power by a few big banks. Measures of banking market structure (captured by market concentration), have been identified as a good indicator of the intensity of competition, itself a measure of market conduct (Scherer and Ross, 1990).

Furthermore, the degree of market competition influences the price of financial products and services, which is a function of firm level profit (a measure of performance). This triangular relationship between structure and conduct on the one hand and conduct and performance on the other, is known as Structure Conduct-Performance (SCP) paradigm, a key concept and framework in the analysis and determination of the existence and nature of collusive oligopoly. A major question, therefore, is, does a firm's conduct affect its performance in the Nigerian banking sector? The answer to this question would help identify the existence and degree of market imperfection such as collusive oligopoly in the Nigerian banking industry.

The need to investigate the presence and degree of market competition (and in particular of oligopoly) in the Nigerian banking system is justified by a number of reasons. First, monetary policy transmission has been persistently distorted in recent years by activities of banks. The Nigerian monetary policy rate (MPR), to which other rates are expected to anchor, appears to diverge away from market rates such as the interbank rate, Open Buy Back (OBB) and other commercial lending rates. In the last several months, activities in the interbank market have remained negligible or non-existent, in the face of a tight monetary policy stance. The question of why changes in the policy rate (MPR) have not transmitted to market rates remains unanswered. Could the existence of oligopolistic tendencies (and collusion) be responsible for the lack of transmission? Monopolistic (or oligopolistic) pricing by banks tends to inhibit transmission of policy rate changes as fully as pure competitive pricing will do (Kashyap and Stein, 1997; Cecchetti, 1999; and Lensink and Sterken 2002). Second, the degree of competition affects the prices that customers pay for banking services, which in turn determines the level of profits and performance in the industry. Bank lending rates have continued to diverge from a fairly stable policy rate (MPR), reaching a high of about 27%. Third, DMBs are a major source and channel of liquidity in the economy. Private and public sector deposits constitute a huge chunk of the liquidity that goes through the banking system. In addition, their balance sheets contain assets that are classified as disposable assets which are easily convertible to cash. The level and management of the banking system liquidity is therefore of concern to the Central Bank due to the high cost of managing excess liquidity. This work differs from other studies, and adds to existing literature in many ways. First, it is a major study of competition and conduct of the Nigerian banking system since the global financial crisis (GFC). Second, it is the first work using Nigeria data, which introduce structural break in the analysis, involving the intervention of Asset Management Corporation of Nigeria (AMCON) set up in the aftermath of the GFC to clean the Nigerian banking system of its toxic assets. The structural break analysis enables the study to identify the historical changes in market competition, conduct and power in the industry. Third, it is arguably the first documented work to use industry performance indicators such as net interest margin and return-on-assets in measuring the impact of market power in the Nigerian banking industry. The primary focus of this study is to test for the existence and degree of oligopoly and collusion, and suggest ways of breaking the unhealthy market power to enhance the overall competitiveness of the industry.

2. THE NIGERIAN BANKING INDUSTRY

The Nigerian banking industry is highly regulated, given its importance in the economy. Banking operations in Nigeria are governed by the Central Bank of Nigeria (CBN) Act (2007); Banking and Other Financial Institutions Act (BOFIA), 1991 as amended; Nigeria Deposit Insurance Corporation Act, 1988 (NDIC); Failed Banks (Recovery of Debts) and Financial Malpractices in Banks Act, 1994; Money Laundering Act, 1995; CBN Prudential Lines, as well as any other Monetary, Credit, Foreign, Trade and Exchange Policy guidelines that are issued periodically by the regulatory authorities.

There are 24 commercial banks in Nigeria, with 15 quoted on the floor of the Nigerian Stock Exchange while the remaining 9 are not. Of these banks, only five are foreign-owned, namely, Citibank, Ecobank, Stanbic IBTC, Standard Chartered and Nedbank, while Nedbank was granted a license in 2014. Therefore, the Nigerian banking system is such that the number of Nigerian banks operating branches in other African countries far exceeds that of the foreign banks operating in Nigeria.

3. REVIEW OF RELEVANT LITERATURE.

Many theoretical and empirical studies debate the issues surrounding concentration and competition in the banking system and their impact on the entire economy. The debate has attracted a lot of attention. Three major strands of the argument are discernible: The first strand contends that competitiveness in the banking systems has the capacity to stimulate economic growth by expanding firms' access to finance (Beck, Demirgüç-Kunt, and Maksimovic, 2004; Pagano, 1993, among others). Some of these studies demonstrate that increases in the market share of small banking firms facilitate economic growth (Lin and Sun, 2008). This viewpoint tends to support societal viewpoint, which suggests that the competitiveness of banking industry is a socially desirable policy, as it tends to minimise intermediation and transaction costs as well as improve household welfare by providing efficient and high quality banking services (Simpasa, 2013). This line of thought is generally consistent with orthodox economic theory that predicts that competition in the banking system can generally provide avenue for higher economic growth. The second strand of the literature argues otherwise, though with few adherents. It asserts that it is not in all situations that competition enhances economic efficiency. The proponents of this strand show both theoretically and empirically that concentration in the banking industry may boost credit to new and small firms which have little or no credit records, hence attracting high lending rates in the economy (Petersen and Rajan, 1995). They maintain that too much competition among banks may ration-out small holders in terms of credit allocation, thus impeding capital formation and the rate of growth in the economy. Some other recent authors, largely from Asia, have shown that an increase in the degree of market power leads to greater bank stability and enhanced profit efficiency (Rima, 2010; Xu, Shen, Wang, and Shen, 2009). This line of reasoning supports the hypothesis of relative market strength.

In this regard, the last strand of the literature has maintained a middle course on the issue by reasoning that although concentration in the banking industry may provide growth prospects for small and new firms, there appears to be robust empirical evidence of an overall dampening influence on economic growth, considering that few banks wield monopoly and substantial market power with debilitating effects on all the sectors and firms in the economy. Therefore, policymakers should encourage competition among banks if the focus is on enhancing the economic conditions and service delivery (Gamberra, 2001).

In terms of available empirical studies in this area of research, there is a proliferation of studies on the developed markets while scanty literature is available in developing and emerging markets. Some authors have argued that concentration in the banking industry is perceived to be high when there are few banks in the industry, possibly resulting from a merger of existing banks. Also, collusion may occur among a few large players thus dominating the cost of products and forcing smaller players to play along with the dominant market price structure (Bain, 1951; Simpasa, 2013). Theoretically, the Herfindahl-Hirschman Index (HHI) is used to measure concentration of firms in a market (Rhoades, 1995). HHI is the sum of the squared market shares of banks in a market. If the post-merger HHI is less than 1800 points and the index did not increase relative to the pre-merger situation by more than 200 points, then the merger is said to have no anticompetitive undertones. Above these values, anticompetitive tendencies are assumed to exist. Also, larger market shares may be as a result of better efficiency and lower costs and not necessarily by merger only (Berger, 1995). However, Hannan (1997) claimed that the HHI may not be a significant measure to explain deposit rates and that it failed to account for the separate importance of market share difference and the number of firms in the market. Scherer and Ross (1990) submit that to ascertain the relationship between the structure of the banking industry and its performance, important to measure banks market concentration, as it is a good indicator for measuring degree of competition. Various studies (Ahmed and Khababa, 1999; Ganesan, 2001; Allen and Shaik, 2005) have identified factors affecting the level of a firm's performance, relating to its market structure or efficiency in the use of resources. The standpoint of literature is that oligopolistic profits can either be earned as a result of the concentrated market structure or from efficiency derived as a result of firm resources utilization (Evanoff and Fortier, 1988). Empirically, there are many studies that find a positive relationship between concentration and the degree of market power. They also show that there may be direct relationship between profitability and concentration (Berger and Hannan, 1989; Chirwa, 2003; Bhatti and Hussain, 2010). They argue that deposit rates would be significantly lower in most of the markets that are highly concentrated. Deposit rate rigidity has

also been shown as evidence of market power in the U.S. banking sector (Hannan and Berger, 1991; Neumark and Sharpe, 1992). Despite this discovery, some other studies cast doubt on the relationship between market concentration and market power. They argue that the relationship between market concentration and market power may not be necessarily monotonic and that such a relationship exists at low levels of concentration, but it vanishes with middle levels of concentration and that direction changes in a highly concentrated market (Jackson, 1992). This argument tends to challenge the conventional structure-conduct-performance hypothesis. Some other literature examines efficiency of banks in terms of its ownership structure, pointing out that a higher ownership concentration is linked to better loan quality, lower asset risk and lower insolvency risk (Giuliano, Giacomo and Andrea, 2007). Considering the analysis of SCP paradigm, Tu and Chen (2006) indicates that both ownership and market structure have significant effect on state-owned commercial banks performance and that the market structure has more effect on performance in case of joint-stock commercial banks. In Africa, the empirical evidence generally on banking competition and economic efficiency has been sparse largely due to data unavailability at individual firm level. However, in more recent times, more firm level data is now accessible, thus, there is need for more research to assess the efficiency in the industry thereby narrowing the dearth of research in the area. Arguably, only the study by Chen (2009) has been able to provide comprehensive evidence across Africa on banking competition. It concludes that the levels of competition differ across the continent. In East African Community, Sanya and Gaertner (2012) provide empirical evidence that indicates that the levels of competitiveness of banks are low in all the four countries in the region, while Hauner and Peiris (2008) discover contrary evidence for Uganda. In Ghana, Buchs and Mathisen (2005) contend that financial reforms appear not to adequately promote banking competition.

In Nigeria, few studies have been conducted on the subject matter. Nnaji (2011) considers the impact of banking sector consolidation on competition in the Nigerian banking sector. The study finds imperfect competition among Nigerian banks, and concludes that while consolidation marginally improves competition, more needs to be done to further improve competition in the sector. This implies that there are still some levels of oligopolistic structure in the Nigerian banking sector. In a similar vein, Ajisafe and Akinlo (2014) examine the relationship between competition and efficiency of commercial banks in Nigeria. The study utilises panel data analysis technique with fixed effects. It indicates that there is a positive and significant relationship between the degree of competition and the level of efficiency of banks in Nigeria. The study concludes that the reforms introduced in the banking sector in the late 1980s, raise the degree of competition and improve the level of efficiency of the Nigerian banks. A more recent study was conducted by Saibu (2015) to examine the implication of 2004 bank consolidation on the competitiveness of banks in Nigeria. The study uses bank-level panel data and measures competition using the PR-H-statistic and the Lerner index. The study finds that Nigerian banks exhibit features of monopolistic competitive behaviour. Particularly, the *H*- statistic is positively and statistically significant, while the Lerner index indicates a growing intensity of competition, particular in the period of post-consolidation. Thus, from the literature reviewed above, it is obvious that there exists mixed empirical evidence in the global analysis of banking competition and economic efficiency. Therefore, there is need to re-examine these interrelationships in Nigeria, particularly after the 2009 global financial crisis

a. Market Share

The market shares are computed for all banks using their deposits and credits in line with literature. The shares are used to derive concentration ratios (CR3, CR4, CR5) for three, four and five largest banks and for computing the Herfindal Hirschman Index (HHI). The two measures gave similar results in terms of market. The average market share varies between 1 and 15 per cent, with banks 8, 20 and 17 as the largest in the deposit market. However, banks 8, 20, 17 and 10 are the largest in the credit market. A group of seven (7) and another group of four (4) banks possess a total of 14 and 16 per cent of the market share, respectively. This means that a single bank in the sector is larger than a cluster of seven smallest banks or almost as large as four medium-size banks, indicating some element of market imperfection such as oligopoly.

b. Concentration Ratio (CR)

Table 4 contains concentration ratios in the Nigerian banking industry. It shows that CR3 is 40% while CR17 is 60%, implying that only 15% of the entire banks in the industry control 40% of the market share of deposits. Also four banks control 47% of total market share. Similarly, 55% of the market share is controlled by five banks, indicating that just 25% of the Nigerian banks control a higher proportion of the market when compared with the others. This development indicates a highly concentrated market, a necessary condition for market imperfection.

c. Herfindal-Hirschman Index (HHI)

Using market shares, the study computes HHI was computed for the Nigerian banking Industry between 2007 and 2014 (Table 3). The average index ranges between 798 and 860. Although these figures do not indicate the presence of market imperfection (e.g. oligopoly), indications from extant literature suggest that HHI is not a sufficient condition for the presence of oligopoly (Shaffer, 1983; Shaffer, 1993, Shaffer and DiSalvo, 1994; and Bikker and Haaf, 2012).

Table 1: HHI For 20 Banks Between 2007 and 2014

Year	HHI
2007	859.85
2008	817.10
2009	818.46
2010	822.25
2011	830.02
2012	809.67
2013	797.57
2014	801.68

Source: Moses et al 2016

The Herfindal-Hirschman index (HHI) is computed as the sum of squared market shares in percentages.

The usefulness of HHI in the determination of market structure is directly dependent on an accurate characterization of market structure. Rigorous econometric analysis is therefore required to determine the presence of imperfect competition in the Nigerian Banking Industry. (Moses et al, 2016)

Panzar-Rosse article shows that $0 < H < 1$ could be consistent with oligopolistic behavior and also commonly with monopolistic competition.

Following Park (2012), and Vesala (1995), the H-statistic may also be estimated from the reduced-form revenue equation of a bank as specified below:

$$\ln TRE (Vit) = \alpha + \beta_1 \ln(PLAB) + \beta_2 \ln(PCAP) + \beta_3 \ln(PFUN) + \gamma_1 \sum h_k + \gamma_2 \sum k_k + \gamma_3 \sum VA_k + \epsilon \quad (5)$$

Where

TRE_{it} is bank i's interest revenue at time t, PLAB_{it} is bank i's factor input price of labour at time t, and PCAP_{it} is bank i's factor input price of capital at time t, PFUN_{it} is bank i's factor input price of funds at time, t, SVA_h is a vector of scale variables (e.g. total assets, number of branches and number of cash centers), and CVA_k is a vector of control variables other than scale variables that affect the bank's revenue function. According to the specification above, the H-statistic is computed by a simple summation of the coefficients β_1 , β_2 and β_3 .

4. A MODEL OF BANK PERFORMANCE AND MARKET POWER

To further deepen the analysis of the competition in the Nigerian banking system, the study uses a regression model to identify the factors that have impacted on the performance of Nigerian banks. Following Park (2012), it uses net interest margin as a measure of performance. In addition, net Return on Assets (ROA), is computed and used as a proxy for a bank's performance. Primarily, this analysis is aimed at determining whether market power and concentration variables (e.g. HHI, CR_n, market shares, etc.) have had an impact on the two measures of bank performance namely, net interest margin and ROA of banks. This analysis is premised on the popular theoretical assumption that competitive conditions can be measured by the magnitude of the net interest margin or other measures of banks' profitability. Therefore equation (6) is the relation of net interest margin (or Return on Assets) to a number of exogenous variables that affect it:

$$PERFVAR_{it} = \alpha + \beta_1 \sum BK_k + \gamma_1 \sum MK_k + \delta \sum ME_k + \text{VAR} + \text{PVAR} + \text{VAR} \kappa + \epsilon \quad (6)$$

Where PERFVAR_{it} = the average net interest margin (or ROA) of bank i at time t;

BKVARK_{it} = bank specific variables of bank i at time t (such that k includes assets per bank, bank loan, bank deposit and number of branches);

MKPVARK_{it} = market power variables of bank i at time t (such as market share and HHI).

MEVAR_{k,t} = macroeconomic variables such as inflation rate. In the analysis, the paper assumes that concentration indices may be unreliable as a tool for measuring market power. According to Bikker and Haaf (2002), other influences may in practice be far more important determinants. Thus, similar to what was documented in earlier research (Shaffer 1993 and Shaffer and DiSalvo 1994) concentration must not preclude substantially competitive conduct.

4.1 Data and Model Estimation

The study uses monthly data from 20 commercial banks in Nigeria for the period, January 2007 to November 2014. The four banks omitted from the sample are largely insignificant in terms of their deposits and other measures of market share. Also, their data have been largely inconsistent and unbalanced due to mergers and takeover activities over the years. Third, the data for many of the variables is largely unavailable. The data is sourced from the CBN database. For confidentiality, the names of the banks are omitted and substituted with random numbers. Even though some banks shut down and others commenced business during the study period, a panel data from 2007 to 2014 is used. The study also assumes that financial intermediation is the core function of the banks, and revenue of a bank (TREV_{it}) is measured by interest revenue. The factor input prices are derived as follows:

PLAB_{it} = personal expenses/number of employees,

PCAP_{it} = depreciation allowance and other maintenance costs/total fixed assets, and

PFUN_{it} = interest expenses/sum of total deposits and borrowings

Net interest margin is derived as the difference between interest income and interest expenses for each bank. Return on Assets (ROA) is a ratio of banks net profit to total assets. Bank-specific characteristics such as total assets, number of branches and number of cash centers are the scale variables included in the model. In addition, macroeconomic variables such as inflation rate and Treasury Bill Rate (TBR) are used in the model, along with other industry-specific variables such as maximum lending rate (MLR) and prime lending rate (PLR). The study uses panel econometric technique to determine the presence and structure of oligopoly in the banking industry, after the fashion of Vesala (1995) and Park (2012). Three different panel data methods (pooled OLS, fixed and random effects) are estimated. The Hausman Test is used to test the robustness of the estimated results, and to make a choice between the fixed and random effects methods

4.2 Reduced Form Revenue Equation Analysis

The reduced form revenue equation (5) was estimated, allowing for the computation of the H-Statistic (an indicator of degree of market competition).

The H-Statistic is computed as a simple summation of the coefficients of the price variables (the price of labour, the price of capital and the price of funds). Using the reduced form interest revenue function, price variables are indicated as the main explanatory variables, along with other important vector and scalar variables. The model goodness of fit statistic indicates that most variables are significant in all three model runs at 1, 5 and 10% levels of significance. In the Pooled OLS model, all but maximum lending rate (MLR) variables are significant at 5%, with a robust adjusted R² of 82%, indicating that the model variables successfully explain over 82% of the changes in the interest revenue. The robust model performance is repeated across all runs of the panel models, with the fixed and random effect models achieving an R² of 86% and 75%, respectively.

TABLE 2: Estimation of Interest Revenue Function, 2007M1 – 2014M11, for the Nigerian Banking System

Variable	Pooled OLS	Fixed Effects	Random
LOG(PRILAB)	0.0892***	-0.2095***	0.1954***
(3.8029)	(-5.3261)	(5.5491)	
LOG(PRICAP)	-0.6038***	-0.3990***	-0.4125***
(-33.0598)	(-18.5712)	(-19.3937)	
LOG(PRIFUN)	0.4244***	0.4227***	0.4268***
(28.9337)	(27.7568)	(28.6259)	
NUMBRA	-0.0011***	-0.0005**	-0.0007***
(-7.2922)	(-2.2607)	(-3.3726)	
MLR	0.0212***	0.0366***	0.0394***
(4.1379)	(6.2677)	(7.0283)	
PLR	0.0020	-0.0316***	-0.0334***
(0.2492)	(-3.6846)	(-3.9351)	

INF	-0.0093**	-0.0073**	-0.0070**
(-2.7202)	(-2.3721)	(-2.3009)	
LNTOTOVE	0.9142***	0.6514***	0.6690***
(52.4408)	(16.7809)	(18.9775)	
NOSTAF	0.0000	0.0001***	0.0000***
(0.1736)	(4.2993)	(3.8095)	
MAKSHARDEPO	5.4830***	6.1884***	6.2521***
(11.0175)	(7.3660)	(8.3355)	
NOCAC	0.0027***	0.0042***	0.0034***
(4.4032)	(3.5038)	(3.4763)	
H-Statistic	-0.0902	0.2332	0.2096
R-squared	0.8175	0.8568	0.7509
Adjusted squared R	0.8166	0.8545	(0.7494)
F-statistic	-	372.2479	516.7488
Prob(F-statistic)	-	(0.0000)	(0.0000)

Source: Moses et al 2016

• *t-statistics* are shown in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively Table 2 shows the key model variables (prices of inputs) required in computing the H-Statistic have the appropriate signs in line with expectation for all runs of the model, except for the Fixed Effect model, where price of labour has a negative sign. Apart from prices of inputs, the number of cash centres has a positive sign, indicating that it has a positive impact on interest revenue. On the other hand, the numbers of bank branches, the maximum lending rate and inflation rate have a negative impact on the interest revenue implying that increases in these variables will lead to a reduction in interest revenue. Overall, the price of funds (PRIFUN) is the most significant price variable in the interest revenue function across all runs of the model. This finding has implications for the cost of funds analysis as well as measures aimed at addressing the problems of high lending rates in Nigeria.

Furthermore, the study introduces a structural break by splitting the sample data into two sub-samples made of pre-AMCON years (2007-2010) and post-AMCON years (2011 – 2014). The H-Statistics computed separately for the two periods helps to identify the changes in the degree of market competition and market power in the banking system, before and after AMCON intervention. The number of bank branches is also significant and similar to the results of the full sample in both pre- and post-AMCON runs. Although the maximum lending rate (MLR) is not significant in the pre-AMCON run, it is significant in the post AMCON model, similar to the full sample run of the model, implying that MLR contributes to the revenue of banks. The number of staff is mostly significant and has a positive sign in the pre- and post-AMCON runs of the model, indicating that the more staff a bank has the more interest revenue it earns. The market share variable is also significant and has a positive sign, indicating that market share, an indication of concentration, can improve the revenue. Tables 8 and 9 contain the results of the final runs of the pre-AMCON and post-AMCON models, respectively.

TABLE 3: Estimation of Interest Revenue Function for the Pre-AMCON Period, 2007M1 – 2010M12

Variable	Pooled OLS	Fixed Effect	Random
LOG(PRILAB)	0.1252**	0.0488	0.0803
(3.4390)	(0.8139)	(1.5699)	
LOG(PRICAP)	-0.4805***	-0.3588***	-0.3793***
(-17.0331)	(-12.6709)	(-13.7100)	
LOG(PRIFUN)	0.4500***	0.4237***	0.4279***
(21.6698)	(18.9703)	(20.0747)	
NUMBRA	-0.0009*	-0.0013*	-0.0014*
(-3.4210)	(-2.3098)	(-3.5007)	
MLR	0.0274	0.0290	0.0311
(1.3606)	(1.5475)	(1.6935)	
PLR	-0.0361	-0.0400*	-0.0406*
(-1.8530)	(-2.2638)	(-2.3139)	

INF	-0.0017	-0.0014	-0.0006
(-0.2061)	(-0.1892)	(-0.0871)	
LNTOTOVE	0.7789***	0.8621***	0.8294***
(20.8434)	(14.5586)	(16.2627)	
NOSTAF	0.0000	0.0001*	0.0000
(0.2655)	(2.0118)	(1.6170)	
MAKSHARDEPO	6.0966**	4.9602*	5.1600**
(7.3692)	(3.2746)	(4.7272)	
NOCAC	0.0024*	0.0036	0.0033*
(2.1590)	(1.8506)	(2.0218)	
H-Statistics	0.10	0.11	0.13
R-squared	0.8104	0.8527	0.7772
Adjusted squared R	0.8082	0.8479	0.7746
F-statistic	367.6755	178.8951	299.9845
Prob(F-statistic)	0.0000	0.0000	0.0000

Source: Moses et al 2016

1. *t*-statistics are shown in parentheses. *, **, *** indicate significance at the 10%, 5% and 1% levels respectively

5. CONCLUSION

The article reviewed and examined the evidence and structure of oligopoly in the Nigerian banking industry, using panel data from 2007 to 2014. Preliminary analysis involving the use of market structure measures such as market share, CR3, CR4, CR5 and HHI, indicates that the Nigerian banking industry is concentrated, and controlled by a few banks. Specifically, 25% of the banks hold over 55% of industry-wide deposits. Furthermore, to confirm the presence of oligopoly, panel data modeling, involving different methods (Pooled OLS, Fixed and Random Effects) is used to estimate a reduced form revenue function. Prices of inputs (labour, capital and funds), along with other firm-specific and industry-level variables are regressed on total interest revenues. Most variables are lagged, especially the input prices, allowing the direct estimation of the elasticity's of input prices, which are summed to give the H-Statistic, an indicator of the degree and nature of market competition. The H-statistics computed from the prices are -0.09, 0.23 and 0.21 for the three runs of the panel data model, indicating the strong presence of oligopoly in the Nigerian banking industry, as the H-Statistics are close to zero, with Pooled OLS run showing a weak evidence of monopoly. In order to test the impact of market power variables on bank performance as a sufficient condition for the presence of oligopoly, market power variables such as CR3, CR4, CR5, market share and HHI are regressed against return on assets and net interest margin, two measures of bank performance. The study finds that most market power variables are positive and significant, indicating that the higher the market concentration, the higher the performance of banks. This is a sufficient condition for the existence of market imperfection and oligopoly is confirmed by the H-Statistics.

Policy Implications

- i. While the author reviewed and noted that the Nigerian banking model is stratified into international, regional and national banks, with varying capital base requirements, an alternative model would be one with a uniform capital base which will entail a new wave of regulated mergers that will ensure that emerging banks are of a similar size and structure.
- ii. Price of funds is found to be very significant in the model with implications for cost of funds in the banking industry. Currently, adjustments in the monetary policy rate (MPR) are not effectively transmitted to market interest rates due to high bank operational costs and structural issues, leading to a wide margin between the MPR and bank lending rates. Strategies aimed at reducing market interest rates in the economy should be explored by policy makers.
- iii. Smaller banks tend to create more credit from their deposits while the bigger banks grant less credit, relative to their deposits. A regulation should be in place to ensure that banks give a specified percentage of their deposits to specified sectors of the economy. This should help reduce the incidence of foreign exchange speculation, and control excess liquidity in the banking system. A formal penalty system should be developed to penalize banks that individually or in collusion, breach monopoly regulations. On the other hand, moral suasion should be adopted as a means of persuading banks to allow a level playing field.

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