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Empirical analysis of structure-conduct-performance paradigm on Nigerian banking industry

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ABSTRACT

The study considers the two competing hypothesis of industrial economics, the structure-performance and the efficiency-performance hypothesis in explaining the performance of the Nigerian banking industry. Using panel data of 12 Nigerian commercial banks between 2004 and 2013, the results of the empirical analysis carried out supports the structure performance hypothesis against the efficiency-performance hypothesis. The bank efficiency variable proxy by operating efficiency (EFF) has negative relationship with bank performance (Pre-tax ROA) on the contrary the two market concentration variables (Market share and Herfindahl-Hirschman index) are positively related with Pre-tax ROA. This result, therefore, confirms the existence of structure-performance hypothesis within the Nigeria banking industry. The findings of this study reflects the high emphasis by the regulatory arm, the central bank of Nigeria, on the restructuring of the commercial banking subsector of the economy in terms of vibrant ownership and capital base. However, in order to facilitate the implementation and achievement of efficiency by these banks, vibrant competition policy should be initiated by the regulatory authorities. Besides, efforts should be geared towards ensuring infrastructural improvements, especially power in Nigeria in order to ensure conducive environment within which the industry operates.

Key words: Banking industry; Market structure, Bank efficiency, Bank performance

JEL Classification: L16, L79, C51

1. INTRODUCTION

The Nigerian banking system has undergone remarkable changes over the years, in terms of the structural development. Since independence, the banking industry has grown substantially from 8 banks with 160 branches in 1959, to 40 banks with 1316 branches as at December 1985. This era marked the period of strict laws and regulation in managing the banking industry, which inhibited growth, competition and efficiency in the system. Following the introduction of the Structure Adjustment Programme (SAP) and consequently deregulation of the banking industry, the number of banks has similarly increased. For instance, as at end-June, 2004, there were 89 deposit money banks operating in the country, comprising institutions of various sizes and degrees of soundness. Structurally, the sector is highly concentrated, as the ten largest banks account for about 50 percent of the industry's total assets/liabilities.

According to Soludo (2004) most banks in Nigeria have a capitalization of less than $10 million. The largest bank in Nigeria has a capital base of about US$240 million compared to US$526 million for the smallest bank in Malaysia. The small size of most of our banks, each with expensive headquarters, separate investment in software and hardware, heavy fixed costs and operating expenses, and with bunching of branches in few commercial centers have lead to very high average cost for the industry. This in turn has implications for the cost of intermediation, the spread between deposit and lending rates, and puts undue pressures on banks to engage in sharp practices as means of survival. Afolabi and Manman (1996) admitted that the resulting competitive pressure brought about the reforms while encouraging financial intermediation in the banking industry have also led to raise risk, sharp practices and hence led to distress in the system. In an attempt to resolve the pathetic financial conditions, the central bank governor, Soludo in 2004 embanked on the recapitalization of banks, which among other led to merger and acquisition with the attendant impact on the structure of banking industry in Nigeria. Consequently, in 2005 the number of banks fell to 25, then 24 as at 2009.

Furthermore, in August 2009 Sanusi initiated the Reform Program necessitated by the global financial crisis. The blueprint for reform was centered on 4 themes. These include, enhancing the quality of banks; establishing financial stability; enabling healthy financial sector evolution; and ensuring the financial sector contributes to the real economy. Perhaps of interest to us is the enabling healthy financial sector evolution, which has to do with banking industry structure, banking infrastructure such as credit bureaus and cost structure of banks, among others. A panoramic view of the banking industry in Nigeria since independence will no doubt reveal the influence of banking policy shaping the structure of the industry.

The issue of number of banks in the banking industry has remained a debatable discourse. While Concentration School of thought, advocates that the fewness of banks (i.e consolidation, via merger and acquisition) provides a stronger financial market. The Decentralization School of thought considers fewness as a threat to the financial stability of the industry. Vives (2001) observes that the degree of competition in the financial sector enhance efficiency of the production of financial services, the quality of financial products and the degree of innovation in the sector, all of which impact profitability. The relevant

question is: to what extent can the structure or efficiency explain performance in the Nigerian banking industry during the period under review?

It is against this backdrop that this study proposes an examination of the two competing hypotheses in the SCP paradigm: the traditional "structure, performance hypothesis" and "efficient performance hypothesis". The structure, performance hypothesis states that the degree of market concentration is inversely related to the degree of competition. This is because market concentration encourages firms to collude. This hypothesis will be supported if positive relationship exists between the market concentration (measured by concentration ratio) and the performance (measured by profits), regardless of the efficiency of the firm (measured by market share). Thus a firm in more concentrated industries will earn higher profits than a firm operating in less concentrated industries, irrespective of their efficiency. On the other hand, the efficiency performance hypothesis states that the performance of the firm is positively related to its efficiency. This is because market concentration emerges from competition where firms with low cost structure increase profits by reducing prices and expanding market share. A positive relationship between firm profits and market structure is attributed to the gains made in market share of more efficient firms. In turn, these gains lead to increased market concentration. That is, increased profits are assumed to accrue to more efficient firms because they are more efficient and not because of collusive activities as the traditional SCP paradigm would suggest. Efficiency and performance are therefore positively related. The paper is structured as follows: section two deals with the literature review; section three is theoretical framework and model specification while four is a data analysis of results and section five is a conclusion of the findings.

2. THEORETICAL UNDERPINNING

The SCP Paradigm

The theoretical starting point in the explanation of the SCP paradigm emanated from the extreme microeconomic theories of market structure; monopoly and perfect competition. The structural characteristics of the perfectly competitive market are a large number of firms with almost equal sizes with no barrier to entry. Long-run equilibrium price equals marginal and average costs with profits at a normal level in perfect competition. However under monopoly, the industrial structure is characterized by one player (firm) with high restriction to entry and the outcome of such entry barrier is that marginal cost is equated with marginal revenue with price above the marginal cost and there are supernormal profits. Thus, the position of any particular industry can be defined along this spectrum by considering the structure of such industry along the number of firms in such industry, the ease (or otherwise) of entry and from such structure, predict the performance of that industry, especially with respect to profitability. The SCP paradigm thus postulated that the movement of an industry with large number of firms towards few firms in such industry, the profitability level will rise from the normal level (in the case of perfect competition) to supernormal level (of monopoly). Summarily, the SCP paradigm predicts a positive relationship between the level of concentration in a given market and profits and output prices.

The link between concentration and performance (profitability) could be modeled from the Cournot oligopolistic behavior model (Rutherberg, 1994; Sawyer, 1981). Assuming an industry with N number of firms and each firm with homogeneous products Q, the profit maximization function of a given individual firm could be specified as the difference between revenue and cost (that is $P_Q Q - C_Q$). All firms are assumed to have identical cost functions and output decisions of all firms are independent of another. The market equilibrium equation of the industry is given as:

$$\frac{P_Q - C\left(\frac{Q}{N}\right)}{P_Q} = \frac{1}{N}\frac{1}{\eta} \quad 1$$

Where η is the price elasticity of demand.

Assuming further that the assumption of identical cost function is relaxed and replaced with an element (λ) which measures the expectations of any firm with respect to rival's reaction of such firms output decisions, the market equilibrium function could be rewritten as:

$$L = \frac{P_Q - MC}{P_Q} = H(1+\lambda)\frac{1}{N} \quad 2$$

Where L is the marker Lerner index and H is the Herfindahl index of concentration. The Herfindahl index is measured as the sum of squared market shares of firms in the industry.

Empirical studies on the SCP paradigm have estimated the relationship between market structure and performance by regressing measures of performance on varieties of variables. However, following Rutherberg (1994), the following general specification is suggested on the relationship between banks' performance and structure:

$$\pi_{it} = f(H_{it}, PC_{it}, NNI_{it}, R_{it}, Z_{it}) \quad 3$$

Where π is a measure of performance; H measures concentration; PC is a proxy for potential competition; NNI measures non-interest income; R is the overall risk all banks are exposed to in the country and Z is the vector all other control variables. i and t represents the bank and period identifier respectively.

The Efficiency Hypothesis

Contrary to the SCP paradigm, the efficiency hypothesis challenges basic rationale behind the SCP paradigm. The efficiency hypothesis posits that the fundamental determinant of the relationship between any firm's structure and performance is the efficiency of such firm. A highly efficient firm relative to its competitors can maximize profit by maintaining its current size and pricing policy or price reduction and expanded operations. The efficient structure hypothesis states that only the efficiency of firms can explain the positive relationship between profits and concentration or profits and market share. The X-efficiency argument within this branch of literature states that firms with superior management or efficient production technologies enjoy lower costs and therefore make higher profits. By extension, those more efficient firms will gain greater market shares, which may result in a more concentrated market. In this context, efficiency influences the level of profit and market structure. The scale efficiency argument contends that firms may have comparable quality of management and technology, but some firms produce at a more efficient scale than other firms, thus they have lower unit costs and higher unit profits. Such

firms are assumed to acquire larger market shares, which may result in higher levels of concentration. In this scenario, efficiency through an indirect process drives both profit and market structure.

Empirical Literature Review

Considerable efforts have been made in literature to establish empirically investigate the validity of the SCP hypothesis and efficiency hypothesis in the factors that determines firms' performance. Most of these studies have produced different results leading to divergent conclusions. Gilbert (1984) reviewed a considerable number of studies (approximately 45 studies) on the relationship between performance and market structure in the Banking industry. He concluded that about fifty percent of the reviewed studies revealed statistically significant relationship between performance and market structure. However, of these studies with statistically significant coefficients on market concentration, estimates of the effect of changes in the concentration ratio on the performance measures were economically very small.

Bourke (1989) investigated the factors that are likely to influence the performance of the commercial banks in Europe, North America and Australia. He used samples of 90 banks between the periods of 1972 and 1981. His results show that liquidity ratio, concentration ratio and growth of money supply in each country are significant in determining commercial bank's profitability. Molyneux and Thorton (1992), applying the model used by Bourke (1989) undertook the study to banks in an eighteen European countries. They used standardized accounting data published by the International bank credit Analysis Ltd (IBCL) to account for differences in accounting policies. The results show a strong positive relationship between concentration and each of the six measures of performance.

Bhatti and Hussain (2010) examined the relationship between market structure and performance in the banking sector using data from Pakistani commercial banks. With a sample of 20 commercial banks incorporated in Pakistan using the annual and pooled data for a period of 9 years from year 1996-2004. They concluded that there is a positive relationship between profitability and concentration, therefore, that market concentration determines the profitability in Pakistani commercial banks while concluding that there is a negative relationship between competition and profitability in the Pakistani commercial banks. Chirwa (2003) investigated the relationship between market structure and profitability of commercial banks in Malawi using time series data between 1970 and 1994. They used time-series techniques of co-integration and error-correction mechanism to test the collusion hypothesis to find out whether a long-run relationship exists between profits of commercial banks and concentration in the banking industry. The results show that a long-run relationship exists between profitability and market structure in Malawian banking. The collusion hypothesis is strongly supported by the positive and significant relationship between commercial bank profitability and concentration in Malawi.

Also, the work by Tabi and Nzongang (1990) tested empirically the Structure - Performance hypothesis within the context of the Cameroonian Commercial banking system. The analysis is based on cross-sectional data collected from three dominant banks over the period from 1987 to 1999. Three accounting measures of a bank's performance

were utilized: return on capital (ROC), return on assets (ROA) and return on equity (ROE). The results indicate that the market concentration power is of paramount importance in the determination of bank profitability. In Nigeria, a study by Ugwunta et. al. (2012) using a time-series regression analysis was applied to a ten-year data period (2001-2010) to evaluate the relationship and the impact of banking sector structure, other explanatory variables on bank performance. Significant findings include that the Nigerian banking sector is oligopolistic in structure and that market concentration positively and significantly impacts on bank performance. These results suggest that market concentration is a major determinant of bank profitability in Nigeria.

ANALYSES OF MARKET STRUCTURE OF THE NIGERIAN BANKING INDUSTRY

Market concentration ratio (*CRn*)

The market concentration ratio is defined as the ratio of the total asset, deposits or loan of the largest banks to the total assets, deposits or loans in a given banking industry. CRn reflects the concentration (CR) of the largest banks (N) in the given market. Generally speaking, the higher market the concentration ratio is, the stronger the market dominating forces of the largest banks and the lower level of the competition in the market will be. Table 1 shows that, the CR4 of assets, deposits and loans of Nigerian banking industry were between 74% and 54% from 2004 to 2013 which signifies a concentrated market among the big-four banks (first bank, Eco bank, Zenith and UBA). Comparing the distribution of CR4 and CR8, we can find that the difference between the two indexes on assets, deposits and loans were significantly larger; basically they were all in about 25 percentage points higher than C4. The CR8 of assets, deposits and Loans was highly concentrated among the big-eight banks (First bank, GTB, Zenith, UBA, Access bank, Skye bank, Diamond bank and Ecobank). This signifies an oligopoly market structure in which only eight market player controlling about 87% of the aggregate market share. Meanwhile, the CR4 of assets, deposits and loans show a clear downward trend. According to the market structure classification criterion which was put forward by Bain in 1968, the market structure of the Nigeria banking industry has gradually switched from oligopoly with high concentration to oligopoly with common concentration.

TABLE 1. Measures of concentration ratios for Nigerian banking industry (2003-2012)

Year		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Assets	CR4	74.2	63.7	65.3	59.6	55.0	57.7	59.6	58.2	57.1	54.6
	CR8	92.1	91.2	88.2	84.8	84.9	86.0	85.8	85.7	83.3	84.0
Deposit	CR4	74.9	75.1	68.1	63.8	61.3	59.8	60.3	57.7	57.1	57.8
	CR8	92.8	94.1	89.7	87.1	86.0	86.9	85.3	84.9	82.7	85.6
Loan	CR4	72.6	67.1	65.0	62.9	53.8	54.8	55.7	56.5	55.7	57.1
	CR8	92.7	93.9	87.1	85.3	83.2	86.7	85.8	84.7	83.2	85.3

Herfindahl-Hirschman Index (HHI)

A commonly accepted measure of market concentration, HHI is calculated by squaring the market share of each firm competing in a market, and then summing the resulting numbers. The HHI number can range from close to zero to 10,000. In this context, *HHI* is the sum of squares of the market shares of total assets (deposits or loans etc.) of banks in a given market. From Table 2, we can find that *HHI* on assets, deposits and loans of Nigerian banking industry were all at the range of 1030.7—1621.6 from 2003 to 2012. But in a dynamical perspective, all the *HHI* indexes on assets, deposits and loans of Nigerian banking industry show a downward trend.

TABLE 2. Measures of *HHI* index for Nigerian banking industry (2004-2013)

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Assets	1,460.9	1,558.2	1,371.1	1,311.7	1,146.2	1,080.9	1,102.8	1,133.3	1,136.3	1,097.5
Deposit	1,485.8	1,559.9	1,557.7	1,469.5	1,247.2	1,223.5	1,141.3	1,132.7	1,115.6	1,090.9
Loan	1,443.9	1,621.6	1,409.9	1,322.8	1,203.5	1,030.7	1,074.9	1,103.5	1,137.7	1,144.2

Performance of Nigerian Banking Industry

TABLE 3. Measures of pre-tax return on asset (*ROA*) for Nigerian banks (2004-2013)

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Big-Four	3.52	3.67	3.57	2.55	2.53	3.06	0.88	1.93	0.84	2.46
Mid-Small size	2.96	3.28	1.53	2.47	2.39	2.88	0.38	1.83	0.28	1.78
Industry Average	3.15	3.41	3.57	2.55	2.53	3.06	0.88	1.93	0.84	2.46

Table 3 shows, firstly, the performances of Nigerian banks were relatively moderate between the analysis periods 2004-2013. The average *ROA* of the Big-four (First bank, Ecobank, Zenith Bank and UBA) was roughly 3.36% on average compared to ROA of Mid-Small size bunks (Access, Skye, Diamond, GTB, Stanbic, Fidelity, FCMB, Sterling bank) which stood at an average of 1.98%. This was not a surprise as evidence of the concentration ratio (CR4) which indicate that the big-four banks controlled about 74% of the total market share in terms of total asset, deposit and loan. Also, the performances of Nigerian banks showed upward trend and then downward trend. This trend might be as a result of the pre-global financial crises (2004-2008) and post-global financial crisis (2009-2013). Also, this trend could also be traced to the era of Book examination by CBN (2011) which compelled all banks to write Non-performing loan from their books which in turn affect their profitability

EMPIRICAL METHODOLOGY AND ANALYSIS

The theoretical review presented in previous section reveals a relationship among the market structure, efficiency and performance of an industry. To investigate the relationship

among these three in the Nigerian banking sector, the following four equations (4a-d) were adapted based on the studies of Berger (1995), Goldberg and Rai (1996) and Jian and Jing (2008):

$$ROA_{it} = \alpha_{10} + \alpha_{11}HHI_{it} + + \alpha'Z_{it} + \xi \quad (4a)$$

$$ROA_{it} = \alpha_{10} + \alpha_{11}MS_{it} + \alpha'Z_{it} + \xi \quad (4b)$$

$$ROA_{it} = \alpha_{10} + \alpha_{11}EFF_{it} + \alpha'Z_{it} + \xi \quad (4c)$$

$$ROA_{it} = \alpha_{10} + \alpha_{11}MS_{it} + \alpha_{12}HHI_{it} + \alpha_{13}EFF_{it} + \alpha'Z_{it} + \xi \quad (4d)$$

ROA represents performance measured as banks' pre-tax return on asset; MS is the market share, measured as the average of the banks' market shares of assets, deposits and loans; HHI is the proxy for market concentration ratio which is measured using the average HHI of assets, deposits and loans; EFF captures efficiency, while Z is a measure of control variable included in the model. The control variable included in the estimation is LogTA which is measured as the logarithm of banks' total assets; and ξ is an error term.

TABLE 4. Result and Discussion

Variables	Model 1	Model 2	Model 3	Model 4
CONSTANT	7.4842	7.5058	14.6857	15.2267
	(2.7704)**	(2.7259)**	(2.4951)**	(2.5150)**
HHI	0.0044			-0.0220
	(0.0039)			(0.0110)*
MS		0.1853		0.7738
		(0.1119)		(0.3182)*
EFF			-0.0558	-0.0557
			(0.0083)**	(0.0081)**
LOGTA	-0.4239	-0.5094	-0.7295	-1.0941
	(0.2074)*	(0.2108)*	(0.1799)**	(0.2337)**
R2	0.0508	0.0635	0.3272	0.3708
N	120	120	120	120

* $p<0.05$; ** $p<0.01$

The fixed effect panel regression result based on the model specified above is presented in table 4. The table presents four regression results with each of the measures of structure and efficiency isolated and estimated differently in columns 1 to 3 and all combined in column 4. Model 1 shows the result of HHI on the banks' performance and it reveals a positive relationship indicating a positive impact of structure on performance. Similarly, the impact of market share on performance is revealed in model 2 and this also reveals a positive coefficient, also supporting the SCP hypothesis. This result is similar to the findings of Jian and Jing (2008) in the case of Chinese banking industry, Bhatti and Hussain (2010) on commercial banks in Pakistan and study of Chirwa (2003) on Malawi banking industry. This might not be unconnected with the collusive behavior among the banks' managers and force consolidation by the regulatory authority.

On contrary, the bank efficiency variable reflects a negative relationship with performance, thus, refuting the efficiency-performance hypothesis. Perhaps, this might be owing to the environment under which the industry operate in Nigeria which is characterized by infrastructural decay particularly electricity, among other factors have inhibited the capacity of banks to boost their efficiency and thus translate into the better performance (Isola, 2005).

Combining the measures of structure and efficiency as given in equation 4, the regression result is presented in model 4 of the table. The results shows a change in sign of the coefficient of HHI from positive to negative while the MS still maintains a positive sign as observed in model 2. The negative coefficient of HHI indicates that the performance of commercial banks can be improved as a whole by intensifying market competition and reducing market concentration ratio while the positive relationship between MS and performance indicates that an increase of market shares of commercial banks will be beneficial to their performance. This result is also consistence to the findings of Jian and Jing (2008) in the case of Chinese banking industry.

Conclusion

The aim of this paper is to evaluate two competing hypotheses, traditional structure-conduct-performance paradigm and the efficiency-hypothesis, on the performance of commercial banks in Nigeria. Following remarkable reform policies and programmes that were implemented in the sector over the years particularly since the nation adopted structural adjustment programme, the sector has witnessed tremendous changes in terms of ownership structure and operational expansion. Using 12 Nigerian banks for the period 2004-2013, the study examines the trend in the degree of market competition and observed the industry is concentrated among few banks as shown in the descriptive statistic where four big banks control over 60% of the market in term of deposit, loan and total asset. Secondly, the two variables of market structure used in the study, market share and Herfindahl Hirschman Index, both reflect positive correlation with market performance, measured as pre-tax return on asset. The panel regression analysis carried out further confirmed the existence of structure-performance hypothesis within the Nigeria banking industry. On contrary, the bank efficiency variable reflects a negative relationship with performance, thus, refuting the efficiency-performance hypothesis.

This finding reflects the high emphasis by the regulatory arm, the central bank of Nigeria, on the restructuring of the commercial banking subsector of the economy in terms of vibrant ownership and capital base. However, regulatory authorities should monitor competition among bank managers by ensuring market induced merger and acquisition rather than force consolidation exercise that exist in the past. This could facilitate the implementation and achievement of a vibrant competition policy that will set a level playing ground for firms in the sector to operate. In addition, as a panacea to redress deplorable environment under which the industry operate, government should address the issue of infrastructure decay, particularly the electricity supply that has been the bane of industrial sector in Nigeria including the banking sector.

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