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# Measuring Competition in the Nigerian Banking Sector

Ozoemena Nnaji, Ph.D\*

This paper investigates the impact of banking sector consolidation on competition in the Nigerian banking sector. The study evaluates the degree of competition using *H-statistic* proposed by Panzar and Rosse (1987), and bank level data from Bankscope to measure the degree of competition before and after consolidation in the Nigerian banking sector. It was concluded that while consolidation marginally improved competition, more needs to be done to further improve competition in the sector. *This finding suggests that policy makers should continue to provide level playing field for all participants while simultaneously working to promote stability concerns to support private sector activities and economic growth in the country.*

**Keywords:** Bank Competition; Banking Sector Consolidation, Nigerian Banking Sector

**JEL Classification:** N26, G21

**Author's e-mail:** [osnnaji@cbn.gov.ng](mailto:osnnaji@cbn.gov.ng)

## I. Introduction

A major trend in the international financial markets in the last decade is financial sector liberalization. This is based on the general realization that protected market and the associated market power, created by protection, is too costly for the local economy. The growing tendency was to favour market mechanisms or regulatory liberalization and legislative authorities to reap the efficiency gains associated with liberalization. One of the outcomes of the financial sector reform is banking consolidation. Academics and policy makers seem to unanimously accept the view that financial institutions play a crucial role in the effective functioning of modern economies. Thus, suggesting that higher degree of competition in the sector is crucial for financial intermediation and economic growth. A competitive banking sector will be more efficient in terms of allocating funds, more especially in operating as an intermediary between depositors and borrowers. There have been considerable concerns about how ongoing consolidation in financial systems around the world will affect competition. Indeed, much of the recent public debate seems to assume that perfect competition in banking is ideal and should be pursued.

\* Ozoemena Nnaji is an Economist and Special Assistant to the Deputy Governor, Economic Policy, Central Bank of Nigeria

Competition in the banking sector has been at the crux of policy debates on financial stability. As in other sectors, competition is usually seen as necessary for an effective banking system as it affects the efficiency and the quality of services offered in the industry. Furthermore, competition in banking has implications for other sectors of the economy. Thus, higher competition in the banking sector is found to be associated with a faster growth of other sectors of the economy that rely on external financing (Claessens and Laeven, 2003). This is because banks advance credit or loans to both firms and consumers and an uncompetitive banking sector will lead to under-provision of such credit. Competition in the banking sector will promote the efficiency required to create a fully functional credit system, and according to the competition-stability theory, will help improve the stability of the system. In addition, Deidda and Fattouh (2002) find that high concentration in banking is negatively related to industrial growth in low-income countries but not in high-income ones, suggesting that emerging economies need a relatively more competitive banking sector in order to promote growth.

Banks are service industries. They contribute to economic growth not by producing real goods, but by providing the financial services to facilitate production in other industries. An efficient banking sector will make the largest contribution to economic growth. Banks, like other firms, sell products to consumers, thus the need to worry about the efficiency implication of a non-competitive banking sector. Banks also act as conduits for monetary policy transmission mechanism; a low level of competition in the banking sector may hinder the effectiveness of the conduct of monetary policy as banks may not respond appropriately to monetary tightening and/or easing (Van Leuvensteijn, et al, 2008).

There is ample evidence in the economic literature that competition in the financial sector is a good thing and should be encouraged. However, the view that competition in financial services is unambiguously good is a naive assumption as recent events in the US<sup>1</sup> have called this assumption to question. Empirical

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<sup>1</sup>Many have argued that the global financial crisis which started in the United States and spread around the world was as a result of liberalization and deregulation in the US financial system. The policy debate in policy circle even in emerging economies is the issue of financial stability and ways of safeguarding their financial system.

evidence has also cautioned against excessive competition in the financial sector on the ground that it could lead to instability. Specific to the financial sector is the effect of excessive competition on financial stability, long recognized in theoretical and empirical research and, most importantly, in the actual conduct of (prudential) policy towards banks. It has been shown, theoretically and empirically, that the degree of competition in the financial sector has implications (negatively or positively) for access of firms and individual households to financial services, and in turn overall economic growth. Therefore, competition has to be considered as part of a broad set of objectives, including financial sector efficiency, access to financial services for various segments of users, and systemic financial sector stability, the possible trade-offs among these objectives. And since competition depends on several factors, one has to consider a broad set of policy tools when trying to increase competition in the financial sector. Thus, the role of policy in striking a balance between competition and stability especially in an emerging market like Nigerian becomes very important. While the goal of stability should be the foremost objective of policy makers, competitive policies should not be ignored. The objective of this paper is to evaluate the degree of competition in the Nigerian banking sector and the contribution of the recent banking sector consolidation in improving competition in the sector.

The rest of the paper is organized as follows: Section II reviews the literature on competition theory in the banking sector. Section III presents an overview of the Nigerian banking sector. Section IV elaborates on theoretical model of Panzar and Rosse (1987) and some empirical evidence generated from their model. It presents the data and the empirical model used in the analysis and the estimation results of the H-statistic for the pre- and post-consolidation periods. Section V summarizes the paper with some concluding remarks.

## **II. Literature Review**

Recent events have opened up debates on the role of market competition on the banking sector. The common consensus is that restraining competitive forces in

the banking sector would produce welfare losses and should be avoided. Majority opinion are of the view that banks with monopoly power would exercise their ability to extract rents by charging higher loan rates to businesses and paying depositors lower deposit rate. This will affect growth through many channels including distortion or entrepreneurial incentive. There is a huge spread between lending and deposit rates in the Nigerian financial market suggesting a monopolistic banking structure<sup>2</sup>. By charging higher loan rate, banks in effect distort entrepreneurial incentives.

In general, in a competitive environment, only the most efficient and innovative firms survive, therefore, ensuring that the industry remains healthy and that firms pass on the benefits of competition and innovation to their customers. In the financial sector, there might be instances in which competition may have a negative impact on stability, as the least efficient firms may have an incentive to increase their risk in order to reach the industry profitability level. However, the Nigerian financial sector is far from this scenario.

A number of methodological approaches have been used to investigate banking competition. These can be divided into two: the Traditional Industrial Organization Theory and the New Empirical Industrial Organizational Approaches. Within the traditional method is the structure-conduct-performance (SCP) theory originated by Mason (1939) and further popularized by Bain (1951). These models postulate that market structure affects the behavior of firms in the market and hence, their performance. It argues that higher concentration in banking markets causes less competitive bank conduct and leads to higher bank profitability, or lower deposit rate in the deposit market. Although, this approach was criticized for taking market structure as given, it dominated competitive analysis until the 1970s when Demsetz (1973) developed the efficiency Structure theory. The X-efficiency model argued that the positive relationship between market concentration and profitability does not hold because of market power, but is a consequence of the greater efficiency

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<sup>2</sup>See data from the Financial Market Dealers Association of Nigeria, [www.fmda.com.ng](http://www.fmda.com.ng).

of firms with the largest market share. Banks with superior management and/or production technologies enjoy higher profits and as a result, have more market share. Alternatively, some banks may produce at more efficient scales than others in their industry, leading to higher profit and higher market concentration. Some empirical studies have found evidence supporting the efficiency hypothesis (See Berger, et al. 1995).

The SCP and X-efficiency theories formed the basis for the structural models used in the measure of bank competition today from which the Contestable theory is derived from. The contestable market theory was developed by Baumol, Panzar and Willig (1982). They defined a contestable market as one in which entry and exit is free and costless. The market structure is determined explicitly and simultaneously by output and prices. Whatever industry structures that minimize total cost for the equilibrium output vector must be the only structure consistent with the industry equilibrium in the long run. This theory offers analytical methods for empirical research in banking competition. Panzar and Rosse (1987) presented a reduced form revenue approach using bank level data to distinguish between market structures. The PR methodology investigates the degree of competition by examining the extent to which changes in factor inputs are reflected in equilibrium industry or bank-specific revenues.

In summary, the literature on the measurement of competition can be broadly divided into two branches: the (non-formal) structural approach and the (formal) non-structural approach. The structural approach centers on the Structure-Conduct-Performance paradigm (SCP) or the efficiency hypothesis, according to what they assume to be the main reason for superior market performance. For the SCP, the collusive behavior among large firms due to a highly concentrated market is the main driver of market over performance. On the other hand, the efficiency hypothesis, implicitly assumes the presence of economies of scale through which large firms achieve increased efficiency and improved performance. Thus, if a firm is more efficient than the rest (e.g., due to a lower cost structure) it could gain market share by reducing prices (Molyneux and Forbes, 1995) and hence, market structure is endogenously shaped by firms' performance

so that concentration is a result of the superior efficiency of the leading firms (See Vesala, 1995).

Other offshoots of the approach that is designed to measure the degree of competition introduced by Bresnahan (1982), Iwata (1974) exist and are often referred to as the conjectural variations approach. This method is based on the idea that a bank when choosing its output takes into account the "reactions" of rival banks. Thus, it investigates the degree of competition by examining the conjectural elasticity of total banking industry output to a variation in the output of bank  $i$ - the perceived response of industry to a change in the quantity of a specific bank. Empirical research has used this approach and a discussion of the Panzar and Rosse model is presented below.

New developments in industrial organization and the refinement of formal models of imperfectly competitive markets, as well as the realization of the need to endogenize market structure have led recent empirical work to rely increasingly on non-structural models. In particular, the application of the SCP in the banking literature has been criticized for the one-way causality (from market structure to market performance) that the original model imposed. There are three main non-structural models proposed in the literature: Iwata's (1974), Bresnahan's (1982) and Panzar and Rosse's (1987) models. Of these, Iwata's model has not yet been applied to the banking industry, due to the lack of micro data needed for empirical estimation. Empirical applications of Bresnahan's model are also relatively scarce for developing countries. There are a number of papers that apply this model to the Latin American banking sector. Variations of Bresnahan's conjectural variation approach find competitive markets in Colombia (Barajas, et al, 1999), Brazil (Nakane, 2001) and Argentina (Burdisso, et al., 2001).

The basic idea is that profit-maximization firms in equilibrium will choose prices and quantities such that marginal costs equal their marginal revenue. This will coincide with the demand price under perfect competition and industry's marginal revenue under perfect collusion. This measure varies between full market power to perfect competition at the extreme spectrum.

Many studies have been conducted using different methods to find the level of competition in the banking sector of numerous countries across the world. Most studies applied the Panzar and Rosse approach. Perera, et al. (2006) used the Panzar and Rosse approach on some developing Asian countries including Bangladesh, India, Pakistan and Sri Lanka and found the banking sector in Bangladesh, India and Pakistan to be monopolistic or monopolistic competitive with H- statistics of 0.68, 0.64 and 0.48, respectively. The banking sector in Sri Lanka was, however, found to be more of a competitive structure with H-statistic of 0.71. Additionally, Claessens and Laeven (2003) applied the Panzar and Rosse method on fifty countries around the world, of which thirty one are developing countries (including Nigeria). The result of the Panzar and Rosse H-statistic from the study showed that most developing countries' banking sectors feature between the range of monopolistic and monopolistic competitive structure<sup>3</sup>. Using this method for the Jordanian banking sector and data from 1994 to 2006, Demirguc-Kunt and Martinez-Peria (2010) found that the banking sector in Jordan had become more monopolistic due to greater evidence of market power and, hence, a lower degree of competition in that country's banking sector as the number of banks reduced.

### **III. Banking Sector Performance after Consolidation**

The Nigerian banking system has undergone remarkable changes over the years, in terms of the number of institutions, ownership structure, as well as depth and breadth of operations. These changes have been induced largely by challenges posed by deregulation of the financial sector, globalization of operations, technological innovations and adoption of supervisory and prudential requirements that conform to international standards. As at end-June 2004, there were 89 deposit money banks operating in the country, comprised of institutions of various sizes and degrees of soundness. Structurally, the sector was highly concentrated, as the ten largest banks account for about 50 percent of the industry's total assets/liabilities (see IMF 2008 article IV report on the Nigeria Banking sector).

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<sup>3</sup>Also see Buchs and Mathise and Claessens and Laeven (2003)



Most banks had capitalization of less than US\$10 million, with the largest bank having a capital base of about US\$240. The small size of most of the 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, led to a very high average cost for the industry. This in turn has implications for the cost of financial intermediation, the spread between deposit and lending rates, and exerts undue pressures on banks to engage in unethical practices as means of survival. Industry analysts were of the opinion that most of the banks were not engaged in strict banking business of financial intermediation; rather, they resorted to quick-business kind of deals and ignored the main function of financial intermediation (e.g. foreign exchange dealings, lending the oil imports, etc.).

**Table 1: Indicators of Banking Performance after Consolidation<sup>o</sup>**

	Pre-Consolidation	Post-Consolidation
Number of Banks	89	24
No. of Branches	3382	4500
Total Asset of Banks (US\$ billion)	24	51.1
Loan to Deposit Ratio	85	98
Cash Reserve Ratio	59	61
Capital Requirements (Naira billion)	5	25

**Source:** Annual Report of the Banking Supervision Department, Central Bank of Nigeria

<sup>o</sup> Based on 2009 data

The sector was marred by a lot of challenges, including, weak corporate governance, evidenced by high turnover in the Board and management staff, inaccurate reporting and non-compliance as well as regulatory requirements (as evidenced by the CBN forensic investigation done on in 2009 which resulted in the sack of management staff from 9 banks).

Based on this, the Central Bank of Nigeria (CBN) embarked on the consolidation of the banking system that reduced the number of banks from 89 to 25 and raised the capital requirement from N5 to N25 billion. 19 of the banks emerged through mergers and acquisition among 69 banks, while 6 of the banks raised additional capital to meet the new capital requirement. Majority of the banks were under

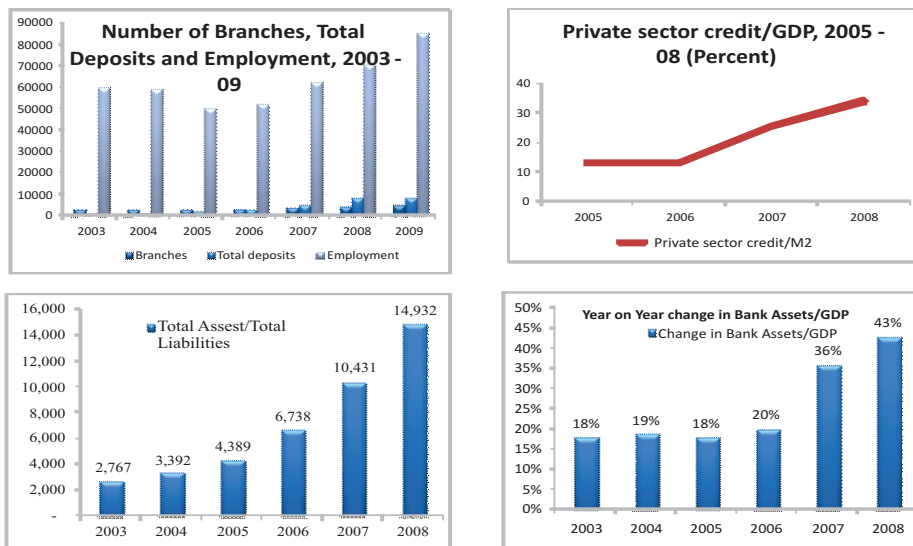
private domestic ownership with the exception of 3 foreign-owned banks operating in the country (Citibank, Stanbic and Standard Chartered). Following the consolidation, banks' balance sheets expanded, most of them venturing into universal banking and expanded cross-border transaction into other African countries, United States and Europe. Credit to the private sector equally increased and all other developmental indicators of the banking sector increased as a result of the consolidation exercise. Financial sector depth (measured by M2/GDP ratio) and intermediation into the private sector (measured by credit to the private sector/GDP) increased substantially (See Table 2 and Figure 1).

**Table 2: Indicators of Financial Development in Nigeria, 2004-2009**

	M2/GDP	Private Sector Credit/GDP	Total NPL	M1/M2
2004	19.8	21	21.9	32
2005	19.3	22	21.6	29
2006	19.8	21	18.2	25
2007	28	31	8.76	20
2008	37	37	6.3	16
June 2009 <sup>4</sup>	44	40	6.6	18

Sources: CBN data and IMF FSI database, 2009

**Figure 1: Financial Development Indicators from Nigerian Banking Sector**



Sources: CBN Annual Reports, various years, author's estimate

<sup>4</sup>Signs of distress in the banking sector are already starting to show as the second round effect of the financial crisis affected the balance sheet of some of the banks.

Credit extension boomed and private sector activities boosted economic growth, underpinned by buoyant oil and non-oil commodity prices<sup>5</sup>. There was a reduction in net interest rate margins driven mainly by reduction in large corporate business and a reduction in Treasury bill rates. Banking sector profitability also declined. Return on assets (ROA) and return on equity (ROE) declined suggesting a more competitive and efficient system.

The banks expanded their balance sheet by more than 60 percent as public confidence in the sector bolstered, evidenced by the increase in deposits. As a result of this growth in the balance sheet and larger capital base, banks were under intense pressure to utilize the funds to provide adequate return to shareholders. The banks established subsidiaries and extended credits in new areas that were previously off limit because of the level of funds required<sup>6</sup>. The banks funded large ticket items that they were not able to fund under the previous capital base. They moved into new untapped areas, banking the unbanked and expanded branch networks. The number of bank branches increased from about 3000 to about 5134 by mid-2009. The ratio of non-performing loans to total loans declined from 18.1 percent post-consolidation to 6.2 at the peak in 2008 and 8.36 in mid-2009 (See Table 2). What happened to competition in the sector?

#### **IV. The Panzar and Rosse Analytical Framework**

In this paper, Panzar and Rosse's (PR) approach is used, which has the advantage of using bank specific data and, therefore, allows control for variables of interest such as size and foreign ownership. The Panzar and Rosse (1977), expanded by Panzar and Rosse (1982) and Panzar and Rosse (1987) methodology uses firm level (bank level) data. It investigates the extent to which a change in factor input prices is reflected in (equilibrium) revenues earned by a specific bank. Specifically, the P-R H statistics is calculated using reduced form of bank revenue equations and measures the sum of the elasticities of the total revenue of the bank with respect to the bank's input prices.

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<sup>5</sup>The global financial crisis and the subsequent decline in the global food and fuel prices have tempered the growth prospects and prompted the Central Bank to intervene in some banks to maintain financial stability.

<sup>6</sup>Areas such as oil exploration, infrastructure and construction

According to the Panzar-Rosse methodology, it is not just the size of the H-statistics that matters, but its magnitude as well. Under a monopolistic structure, an increase in input prices  $P$  will increase marginal cost, thus reducing equilibrium output  $y^*$  and revenue, thereby implying that the H-statistics value be less or equal to zero. In contrast, in a perfectly competitive setting in the long-run, an increase in input prices  $P$  will increase marginal cost as well as average costs by the same proportion, without under certain assumption changing the equilibrium output of banks. As inefficient banks are forced to exit the market, the increased demand faced by the remaining banks leads to an increase in output prices and revenues in the same proportion as costs, thus implying a H-statistics value of unity. In the case of monopolistic competition, an increase in input prices  $P$  will lead to a less than proportional increase in revenue as the demand for bank loans is inelastic. In this case, H-statistics will lie between 0 and 1.

**Table 3: Interpretations of the Panzar and Rosse's H-statistic**

Values of H-statistics	Implied Market Structure
$H \leq 0$	Monopoly Colluding oligopoly, conjectural variations of oligopoly
$0 < H < 1$	Monopolistic Competition
$H = 1$	Perfect Competition Natural monopoly in a perfectly contestable market

The PR approach has been used in several studies that test competition for the European banking industry and emerging markets' banking sector (Buchs and Mathisen, 2005; Claessen and Leaven, 2003). More recently, the approach has also been applied to emerging markets' banking system and in large cross country studies<sup>7</sup> (Table 4 presents a survey of the main results using this approach).

The test is derived from a general banking model which determines equilibrium output and the equilibrium number of banks by maximizing profits at both the bank level and the industry level. Two critical implications exist for this equilibrium model. The first is that at the bank level, profit maximization is assumed

<sup>7</sup>For example see Claessens and Leaven (2003) used the model to study competition in 50 countries including Nigerian banking system before banking consolidation.

$$R^i(y_i, k, v) - C^i(y_i, f_i, q_i) = 0 \quad (1)$$

$R^i$  is the marginal revenue function,  $C^i$  is the marginal cost function  $y_i$  is the output of bank  $i$ ,  $k$  is the number of banks and  $v_i$  and  $q_i$  are exogenous variables that shift the bank's revenue and cost function while  $f_i$  is a vector of bank  $i$ 's factor input prices. All of the variables are expressed in log form. This also implies that the zero profit constraint holds at the industry level.

**Table 4: Studies that Applied Panzar Rosse Model to Banking Industry**

Author	Period	Banking sector Studied	Results
Shafer (1982)	1979	New York	Monopolistic competition
Nathan and Neave (1989)	1982-84	Canada	Perfect Competition (1982); monopolistic completion (1983-1984)
Lloyds-William et al (1991)	1986-88	Japan	Monopoly
Molyneux et al. (1994)	1986-89	France, Germany, Italy, Spain, UK	Monopoly (Italy); Monopolistic competition (France, Germany, Spain and UK)
Vesala (1995)	1985-92	Finland	Monopolistic competition
Bikker and Groeneveld (2000)	1989-96	EU- 15 countries	Monopolistic competition
Coccoresse (1998)	1988-96	Italy	Monopolistic competition
Rime (1999)	1987-94	Switzerland	Monopolistic Competition
De Brandt and Davis (1999)	1992-96	France, Germany, Italy	Large banks: Monopolistic competition in all countries; Small Banks: Monopoly in France and Germany and Monopolistic competition in Italy.
Jiang, (2004)	1992-2002	Hong Kong	Monopolist competition
Cleassens and Leaven (2004)	1994-2001	50 industrialized and developing countries	Monopolistic competition (with larger countries having tending to have lower competition)
Buchs and Mathisen (2005)	1989-2003	Ghana	Monopoly
Pasadila and Milo (2006)	1995-99	Philippines	Large banks: Monopolistic competition; Small banks perfect competition
Greenberg and Simbanegavi (2009)	1992-2007	South Africa	Large Bank: perfect competition; Small banks: Monopolistic competition

**Source:** Claessens and Laeven, 2005, Perera (2006) and author's compilations

Thus the H-statistic is formulated as:

$$H = \sum_{i=0}^n \left( \frac{\partial R}{\partial f_i} \frac{f_i}{R_i} \right) \quad (2)$$

The intuition behind the interpretation of H-statistic rest on economic theory, which

explains how income or revenue reacts to changes in input prices for different market structure. Under monopolistic competition, the change in input prices is greater than the change in revenue, thus H-statistic is expected to be smaller than one but greater than zero. Under perfect competition, the change in input prices leads to an equal change in revenue, therefore H-statistic is expected to be equal to one (see Table 3 above). The P-R method shows that large H values imply a continuous measure of competition.

Two approaches, the “production approach” and the “intermediation approach” have been used in empirical literature in measuring banking sector competition. In this paper, the intermediation approach, which classifies deposits and loan as inputs and output, respectively, is used.

#### IV.1 The Empirical Model

Following Bikker and Haaf (2002), the reduced form revenue model is as follows:

$$\ln(Rit) = \alpha + \beta_1 \ln UPL_{it} + \beta_2 \ln UPF_{it} + \beta_3 \ln UPC_{it} + \gamma \ln RC1_{it} + \gamma \ln RC2_{it} + \delta \ln CUSDEP_{it} \quad (3)$$

where  $R_{it}$  is the ratio of gross interest revenue (or total revenue) to total assets (proxy for output price of loans),  $UPL_{it}$  is the ratio of personnel expenses to total assets (proxy for input price of labor),  $UPF_{it}$  is the ratio of interest expenses to total deposits (proxy for input price of deposits), and  $UPC_{it}$  is the ratio of other operating and administrative expenses to total assets (proxy for input price of equipment/fixed capital). We also include a set of exogenous and bank-specific variables that may shift the revenue schedule. Specifically,  $RC1_{it}$  is the ratio of non-performing loans, and  $RC2_{it}$  is the ratio of net loans to total assets and  $CUSDEP_{it}$  is the ratio of customer deposit to total deposits. All of these variables are in logs, with the coefficients representing their respective elasticities. Based on the model above, the H-statistics can be represented as the sum of:

$$H = \beta_1 + \beta_2 + \beta_3 \quad (4)$$

This measure is based on the idea that competitive firms are price takers and must pass through cost changes to customers, while monopoly can vary output to

maximize profit in the face of higher input prices.

#### **IV.2 Data Description and Definition of Variables**

Annual individual bank level data from Bankscope of 19 out of the 24 deposit money banks (DMBs) in operation from 2000 to 2008 was used. Some banks were dropped due to data unavailability as some of the banks did not exist as an entity prior to the banking consolidation exercise. Given that the data used in the study is from the same industry, operating in the same environment, a common effect model was chosen for the estimation presented in the paper. A panel unbalanced regression was run on pooled cross-section of the 19 banks. All variable used in the regression are in logged form. Specifically, the variables are defined as follows:

$$UPL = \frac{\text{Total Expense}}{\text{Total Assets}}$$

$$UPF = \frac{\text{Interest Expense}}{\text{Total Deposits}}$$

$$UPC = \frac{\text{Other Expense}}{\text{Fixed Assets}}$$

$$RC1 = \frac{\text{Non Performing Loans}}{\text{Total Loans}}$$

$$RC2 = \frac{\text{Net Loan}}{\text{Total Assets}}$$

$$CUSTDEP = \frac{\text{Total Customer Deposits}}{\text{Total Deposits}}$$

The H-statistic test is defined as the sum of the elasticities of equation (3) with respect to input prices (that is, the linear combination of the coefficients ( $\beta_1 + \beta_2 + \beta_3$ ), which are presented along with their joint standard error (SE). In order to test whether there has been a statistically significant increase in competition, the results of the estimation for the pre- consolidation and post-consolidation periods are presented alongside each other with a Wald test of equality of the H-statistics for the two periods. Hausman test suggested that there were no bank-specific

effects, as all banks were operating in the same environment.

### **IV.3. Estimation Results**

The estimation result shows that while consolidation slightly improved the competitive nature of the banking system under the Panzar-Rosse model, the system was not overly competitive. The H-statistics lie between 0 and 1 (see Table 5). Before consolidation, the H-statistics ranged between .45 and .56 depending on the variable included in the study. However, the post-consolidation H-statistics ranged from 0.52 to 0.62, suggesting that consolidation slightly increased competition in the Nigerian banking system, but not to an unhealthy level. This is just with a limited time data after the exercise. A longer term data may likely find higher competition ratio than is currently reported. Consolidation moved the Nigerian Banking sector further in the monopolistically competition region.

This market structure is consistent and similar to what is obtained in similar markets. Studies of the Ghanaian and Kenyan banking sector suggest that they too have H-statistics of .56 and .58 respectively (see Buchs and Mathisen, 2005; Claessens and Laeven, 2003). However, the South African banking sector was found to be more competitive than the Nigerian banking sector, with H-statistics of .75 for all banks and .97 for large banks. Consolidation improved competition slightly allowing banks to perform the important intermediation function of credit extension and other services that promoted economic activities and ultimately growth but not without some imperfection in the system.

The coefficients of the unit prices of labor, capital and funds are all positive, implying the increased factor cost leading to higher revenue for banks. The unit price of labor (UPL) is statistically significant in all specifications with comparable positive elasticities. This suggests that personnel costs are as important as overhead costs, which are relatively high in Nigeria. The over-head cost of the banks operating in Nigeria are relatively high as they have to provide services like power and security, services that are normally public goods provided by the government.

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<sup>8</sup> See Greenberg and Simbanegavi, (2004) "Testing for Competition in the South African Banking Sector"



The dilapidated state of infrastructure is hampering the competitive nature of the banking system.

The unit cost of funds (UPF) is significant in all specifications and has a higher impact on interest revenue than other revenue in the post-consolidation period, probably reflecting the better market responsiveness of the present system. The unit cost of fixed assets (UPC) is a determinant of total revenue, but not of total interest revenue, which may be partly explained by the importance of private money transfers and investment costs (e.g., in ATMs and branches), that were incurred during the period, for which revenues are fee-based.

The non-performing loans ratio (RC1) has a statistically significant positive effect both in the pre-consolidation and post-consolidation period, although the magnitude in post-consolidation is smaller, suggesting that while progress is being made in the cleanup of non-performing loans, more needs to be done in that regard to improve competition in the system.

**Table 5: Empirical Results of the Panzar-Rosse Model for the Nigerian Banking Sector**  
**Regression results**  
**Sample Period: 2000 2004**      **Sample Period: 2004 2008**

Independent Variables	Before Consolidation Total Revenue/Total Assets			Dependent Variables			
	1	2	3	1	2	3	4
Constant	-.159 (-.49)	-	-	.462* (1.99)	-	-	-
UPF	.311** (5.80)	.322** (6.37)	.328** (6.45)	.270** (5.98)	.301** (6.60)	.302** (6.62)	.290** (6.17)
UPL	.102* (1.30)	.132** (2.94)	.123** (2.84)	.111* (1.84)	.193** (4.19)	.191** (4.18)	.206** (4.27)
UPC	.080* (1.04)	.085* (1.11)	.072 (2.93)	.143** (2.69)	.115** (2.02)	.112** (2.02)	.125** (2.23)
RCI	.056* (1.78)	.056* (1.77)	.060* (1.78)	.024* (1.11)	.028* (1.22)	.028* (1.22)	.023 (.977)
RC2	.259** (2.49)	.272** (2.68)	.278** (2.70)	.266** (3.69)	.296* (4.02)	.300** (4.24)	.275 (3.53)
CUSTDEP	-.37719 (-.65)	-.349 (-.60)	-	.037 (.278)	.031 (.229)	-	.036 (.27)
AR(1)	.309 (1.64)	.339* (1.81)	.382** (2.15)	.275** (2.14)	.340** (2.71)	.351** (2.86)	.32** (2.51)
Size							-.057 (-.82)

H-statistics	.493	.521	.523	.524	.609	.605	.621
<b>Market Structure Wald Test</b>							
<b>Test for H=0</b>	Reject at 5%	Reject at 5%	Reject at 5%	Reject at 5%	Reject at 5%	Reject at 5%	Reject at 5%
F-Test	(P=0.00)	(p=0.00)	(p=0.00)	(p=0.00)	(p=0.00)	(p=0.00)	(p=0.00)
<b>Test for <math>0 \leq H \leq 1</math></b>	Not Reject	Not Reject	Not Reject	Not Reject	Not Reject	Not Reject	Not
Reject	at 5%	at 5%	at 5%	at 5%	at 5%	at 5%	at 5%
F-Test	(p=.5803)	(p=.3765)	(p=.6023)	(p=.5808)	(p=.6032)	(p=.3790)	(p=.7099)
<b>Test for H=1</b>	Reject at 5%	Reject at 5%	Reject at 5%	Reject at 5%	Reject at 5%	Reject at 5%	Reject at 5%
F-Test	(p=0.00)	(p=0.00)	(p=0.00)	(p=0.00)	(p=0.00)	(p=0.00)	(p=0.00)
Adjusted R <sup>2</sup>	.777	.775	.773	.681	.662	.662	.665
DW Statistics	1.52	1.53	1.46	2.22	2.25	2.25	2.26
Number of Observations	38	38	38	72	72	72	72

## **V. Conclusion**

Competition is as important in banking as in any other industry. Competition has implications for efficiency, innovation, pricing, availability of choice, consumer welfare, and the allocation of resources in the economy. The functions of the banking system, including providing a payments and settlements system, mechanisms for borrowing and lending, and pooling and allocation of funds, among others, impinge on all aspects of the economy and are central to the overall performance of the economy. The efficacy of the financial system in performing these functions is a major ingredient of the efficacy of the economy as a whole. Given the pivotal role of banking in an economy, the role of competition in this industry is particularly important. Banks are important for economic development. Therefore, it is imperative that the banking sector faces a reasonable level of competition. This will both help to create a fully functioning credit system as well as strengthen the effectiveness of monetary policy. Banks contribute to economic growth not by producing real goods, but by providing the financial services to facilitate production in other industries. A competitive and efficient banking sector will make the largest contribution to economic growth.

This paper has used the P-R methodology to test for the level of competition in the Nigerian banking sector, before and after banking consolidation exercise. The study suggests that consolidation improved competition only slightly and that competitive policies should continue to remain a focus of policy objective in the Nigerian financial sector to promote economic growth and to create an inclusive financial sector that is able to perform its intermediation functions.

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