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MARKET CONCENTRATION AND PROFITABILITY IN NIGERIAN BANKING INDUSTRY: EVIDENCE FROM ERROR CORRECTION MODELING

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Abstract

Nigerian banking industry has undergone a number of substantial reforms including structural and conduct regulations. This structural regulation may tend to make entry difficult, and may tend to protect incumbent firms from competitive pressure. In the long run; it may lead to a concentrated industry/market. This study therefore examined the effect of market concentration on bank profitability in Nigerian banking industry using time series data from 1991 -2012. Error correction mechanism (ECM) was employed, after conducting Co-integration test; to analyze the data sourced from Central bank of Nigeria and Annual report and Accounts of banks. The study used the Return on Capital Employed (ROCE) as a proxy for Bank profitability, which is the dependent variable. Texas ratio (TR), Number of bank branches (NOB),Earnings Power Ratio (EPR), and Concentration Ratio (CRL), serve as the independent variables The overall results rejected the market power hypothesis which states that market concentration increases bank profitability. It was concluded that the policies which aimed at reducing barriers to competition would be expected to benefit the banking industry without harming the consumers, however; a policy designed which aimed at achieving de-concentration should be surveyed with skepticism.

Keywords: Concentration, Bank profitability, Texas ratio, Banking, ROCE

INTRODUCTION

One of the best ways to examine market power within a particular industry /or market is to measure the level of concentration. When there are only a few relatively large firms in a market, we say that the market structure is concentrated. Concentration implies the existence of market power (Brux, 2008). The links between market structure and the conduct and performance of firms have its traditional basis from the SCP (Structure-Conduct-Performance) Paradigm. The SCP assumes there is a causal relationship running from the structure of the market (for example, firm concentration) to the firm's pricing behavior, the firm profit and degree of market power.

The performance of firms has always been one of the central research themes in industrial organization. This body of empirical research that seeks to explain reasons for variation in performance commonly measured performance using profitability ratios (see Bain, 1951; Collins and Preston, 1966; Slade, 2004). Theoretically, the neoclassicists assume high or abnormal profits are the result of the abuse of market power (Market power hypothesis) while the Chicago school argued that abnormal profit may be the result of cost advantages or productive efficiency on the part of certain firms which lead to monopoly status by way of cutting price and pushing rivals out of the industry (Efficiency hypothesis). Hence, market power should not be seen as detrimental to the interests of the consumers. This is well supported by the Schumpeterian view of reward for innovating firms (Lipczynski, Wilson and Goddard, 2009). The Schumpeterian hypothesis states that market power and monopoly status should be interpreted as the reward for successful innovation. For some period, the successful innovating firm becomes a monopoly supplier of a new product which it produces at lower costs than its rivals, perhaps capturing some or all of their market shares by setting a price they are unable to match. This market power is temporary, because new technology will come up which will supersede the old technology. Hence, the monopolistic power disappears (Lipczynski *et al,* 2009; Ajide, 2014).

It is important to note that Nigerian banking industry has undergone a lot of financial reforms. The Industry was deregulated in 1986 and the number of banks increased to over 100, many of the new entrants was characterized by weak capitalization and poor management quality. There was also a weak regulatory supervision. All of these led to the collapse of some of the new banks in the industry. By 2003, there were about 89 banks left. However, by 2005, the consolidation plan raised minimum Shareholders' Fund for banks in the country to N25bn from N2bn which came with incentives for banks in the country to consolidate through mergers and acquisitions. This arrangement sought to encourage banks to play active development roles in the Nigerian economy, and at the same time, to be competent and competitive players in both

Africa and the globe. However, it is also important to note that all these reforms would have changed the structure of the banking industry (Ajide, 2014; Elumelu, 2005).

The enthusiasm for this study stems from the dearth of specific studies that have examined the relationship between market concentration and bank profitability in Nigeria. For instance, the Nigerian banking consolidation period corresponds to a period characterized by substantial reform to restructure and consolidate the banking into a market-driven based economy, and to further liberalize and deregulate sufficiently the systems in order to integrate economically with the international financial market. However, both structural and conduct regulations had been experienced in Nigerian banking industry. Structural regulation focused on market structure, featured with the functional separation of firms into complementary activities (for example, caving out microfinance bank from the conventional commercial banking functions), restrictions on entry and rules regarding the operation of foreign banks. This structural regulation may tend to make entry difficult, and may tend to protect the incumbent firms from competitive pressure which might have significant impact on bank s' profitability.

The scanty empirical studies (see Babalola, 2012; Obamuyi, 2013; Adeusi, et al.,2014; Berger et al., 1987; Barajas et al., 1999; Naceur and Goaied, 2001; Naceur, 2003; Athanasoglou et al., 2006; Behname, 2012; Bourke, 1989; Molyneux and Thornton, 1992; Demirgüç-Kunt and Huizinga, 1999; Abreu and Mendes, 2002) have used available data for selected banks to examine the relationship between bank profitability and its determinants with only few of them pay attentions to specific effect of market concentration on banks' profitability.

Therefore, this study contributes to the existing literature by empirically re-confirming (or otherwise) the results of the previous studies, especially with regard to Nigeria's situation. The uniqueness of this study is that; it examines the effect of market concentration on bank profitability using error correction modeling with time series data at industrial level from 1991-2012. This study intends to rigorously look at these components together and discuss their consequences in a developing country like Nigeria. The rest of this paper is sectioned as followed, thus; literature review, Methodology, discussion of results and conclusion ends the discussion.

LITERATURE REVIEW

Traditionally, there are two main ways of analyzing the banking industry concentrated features within the rim of the structural approach: the "Structure-Conduct-Performance Hypothesis" (SCP) and the "Efficient Structure Hypothesis" (ESH). Also, the market structure of an industry can be evaluated using market shares of individual firms, concentration ratios (CR), or a Hirschman–Herfindahl index(HHI). The SCP hypothesis measures the degree of competition in

an industry from its structural features (Bain, 1951). It assumes that the concentration in the market can lead to market power, which makes banks to earn monopolistic or abnormal profits by offering lower deposit rates and charging higher loan rates. On the other hand, Demsetz (1973) suggests Efficient Structure Hypothesis (ESH) and states that the positive relationship between profitability and market concentration is not a consequence of market power but due to the greater efficiency of firms with larger market share. Alternatively, the "Contestable Market Theory (CMT)", states that individual banks that make up an industry may behave differently depending on the market structure in which they operate. This theory was developed by Baumol (1982) who declares that a concentrated industry can behave competitively when there are no (or low) barriers for new entrants to enter the market. These arrangements imply that a concentrated market can be competitive even if it is dominated by a few large banks. Therefore, policymakers should be relatively less concerned when the financial system is dominated by few financial intermediaries if the financial market is contestable. These assertions is consistent with Allen and Gale (2000) who have shown that a few large banks with extensive branch networks can provide a more competitive outcome than a unitary banking system in an environment with switching costs: a large-branch bank has less of an incentive to exploit the "locked-in" value of clients, because it is always competing for the clients" future business in another product or location.

Empirically, few studies have made an attempt to examine the relationship between bank profitability and its determinants (see Chirwa, 2003; Babalola, 2012;Obamuyi, 2013; Osuagwu, 2014; Berger et al., 1987; Barajas et al., 1999; Naceur and Goaied, 2001; Naceur, 2003; Athanasoglou et al., 2006;Behname, 2012; Bourke, 1989; Molyneux and Thornton, 1992; Demirgüç-Kunt and Huizinga, 1999; Abreu and Mendes, 2002 etc), but only few of them have empirically considered market concentration as one of the major determinants of bank profitability. For instance, Chirwa (2003) examined the relationship between market structure and bank profitability in Malawi using time-series data between 1970- 1994. The study employed co-integration and error correction techniques, the findings supported the traditional collusion hypothesis of a long-run positive relationship between concentration and performance. Aburime (2008) investigated the determinants of bank profitability, using a panel data from 1980-2006. His finding showed that banking sector development, stock market development, and financial structure are insignificant on bank profitability while real interest rates, inflation, monetary policy, and exchange rate regime are significant macroeconomic determinants of bank profitability. A study by Oladele, Sulaimon and Akeke (2012) found that operating expense; relationship between cost and income, and equity to total assets significantly affects the performance of banks in Nigeria.

Furthermore, Babalola (2012) used four models with an aggregated model coupled with three other decomposed models to investigate the determinants of profitability in Nigeria. His findings showed that in the short run, capital adequacy ratio is the determining factor for bank profitability. A study conducted by Obamuyi (2013) investigated the effects of bank capital, bank size, expense management, interest income and the economic condition on banks' profitability in Nigeria. The fixed effect regression model was employed on a panel data obtained the annual reports and accounts of 20 banks from 2006 to 2012. Findings indicate that improved bank capital and interest income, as well as efficient expenses management and favourable economic condition, contribute to higher banks' performance and growth in Nigeria.

Adeusi, et al. (2014) examined factors influencing profitability level of commercial banks in Nigeria. Panel data method was employed from 2000 to 2013 on a sample of fourteen banks. Profitability is measured with return on assets as a function of capital adequacy ratio, asset quality, management efficiency, liquidity ratio, inflation, and economic growth. The results showed that asset quality, management efficiency, and economic growth are the determinants of commercial banks' profitability. Another study was carried out by Osuagwu (2014) who investigated the determinants of bank profitability in the light of bank specific variables, industry related factors and macroeconomic influences, using a panel of selected banks in Nigeria. He found that bank profitability is largely determined by credit risk. Market concentration is significant as a determinant of bank profitability. There is no evidence of structure-conduct-performance hypothesis, however empirical results show that there is no collusive behavior amongst banks. Exchange rate is significant as a determinant of bank profitability through return on equity and non-interest margin, but not significant to return on asset as a measure of profitability.

In a nutshell, the review shows that only scanty empirical research, using available data for selected banks are used to examine the relationship between bank profitability and its determinants in Nigeria. Therefore, this study contributes to the literature by empirically re-confirming (or otherwise) the results of the previous studies, especially with regard to Nigeria's situation. By examining the effect of market concentration on bank profitability using error correction modeling with time series data at industrial level.

METHODOLOGY

This study employed secondary data for the period of 1991-2012, which were obtained from the Nigeria stock exchange Annual report, Central Bank of Nigeria Statistical Bulletin, Fact Book and annual report and accounts for commercial banks in Nigeria.

In order to determine the relationship between the concentration and bank profitability in Nigeria, co-integration and error correction mechanism were employed to analyze the data obtained. Thus, we use the Average Return on Capital Employed (ROCE) as a proxy for Bank profitability, which is our dependent variable. Average Texas ratio (TR), Number of bank branches (NOB), Average Earnings Power Ratio (EPR), and Concentration Ratio-Loan (CRL), serve as the independent variables. The variable of interest is the concentration ratio (CRL) which is measured as Bank concentration index of the highest three (CR_3). Total Loans was used for the measurement. CR_k is computed as the sum of top k^{th}-tier firms′ market shares and summing only the market shares of the *k* largest banks in the market, it takes the form:

$$CR_k = \sum_{i=1}^{k} S_i$$

Where S_i , is the ratio of the Loan of the first-three largest banks to total Loan in the banking industry in Nigeria. CR_k is a relatively strong measure because it clearly catches the market structure through market shares of a few dominating firms. This index is based on the idea that the behavior of a market is dominated by a small number of large banks. The CR_k index is very useful to examine the market influence of a few dominating firms in the market. In line with market power hypothesis, it is expected that there would be positive relationship between market concentration and bank profitability.

Three control variables such as risk (Texas ratio) measured by Non-performing loan/(Tangible Capital employed+ Loan Loss Provision),Earnings Power Ratio measured by Gross income/ Average Total Asset and the bank network measured by Number of Registered bank branches(NOB) have been incorporated in the model. Hence, the study also expects that the higher the expansion of bank's network, the higher the profitability of banks. However, the business of financial intermediation is exposed to various forms of risk such as credit risk. In this manner, the traditional risk-return proposition suggests a positive relationship between risk and bank profitability. Hence, we expect positive relationship between Texas Ratio (TR) and bank profitability. The Earnings Power Ratio measures the income earned per naira asset employed, that is, the productivity of naira asset employed. We expect positive relationship between bank profitability and earnings power ratio. The model for the study is therefore specified as below:

$$\boldsymbol{ROCE = F(CRL, TR, EPR, NOB)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

To explore long-run relationship between market concentration and bank profitability, the following econometric models is specified:

$$\Delta \boldsymbol{ROCE_t} = \alpha_0 + \alpha_1 \Delta \boldsymbol{CRL_t} + \alpha_2 \Delta \boldsymbol{TR_t} + \alpha_3 \Delta \boldsymbol{EPR_t} + \alpha_4 \Delta \boldsymbol{NOB_t} + \mu_t \ldots\ldots\ldots\ldots (2)$$

$\Delta\, represents\ first\ differencing$, and μ_t is the error term

To capture both the short-run relationship between the time series variable of interest and their corresponding long-run Equilibrium relations, the following models were to be estimated.

$$\Delta \boldsymbol{ROCE}_t = \propto_0 + \sum_{i=1}^{k} \prod_i \Delta \boldsymbol{ROCE}_{t-1} + \sum_{i=1}^{k} \boldsymbol{\alpha_1}\, \Delta \boldsymbol{CRL_{t-1}} + \sum_{i=1}^{k} \alpha_2\ \Delta \boldsymbol{TR}_{t-1} + \sum_{i=1}^{k} \alpha_3\, \Delta \boldsymbol{EPR}_{t-1}$$
$$+ \sum_{i=1}^{k} \alpha_4\, \Delta \boldsymbol{NOB_{t-1}} + \gamma_1 \boldsymbol{ECM}_{t-1} + \epsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (\mathbf{3})$$

The ECM is the error correction term. The coefficient of the error correction term measures the speed of adjustment toward the long run equation and is expected to be negative. ϵ_t is the white noise. It is expected that $\alpha_1, \alpha_2, \alpha_3, \alpha_4 > 0$

EMPIRICAL RESULTS AND DISCUSSION

This section empirically investigates the impact of market concentration on bank profitability in Nigeria(1991-2012) using co-integration and error correction technique to determine the relationship between the dependent and independent variables.

Statistical Properties of the Data Series

The unit root test results were reported in Table 1 after using the Augmented Dickey-Fuller (ADF) with intercept only. The decision rule is that the ADF test statistic value must be greater than the Mackinnon critical value at 5% (in absolute value).

Table 1: Augmented Dickey Fuller rest results for the series of variables

	ADF test at Level		ADF test at First Differences		Remarks
Variables	**ADF statistic**	**Critical Value(at 5%)**	**ADF statistic**	**Critical Value(at 5%)**	
CRL	-0.4485	-3.01236	-3.313	-3.02068	**I(1)**
EPR	-2.2223	-3.01236	-6.491	-3.02068	**I(1)**
NOB	-1.2765	-3.01236	-4.265	-3.02068	**I(1)**
ROCE	-2.7427	-3.01236	-5.883	-3.02068	**I(1)**
TR	-1.2275	-3.01236	-3.026	-3.02068	**I(1)**

From Table 1, it could be evidenced that all the variables were non- stationary at level because they had their Augmented Dickey Fuller (ADF) statistics less than Mackinnon critical value at 5%. This led to the testing for stationarity at first difference. Also, as shown in the Table 1, the five variables are stationary at first difference. That is, integrated of order one **I(1),** because they

have their respective ADF statistics greater than Mackinnon critical value at 5%. As evidenced from the unit root test, the variables would have a long run relationship. That is, they are cointegrated in the long run. We therefore proceed to test for cointegration.

Test for Co-integration

We therefore tested for possible cointegration among these variables by employing the Engle and Granger two –steps method. The ECM will enable the derivation of both short run and long run properties of the model which other estimation techniques lacked except lags are forced into them. Co-integration establishes the stationarity of the residuals generated from running a static regression at levels of the regressors (independent variables) on the regressed (dependent variables).

Table 2: Co-integration residual stationary test result

Null Hypothesis: RESIDUAL has a unit root		Critical Values	
ADF Statistic	P-Value*	1% level	-3.78803
-5.832963	0.0001	5% level	-3.01236
*MacKinnon (1996) one-sided p-values.		10% level	-2.64612

Table 2 report the cointegration test conducted. We carried out the co-integration test by first conducting the regression of the variables at levels and the residual series was obtained. Hence, the residual series was subjected to ADF test at level. The result of ADF co-integration tests presented suggests that the ADF coefficient is significant at 5% level of significance. The value of ADF test statistic is -5.832963 which by all indications is greater than the critical value of -3.01236 at 5% level of significance and the critical value of -3.78803 of 1% significance level.

Short-Run Error Correction Resolution of the Model

The technique adopted is derived parsimonious error correction model by adopting the general to specific (GTS) methodology. The lag period has been consciously chosen to enable a robust identification of the main dynamic patterns in the models and to avoid unwarranted restriction that a too short lag length could generate. The interpretation of an over-parameterized model appears difficult to interpret; this has thus informed its reduction to a parsimonious model. The reduction is carried out by removing the variables with insignificant coefficients successively based on the imposition on those variables with zero coefficients as they bear low t-statistics or high probability values. The criterion of maximum R- squared and Akaike criterion were also applied in selecting the parsimonious model.

Effect of Market Concentration on Bank profitability

The result of parsimonious model of the effect of market concentration on bank profitability is presented in Table 3. The result of model shows that the two-year period lag of the concentration is negatively related to the contemporaneous value of current bank profitability. The variable of one-year period lag of concentration ratio is negatively related to bank profitability and bears a coefficient of -11.44457, implying that a 1 percent increases in market concentration would reduce bank profitability by 11.4 percent, on average. We therefore conclude that market concentration has proven to have a negative impact on bank profitability in Nigeria. It should be noted that this impact is even instantaneous because the current value of market concentration is also significant (-19.797, p-value <0.1). This result is contrary to our aprior expectation and cannot be surprising. The best – managed firms would have the lower costs then they have the larger market share. This high share leads to higher concentration, this means the relationship between performance and competition could be inverse (Demsetz, 1973).Also, the variable of CRL shows market structure, it follows that if the market structure goes to collusion or monopoly, profitability would decrease (Behname, 2012). A negative value of the market share variable signals that an average of smaller banks is being more profitable than larger ones. This result is consistent with Garcia-Herrera (1997), Chortareas et al (2010) and Behname (2012) who have obtained similar results, but the result is not consistent with the findings of Chirwa (2003) who have employed co-integration and error correction techniques to examine the relationship between market structure and bank profitability in Malawi using time-series data between 1970- 1994. This means that policy makers need to always make a robust and reasonable forecast when making decision on bank consolidation policy because the present decision will have a lot of future implications in the industry.

Table 3: Parsimonious error correction Modeling by OLS

Dependent Variable: D(ROCE)

Variables	Coefficient	std Error	t-statistic	P-Value
C	-0.192421	0.828581	-0.232229	0.8216
D(CRL)	-19.797	9.154467	-2.16255	0.0588***
D(TR)	-1.920479	1.969354	-0.975182	0.355
D(EPR)	0.451761	0.249291	1.812188	0.1034
D(NOB)	0.137134	0.052277	2.623232	0.0277**
D(CRL(-1),2)	-11.44457	8.321756	-1.375259	0.2023
D(CRL(-2),2)	-14.76922	7.87774	-1.874805	0.0936***
D(NOB(-1),2)	-0.122153	0.034923	-3.497814	0.0067*
ECM(-1)	-0.839268	0.278392	-3.014702	0.0146**

Akaike info crit.	5.260026	*R-squared*	*0.91207*	DW	1.786455
Schwarz crit.	5.705212	*Adjusted R-squared*	*0.83391*		
Hannan-Q	5.321411	*F-statistic*	*11.66928*		
Mean dep. Var.	-0.601852	*Prob(F-statistic)*	*0.000634*		
Std dep. Var	7.065764				

*,**, *** significant at 1%, 5%, 10%

It is very important to note that the a year and a two year lag variables of TR had been eliminated in the process of model reducing due to the insignificant nature of the coefficients. The current value of TR is negative and also insignificant. It means that negative relationship exists between credit risk and bank profitability. If credit risk increases by 1 percent, bank profitability will reduce by 1.92 percent, but insignificant in determination of bank profitability in Nigeria. The NOB variable measures the bank branch network of Nigerian banks. The coefficient of this variable is positive, which follows our apriori expectation. That is, the wider the network of banks, the higher the profitability. The coefficient of EPR is also positive; EPR measures the earnings power of Nigerian Banks. A 1-percent increases in EPR means that bank profitability will increase by 0.45 percent, on average.

Statistically, the overall goodness of the model as shown by the adjusted coefficient of determination(adjusted R-squared) is 0.83, which shows that the variations in the dependent variable as explained by the independent variables is about 83%, after taking the degree of freedom into consideration. The coefficient of error correction terms (ECM) is negatively signed and also significant (-0.839, p-value<0.01). Its magnitude of 0.839 implies that about 84 percent of the previous year disequilibrium in bank profitability is adjusted for in the following year. This means that, to a greater extent, the bank profitability is endogenously determined in Nigeria.

CONCLUSION

This study examined the effect of market concentration on bank profitability in Nigerian banking industry using time series data from year 1991 -2012. Error correction modeling was employed to analyze the data. The overall results rejected the market power hypothesis (simply called collusion hypothesis) which states that as market concentration increases bank profitability would as well increase. The results contradict our expectations of increased market power that could have possibly come from the banks' collusion and a corresponding increase in the level of concentration which could, in turn; increase bank profitability. By implication, the policies which aim at reducing barriers to competition would be expected to benefit the banking industry without being harmful to consumers, however; a policy designed which aims at achieving de-concentration should be surveyed with skepticism. The policy makers need to always make a robust and reasonable forecast when making decision on bank consolidation policy because the present decision will have a lot of future implications in the industry.

This study used only one country (Nigeria) as a case study. From this basis, other researchers can look at the dynamic relationship between market structure and bank profitability. They can as well examine the implications of the banking structure to other sectors of the economy.

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