

Does Economies of Scale Exist in The Nigerian Banking Industry? An Empirical Investigation.

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ABSTRACT

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The objective of the paper is to investigate whether or not economies of scale exist in the Nigerian banking industry. Aggregate annual data on 22 commercial banks covering the period from 2004 to 2013 were analysed using the ordinary least squares estimation technique to achieve the objective. The empirical evidence indicates that economies of scale does exist in the Nigerian banking industry as investment which is a major component of banks' assets (proxy for bank size) is observed to be positively and significantly related to unit operating cost of the banks. Thus expansion in bank size is associated with reduction in operating cost in Nigeria. As a measure to reduce operating cost which invariably translates into reduction in cost of loanable funds (lending interest rate), the paper proffers as recommendation for policy, efforts by the banking industry and its regulators to expand the size of the banks operating in the country (by way of greater investments) as this would translate into reduction in the operating cost as well reduction in lending interest rate which is favourable to domestic investment.

KEYWORDS: *Economies of Scale, Banking Industry, Commercial Banks*

Introduction

Economies of scale refers to a decrease in long run average (unit) costs of production over a range of output, that results from an increase in the size or scale of a company's operations (Gjirja, 2005). It is the reduction in the average cost of a product in the long-run, which resulted from an increased level of output. Koutsoyiannis (1985) also defined economies of scale as economies that arise from the firm increasing its plant size. Economies of scale, according to Pearce (1985), are the reduction in the average cost of a product in the long-run, which resulted from an increased level of output. Economies of scale in the banking industry can therefore be defined as the reduction in the unit (average) cost of banks resulting from

expansion in their sizes as measured by the value of their total assets.

The Nigerian banking industry has experienced dramatic changes over the last two decades. Deregulation, financial innovations and automation have been the major forces driving the performance of banks in the sector; and inducing stiff competition. Competition and inflation in the economy continue to weaken the banks' capital structure and their ability to finance big developmental projects. According to Soludo (2005), Nigerian banks were weak in both capital and size and as a result were not positioned to finance the country's productive sector. Small size he argued, made the banks weak and inefficient in financing real development, and also responsible

for their high cost of operation which ultimately snow-balled into high cost of providing banking services (high interest rates). This was inimical to private sector borrowing for investment. Domestic production of goods and services were thus adversely affected. He argues that if banks are allowed to grow significantly in size, it might improve their cost efficiency which could result in a 'lowering' of their charges, and improvement in performance; which we in this study accept as 'effectiveness'. Thus, the Central Bank called on banks to increase their sizes in order to reap economies of scale and post higher level of performance in certain key functions.

The call has made many banking scholars to wonder whether indeed economies of scale exist in the banking sector, and if it exists, to what extent? What really is the cost per unit and whether it can fall with increasing volume of loans. If cost per unit of bank loan is reduced, it follows that banks will be able to reduce their charges to customers. That is interest rates will be reduced. If this happens, entrepreneurs will be able to obtain more bank loans at more affordable rates. This in itself will lead to increased investment, which will generate greater output in the economy. The average cost of producing an economic good or service is expected to decrease as the firm producing the commodity increases in size. This is in compliance with the principles of 'economies of scale', which is widely acknowledged in economic literature. However, the extent and magnitude of the decline has been the subject of controversy in the literature.

The subject of economies of scale in the banking industry in Nigeria has been investigated by many scholars, particularly Lawal (1989), Ojo (1992), and both reported insignificant presence of economies of scale. These studies however were not robust enough in their methods of analysis; hence the low level of scale economies reported.

2. Literature Review

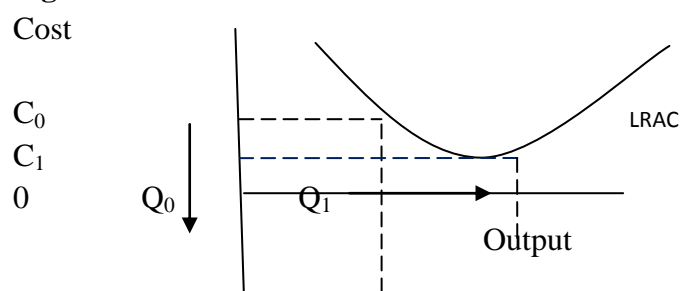
2.1 Theoretical Literature

2.1.1 Economies of Scale

Samuelson (1970) points out that the relationship between a firm's long-run average cost and its level of output follows either of three cost patterns. Its long-run average cost may stay the same as the quantity of output changes resulting in *constant return to scale*. This occurs, for example, if output doubles when all inputs are doubled. If the firm's long-run average cost rises as the quantity of output increases, the firm is said to have *diseconomies of scale*. If the firm's long-run average cost falls as the quantity of output increases, the firm is said to exhibit *economies of scale*. Economies of scale exist then when the average production cost of a product decreases as the number of units produced increases. There is, therefore, an inverse relationship between the per unit cost of the product or service and the amount of production or amount of service provided.

When costs fall indefinitely, without limit, at all output levels, then it is efficient for one firm to produce output for the entire industry. If it is efficient for only one firm to produce the entire industry output, a *natural monopoly* is said to exist. However as Carlton and Perloff (1990) points out, a pattern of unlimited decreasing average cost may be unrealistic in general for a wide range of industries. Ultimately the economies of scale will be exhausted causing the cost curve to level out and eventually turn upward. The existence of scale economies is illustrated graphically in figure 2.1 below using the long-run average cost curve.

Figure 2.1 – Illustration of Economies of Scale



As quantity of production increases from Q_0 to Q_1 , the average cost of each unit decreases from C_0 to C_1 .

Johnston (1960) in Carlton and Perloff (1990) estimated cost curves for a number of manufacturing firms and found that they tended to be U-shaped. This means that initially, there are large advantages to size, but eventually those economies diminish and the average costs remain relatively constant and there- after, begins to rise with further increases in output.

In micro economics, economies of scale are the cost advantages that an enterprise obtains due to expansion. There are factors that cause a producer's average cost per unit to fall as the scale of output is increased. These include bulk buying of materials through long-term contracts; increasing specialization of managers; having access to financial markets and using greater range of financial instruments; having a greater reach to market and technological advancement. Each of these factors reduces the long run average costs (LRAC) of production by shifting the short-run average total cost (SRATC) curve down and to the right.

Put simply, economies of scale are long run concepts and refer to reductions in unit cost as the size of a facility and the usage levels of other inputs increases. It is a situation where the long-run average unit cost of production in a firm declines as the size of the firm's productive capacity increases. That is, the tendency for the cost curve to fall downward to the right as the scale of the firm is increased. Economies of scale may be achieved by increasing the size of the plant or by increasing the number of plants in the firm (Lawal, 1989).

2.1.2 Estimating Economies of Scale:

According to Gregory (2000), there are essentially three methods for empirically estimating the optimal firm size in an industry. They include

the statistical cost or production function method, the engineering analysis method, and the survivorship method. All have been used extensively in the economic literature to investigate the relationship between firm size and efficiency, and each has its own advantages and disadvantages.

In the statistical cost or production function study, which we will limit ourselves to in this study, the actual recorded costs, outputs and other characteristics of firms of varying sizes are compared, to empirically examine the production process. Either time series or cross-sectional data are compiled for a wide range of firm sizes, and a production or cost function is constructed to evaluate the production process. Statistical techniques are then used to estimate the relationship between inputs and outputs to determine whether there are constant, increasing or decreasing returns to scale. The main advantage of this method is the ability to apply rigorous econometric techniques to the data across a range of firms' sizes while its limitation is the difficulty in obtaining accurate and consistent data of the firms under study.

2.2 The Banking Firm and Economies of Scale

Mason (2001) stated that a bank is a firm that provides financial services, particularly loans and advances. It is a financial intermediary. It intermediates between the surplus (ultimate savers) and the deficit (ultimate borrowers) sectors of the economy. In simple language, the bank is engaged in borrowing and lending (Wang 2003). In carrying out these activities, it is expected that a surplus will be made over the running costs of operations. The bank takes deposits from those who have surplus money at a rate of interest, that is deposit interest rate. These deposits are accumulated and loaned to those who are in need of funds, also at interest rates (that is, lending interest rate) which is high enough to take care of all costs and still have a margin, which

represents profit. The bank therefore has a major role to play in fixing deposits and lending rates. If the deposits rate is too low, it is expected that the flow of funds to the banks will be decreased. Also, if the lending rate is too high, it will deter customers from borrowing. A special banking skill is therefore required in this area.

Kuroda and Kaneko (1986) state that the bank is a firm that produces loans (in its various types) and other “off balance sheet” (OBS) products. Loans, overdrafts, advances, and investments have been aggregated into one as loans, while “off balance sheet” items represent other banking incidental services such as contingent liabilities, transfers, commission on turnovers etc. However these outputs are produced by engaging certain inputs.

According to Wheelock and Wilson (2009), the banking firm engages inputs such as deposits, labour and capital to produce outputs. The input-output relation implied in this case is slightly different from what operates in the manufacturing industry and public utilities. While the emphasis in the manufacturing industry and public utilities is on durable capital inputs at low levels of output to achieve economies of scale, this is not the case in banking where the issue impinges on the efficient utilization of labour resources among other considerations. This is because banking is a pre-dominantly labour intensive industry, especially in the developing countries. Banking products vary slightly from one bank to another. According to Ojo (1979), there are financial and non-financial services. The financial services include lending, which according to Greenbaum (1967) accounts for approximately 90 percent of the banking system current earnings; investment in financial securities and deposits (time and fixed) generation. The non-financial services include loan syndication and stock brokerage operations.

Another important item that affects the banking firm in its productive activities is its structure.

This takes different forms depending on the types of banking system operating in the country, whether it is branch banking system which operates a network of branches across a nation or the unit banking system, which is based on localized operation within a small geographical area. Whichever system that is in operation, the bank will always seek an optimal banking structure. An optimal banking structure according to Greenbaum (1967) is that which is characterized by maximum productive efficiency and allocative neutrality. This means that the overall allocation of resources in the economy would not be appreciably influenced by any peculiarity of the banking structure and that there would be maximum response to technological and demand oriented changes such as automation of the banking system.

Mester (2005), Mckillop et al. (1995), Hughes and Mester (2011) state that scale economies should be measured with respect to bank costs and refer to how the bank’s scale of operations (its size) is related to cost - what percentage increase in costs occurs with a one percent increases in scale of production. A firm is enjoying economies of scale if an increase in scale of operation leads to a less than proportionate increase in cost. In this case, we would be thinking of the optimal combination of products to minimize cost. In a cost function, variable costs depend on the prices of variable inputs, the quantity of variable outputs, any fixed inputs or outputs as well as an error term. This function describes the average relationship between costs, outputs, and input prices. Following from the above, banks enjoy economies of scale derived from the diversification of risk obtained from a larger portfolio of loans and a larger base of deposits (Mester and Moon 1996, 2000).

Mason (2001) posits that bank performance varies with size, location and, loan portfolio mix. Small banks are better at relationship banking than large

banks due to superior information and greater discretion in applying information. Furthermore, Brickley, Linck, and Smith (2000) found that small locally owned banks have a comparative advantage over branch banks of large banks in some environments.

However, beyond location and in general terms, does size play a role in the performance of a bank? In other words do economies of scale exist in the banking industry in Nigeria? Do the long run average costs of banks, fall as the loans, investments and “off balance sheet items” of the bank increase?

2.3. Determinants of Operating Cost in the Nigerian Banking Industry

Now, what are those factors in the bank balance sheet that make the bank to incur cost in its operations? Also, what are those assets in the bank balance sheet that make them to earn income?

To answer these questions, a look at the operation of banks in Nigeria may help.

Mix-banking system had been in operation in Nigeria up till 2001. Then the country had commercial banks, merchant banks and the community banks which later metamorphose into micro-finance banks. The commercial banks were mainly into retail banking with branches spread all over the country, particularly in the major business zones. Because of their good network system, they became the bedrock of the nation's payment system. The merchant banks specialized in wholesale banking. They had few branches and concentrated on corporate customers. The microfinance and community banks were mainly unit banks. Their activities were more noticeable in the rural areas where the commercial and merchant banks were not very active.

However, in 2001, Nigeria introduced the universal banking system, whereby banks were allowed to engage in array of commercial and merchant and other non - bank financial services (Okereke 2003). With the universal banking in

operation, banks have gone into providing so many other financial services outside the traditional loans and investments. Many are now providing stock market-related services such as under writing services. They are also acting as issuing houses, and also as registrars of companies.

Nigerian banks are supervised and regulated by a central bank. The Central bank does normal regulatory functions as well as additional functions that are generally termed developmental. The Central bank of Nigeria is still trying to find its feet in its regulatory functions; hence policy reversals have characterized the system. This has affected the structure of banks' earning assets and costs in the study period.

According to Okereke (2003) banks assets can be classified into five major categories;

1. Cash which include: Vault cash and Balances with Central bank
2. Balances held with other banks: Banks in Nigeria; Offices and branches abroad; Other banks abroad
3. Loans and Advances to: Banks in Nigeria; Subsidiaries of banks in Nigeria; Other customers; Money at call outside the CBN; and Bills discounted
4. Investments which include: Treasury bills and certificates; Balances in call money funds; Stabilization securities and; Investment abroad
5. Other assets, not specified

For the purpose of analysis, these can be re-grouped into three groups. The first group comprises cash and investments in treasury bills and certificates; which is the most liquid of all bank assets, however, it provides little income. The second group comprises those assets which involve the use of deposits, where funds have been given out to some other organization on interest, whether for short or long term. We will call this group loans. A third group will now be

referred to as 'off balance sheet items (OBS). This group mainly consists of services such as guarantees, bonds, letters of credits, indemnities etc and other services on which income is earned.

On the other hand, Nigerian banks' liabilities are classified into six groups namely: (i) Capital account (ii) Balances held for banks in Nigeria, offices and branches abroad, other banks abroad (iii) money at call with banks in Nigeria (iv) Loans and advances from: The central bank, banks outside Nigeria, other banks in Nigeria, others (v) Deposits (vi) Other liabilities.

It should be noted that while banks earn income on their assets, they incur costs on their liabilities. For purpose of analysis, we would group banks' liabilities into three main groups. The first is capital; they are the owners' equity, and so no cost is incurred on them. The second is deposits. Deposits in this case consist of all monies that flow into the banks-whether interest bearing or not but are repayable whether on demand or on notice. The third group is other liabilities such as provisions for taxation, deferred taxation, proposed dividends, cash security for letters of credit, interest payable in suspense etc. these liabilities do not induce costs, though they provide funds that could be used to fund loans and advances on short term basis.

Banks' liabilities can be seen as inputs in the banks' production process. In addition to the above identified inputs, labour can be added. For in a normal production process, it is labour that organizes other input factors. In summary we have four input factors as follow:

- a) Deposits, represented with its interest expense.
- b) Capital, assumed, to have been spent on the provision of fixed assets and also on provision of loans.
- c) Labour represented by wages and salaries paid to staff.

- d) Other liabilities including expenses on transmission of letters of credit, consultancy fees paid, other charges paid etc.

On the other hand, banks output will be;

- a) Loans; which would be the total amount of all loans and advances and investments.
- b) Off balance sheet items (OBS); which would be the total of all such items.
- c) Deposits and borrowed funds; which would be the total of customers' deposits and all other funds borrowed whether short or long term, on interest or not.

From the above, one may ask this pertinent question- what is the efficient mix of outputs in banking? That is, what is the optimal combination of products to minimize costs? This is pertinent to the issue of universal banking and the mixing of commercial and merchant banking products. Scale and scope economies are usually measured with respect to bank costs and refer to how the bank's choice of multiple product lines is related to cost. A firm producing multiple products enjoys scope economies if it is less costly to produce those products together in a single entity than it would be to separate production into specialized firms. Also, given the level of technology in the country, how efficient are Nigerian banks in their use of inputs to create outputs? Would 'size' of inputs be a factor in bank efficiency in Nigeria?

2.4 Empirical Literature

Despite claims of Bankers with few exceptions, researchers have found little evidence of significant scale economies in banking. Early studies found that Banks exhaust scale economies at \$100-\$200 millions of total assets, suggesting little cost savings are generated through either bank merger or internally generated growth. However, much of the early research on scale economies involve the estimation of cost functions that fail specific tests or models that fail

to capture key features of banking production (Wheelock and Wilson 2009).

The early literature on modeling bank cost function use input prices to translate the production function into the minimum cost of producing output. They considered how to specify outputs and input in terms of bank assets, financial services and liabilities. After calculating the input prices it derived a cost function for econometric estimation, applied it to bank data, and computed scale economies from the fitted function. This method, as has been widely reported, usually offered little or no evidence of scale economies. It is argued that banks might enjoy scale economies derived from the diversification of risk obtained from larger portfolio of loans and larger base of deposits. These diversification benefits allow larger banks to manage risk with relatively fewer resources. In other words, a larger scale of operation improves a bank's risk-return trade-off. This method is evident in the works of Kurado and Kaneko (1986), Clark(1988), and Berger et al (1993).

Kurado and Kenako in their work, made the following assumptions in order to derive a bank's production function:

- i) Although all loan contracts are determined by bilateral negotiation, competition among bilaterally negotiated transactions works so that interest rates are competitively determined.
- ii) Loans are the output of banks and are homogeneous from the producers' point of view. The cost of loans, which includes such operating expenses as the cost of labour and capital, depends on total lending rather than the size of each individual (bilaterally negotiated) loans.
- iii) The default risk of borrowers is explicitly modeled by introducing the bank's subjective probability distribution of borrowers' returns.

The basic problem with this model is that loans and loans alone are defined as banks' output, and the production cost of the loans are modeled to be the interest paid on deposits, cost of labour and other general operating costs. It has not been put into consideration that the volume and tenor of deposits could have impact on their costs, and so the cost of producing loans. It should also be noted that loans are not the only products that are produced by banks. There are also other products such as OBS, investments, and even deposits.

Lawal(1989) and Ojo(1992) while modeling banking costs in Nigeria also defined banking costs as cost of labour, capital, and other operating costs. In their models, cost of capital is also taken as cost of funds; that is interest paid on funds deposited by customers. Bank output was defined as loans and deposits. They adopted deposits as output in the sense that banks expense resources to generate deposits. On the other hand, deposits are inputs (raw materials) which are used to produce loans. They are therefore both input and output. However, Lawal/Ojo studies suffered from the same short comings of the Kurado and Kaneko works; banks' outputs are more than just loans and advances.

Berger et al (1993) summarized the literature and concluded that the average cost curve has a relatively flat U-shape, with medium sized firms being slightly more scale efficient than very large and small firms . They suggest that the minimum efficient scale was something less than \$300 million total assets.

The failure of past studies to find evidence of substantial scale economies may be the consequence of the limited definition of banks' output and some other important assumptions that are typically employed by past scale economies studies. First, previous estimates have concentrated on cost efficiency in the provision of retail banking services rather than wholesale banking services. Typically, output of the bank is

measured by such quantities as total loans, loans by class (commercial, mortgage, consumer etc). These take no account of the profitability of these activities; i.e. there is no adjustment for quality of outputs. Second, the methodology assumes that inputs, including labour are purchased on competitive markets.

Differences in estimates of scale economies between earlier and more recent studies may also partly reflect the removal of branching restrictions and other changes in regulations that have made it less costly for banks to become large in recent years (Mester 2005). Further, over time, technology advances may have favored larger banks and thereby affected returns to scale. Information processing equipment and software entail rather high fixed costs. Moreover, reductions in the cost of acquiring quantifiable information about potential borrowers have eroded some of the benefits of small scale and close proximity to borrowers that enable small banks to additionally out compete larger banks for some customers is no longer an advantage (Wheelock and Wilson 2009, Berger 2003).

More recent studies have found considerably more evidence of scale economies in banking. By integrating theories of production, financial intermediation, and asset pricing, into the model, Wang(2003) find evidence of significant scale economies. Also, McAllister and McManus (1993), Wheelock and Wilson (2001) find that banks face increasing returns to scale up to at least \$500 million of total assets. Both studies use non-parametric and semi non-parametric methods that avoid the problem of specifying a priori for a particular functional cost relationship to be estimated. Likewise, studies that incorporate banks' risk preferences and financial capital into models of bank production find more evidence of increasing returns to scale than studies that ignore these effects. For example Hughes et al (2001) estimate returns to scale within the context of a

value maximization model that explicitly incorporates the capital structure and risk – taking preferences of individual banks. Based on a sample of 441 top-tier holding companies in 1994, Hughes et al (2001) find that large banks face significant scale economies that increase with bank size.

Feng and Senlitis (2009) also find that large banks operate under increasing returns to scale. That study derives estimates of return to scale from Bayesian estimation of a translog output distance function, rather than from a cost function. This approach has the advantages of avoiding the use of input prices, which may be subject to considerable measurement error. Based on a sample of 292 banks with at least \$1billion of total assets during 2000-2005, Feng and Senlitis (2009), find that all banks exhibit increasing returns to scale. The study acknowledges, however, that the translog specification is suitable only for samples composed of relatively homogeneous firms. A different approach is required for estimating scale economies across banks of widely differing sizes.

Wheelock and Wilson (2009) in their own work, also find significant scale economies for banks throughout the distribution of observed bank sizes for 1984-2006. They estimate return to scale in a cost framework, which provides evidence on whether society's resources are allocated efficiently by addressing directly the long – controversial question, whether banks can lower their average costs by increasing scale of operation. This study use a non-parametric local-Linear estimator to estimate the cost relationship for commercial banks and to derive estimates of ray- scale and expansion path scale economies, and thereby avoid the potential for specification error associated with parametric estimation.

While recent studies in many countries, using more robust models have found significant scale economies in banking, that banks are able to lower

their average costs by increasing their size of operation, it has not been established that the banks have thereby lowered charges of providing services to their customers. In other words, it has not been established that economies of scale result in banks' *effectiveness*. It is expected that banks that enjoy scale economies should provide cheaper services, thereby pass around part of their gains from scale economies and hence, become effective. This is the only way the entire economy will benefit. If this happens, the banks will hence be both efficient and effective. Banks will be efficient by lowering their average operating costs and effective by lowering prices of their products. This study takes cognizance of the Lawal (1989) and Ojo (1992) works on the Nigerian banking, its methods which defined only loans and deposits as banks' output and total operating expenses as input costs and their conclusions that there is little evidence of scale economies. We have now expanded the definition of banks' output in line with Anderson and Joeveer (2011), Wheelock and Wilson (2009), Feng and Senlitis (2009), Tadesse (2005), Wang (2003), Hughes et al (2001), to include loans, investments, OBS, and deposits while the input is to include cost of labour, deposits, interest expense and other operating costs.

The Lawal/Ojo works did not state anything about effectiveness of the banks. We have also expanded this area by considering whether the Nigerian banks have indeed become more effective. Evidence of effectiveness is shown in the banks' lower products' prices. Loans and advances is the main product of the banks. We have therefore obtained data on the banks' lending rates for a period of ten years – five years before the banks' consolidation programme and five years after the programme. This will enable a comparison of the two sets of rates in order to determine whether lending rates were lower after the consolidation. Lower lending rates after consolidation will evidence banks' effectiveness.

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3. Model Specification, Methodology and Data

3.1 Model Specification and Methodology

In order to investigate existence of economies of scale in the Nigerian banking industry and hence, find an answer to the question posed by the title of the article, we specify a model in its functional form as:

$$TTA = f(\text{LOA}, \text{INV}, \text{OBS}, \text{DEP})$$

Where:

TTA= Unit cost of input variables i.e. deposits' interest expense, labour wages and salaries, other operating expenses divided by total earning assets.

LOA= Total Loans and Advances, INV= Investment on call placements and trading securities; OBS = Off Balance Sheet Items; DEP=Total Deposit.

LOA, INV and OBS are key component of bank assets, while DEP included as a control variable is a liability to the bank. Econometrically, equation (1) can be specified as:

$$TTA_t = h_0 + h_1 \text{LOA}_t + h_2 \text{INV}_t + h_3 \text{OBS}_t + h_4 \text{DEP}_t + \xi_t$$

.....(2)

The variables are as previously defined. ξ_t = Error term and assumed normally distributed (with zero mean and constant variance).

The *a priori* expectations are $h_1 < 0$, $h_2 < 0$, $h_3 < 0$, $h_4 > 0$.

The ordinary least squares estimation technique shall be employed for the estimations. This technique is adopted because it yields estimates that are BLU (best, linear, unbiased)

3.2 Data

Aggregate annual time series data on 22 commercial banks in Nigeria were used for the study. The data which span the period 2005 -2013 were sourced from the Central Bank of Nigeria (CBN) statistical Bulletin of 2013, the Nigerian Stock Exchange (NSE) Fact Book and the annual reports of the sample banks.

4. Results and Discussion

4.1. Descriptive Statistics

Before presenting the regression results of the TTA model, descriptive statistics of the main variables are given in table 6. Table 6 shows that, the mean for some of the variables substantially differ from the median. So, we could say they

suffer from skewness. This is a normal phenomenon when using time series data sets in most studies in recent years. It tells us that in estimating the model, one should be cautious about no normality of the residuals (Linsink, 2000).

Table 1: Descriptive Statistics

Statistics	TTA	LOA	INV	OBS	DEP
Mean	2.310000	3374714.	4465391.	1762320.	65110921.53
Median	2.040000	2486462.	4251813.	1865823.	5304742.
Maximum	5.590000	8230987.	10400402	3563791.	16311028
Minimum	1.530000	282556.0	726822.0	131493.0	740012.0
Std. Dev.	1.189173	2915552.	3313321.	1347763.	5495582.
Skewness	2.364569	0.454769	0.448436	-0.014249	0.569781
Kurtosis	7.204714	1.703346	1.956827	1.267111	1.990939
Jarque-Bera	16.68515	1.045238	0.788579	1.251549	0.965337
Probability	0.000238	0.592966	0.674159	0.534847	0.617135
Sum	23.10000	33747135	44653906	17623199	65110918
Sum Sq. Dev.	12.72720	7.65E+13	9.88E+13	1.63E+13	2.72E+14
Observations	10	10	10	10	10

Source: Authors' Computation using *EViews 8*.

Table 1 shows the result of the variables employed in the estimation. It shows that Total Cost/ Total Asset (TTA), in nominal terms averaged 2.31 and varied from 1.53 to 5.59. Loans (LOA) averaged 3,374,714.0 and ranged from 282,556.0 to 8,230,987.0 with a standard

deviation of 2,915,552.0. Also, Investment (INV) ranged from 726,822.0 to 10,400,402.0 with a mean of 446,591.0. On the other hand, OBS stood at 1,762,320.0 and ranged from 131493.0 to 3,563,791.0 and Deposit (DEP) ranged from 740,012.0 to 16,311,028.0 with an average of 6,511,092.

4.2. Estimation Result

The result of estimation of the specified model is presented in Table 2

Table 2. Ordinary Least Squares Estimation Results

Dependent Variable: TTA				
Method: Least Squares				
Sample: 2004 2013				
Included observations: 9				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.049224	0.539750	5.649324	0.0024
LOA	9.95E-07	1.46E-06	0.681597	0.5258

INV	-1.69E-06	7.32E-07	-2.313086	0.0686
OBS	7.50E-07	7.66E-07	0.978191	0.3729
DEP	3.29E-07	9.52E-07	0.345357	0.7439
R-squared	0.700671	Mean dependent var	2.310000	
Adjusted R-squared	0.661208	S.D. dependent var	1.189173	
S.E. of regression	0.872882	Akaike info criterion	2.872821	
Sum squared resid	3.809617	Schwarz criterion	3.024113	
Log likelihood	-9.364103	Hannan-Quinn criter.	2.706853	
F-statistic	8.926010	Durbin-Watson stat	2.236085	
Prob(F-statistic)	0.0114887			

The estimation result shows that expansion in banking sector investment significantly reduces unit cost of the banks. The effect of investment on unit cost is significant at the 10% level. We observe also that loans and advances extended by the banking sector, customers deposits in the banks and off balance sheet items are positively related to unit costs, though the relations are not statistically significant. The coefficient of determination suggests that 70% of the systematic variation in unit costs of the banking industry is explained by the model. The F-statistic indicates that the variables are jointly significant in the determination of unit costs of the banks. The Durbin-Watson statistic indicates absence of the problem of autocorrelation in the model. Thus the model can be relied upon for policy purposes.

5. Conclusion and Recommendation

The study investigated whether or not economies of scale exists in the Nigerian banking industry. The ordinary least squares estimation technique was employed to estimate aggregate bank (industry) data that spanned the period from 2005 to 2013. The analysis indicated that economies of scale does exists in the Nigerian banking industry as expansion in the industry's investment was observed to be associated with decrease in unit costs of the banks in the industry.

In view of the empirical evidence, it is recommended that banks take measure to expand

the length and depth of their investments so as to reduce their cost of operation as this would ensure reduction in the cost of loan extended (that is, interest rates), making it easy for would-be borrowers (investors) to have access to investible funds, which will ultimately enhance the growth of the economy.

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