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Banking Consolidation in Nigeria, 2000-2010

Carlos Pestana Barros
Instituto Superior de Economia e Gestao, Technical University of Lisbon,
Portugal

and

Guglielmo Maria Caporale
Brunel University, London, CESifo and DIW Berlin

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ABSTRACT

This study examines the Nigerian banking consolidation process using a dynamic panel for the period 2000-2010. The Arellano and Bond (1991) dynamic GMM approach is adopted to estimate a cost function taking into account the possible endogeneity of the covariates. The main finding is that the Nigerian banking sector has benefited from the consolidation process, and specifically that foreign ownership, mergers and acquisitions and bank size decrease costs. Directions for future research are also discussed.

Keywords: Nigeria, banking consolidation, dynamic panels

JEL Classification: G21, C23, O55

Corresponding author: Guglielmo Maria Caporale
Centre for Empirical Finance
Brunel University, West London UB8 3PH
United Kingdom
Tel.: +44 (0)1895 266713
Fax: +44 (0) 1895 269770
Email: Guglielmo-Maria.Caporale@brunel.ac.uk

1. Introduction

This paper focuses on the impact of banking consolidation in Nigeria on costs of banks during the period 2000-2010. This process started in 2004 after the Central Bank of Nigeria (CBN) announced new capital requirements for Nigerian banks. The intention was to push banks to increase their average size through mergers and acquisitions. Some banks could neither satisfy the new capital requirements nor find a suitable merger partner, and therefore were forced to go into liquidation. As a result, the number of banks was considerably reduced. Not surprisingly, all foreign banks survived the recapitalisation as they usually relied on capital injections from the parent company to meet the capital requirements. The total number of Nigerian banks immediately after the consolidation, that is, before the Stanbic Bank/IBTC merger, was 25 (Hesse, 2007; Porter, 2007; Assaf, Barros and Ibiowie, 2011).

The existing literature offers contradictory views on whether or not consolidation has a positive impact on bank costs; moreover, the results are often country-specific. In the US, for instance, there is little evidence of any improvement in cost efficiency following a merger (Esho, 2001; Sathye, 2001). In general, consolidation is expected to lead to better bank performance, lower prices, and improved service quality as well as resource allocation. In contrast to the case of the developed economies (e.g. the US and Japan), very little research has been conducted on the efficiency of African banks, despite the fact that the banking sector in many African countries is highly concentrated (Okeahalam, 2006).

The present study makes a threefold contribution. First, it provides evidence on the impact of consolidation on costs in the specific case of Nigerian banks, as this can vary from country to country, depending on their market characteristics and regulations (Focarelli, Panetta and Salleo, 2002; Vander Vennet, 2002). Second, it adds to the limited number of existing studies on banking consolidation (Chapelleand Plane, 2005a; 2005b; Francis, Hasan and Wang, 2008; Yildirim and Philippatos, 2007; Binam, Gockowski, and Nkamleu, 2008; Igbekele, 2008; Assaf, Barros and Ibiowie, 2011) by estimating a more suitable dynamic model rather than conducting the efficiency

analysis typical of most papers. In particular, it adopts the Arellano and Bond (1991) dynamic GMM method. Third, it focuses on Africa, a region which has attracted only limited attention in the literature (Figueira, Nellis, and Parker, 2006; Hauner and Peiris, 2005; Okeahalam, 2006; Blankson, Mbah and Owusu-Frimpong, 2009), most studies examining instead European or US banks.

The layout of the paper is the following. Section 2 describes the main features and the evolution of the Nigerian banking sector. Section 3 provides a brief review of the literature on banking efficiency. Section 4 outlines the econometric approach. Section 5 specifies the hypotheses to be tested. Section 6 discusses data sources and definitions. Section 7 presents the empirical results. Section 8 summarises the main findings and their implications and suggests directions for future research.

2. The Nigerian Banking Environment

The Nigerian banking system has evolved since the colonial periods in three distinct phases. The first, generally referred to as the free-banking era, was the pre-independence period when the industry was dichotomised between foreign and indigenous banks. The foreign banks, which obtained their operating licences abroad and dominated banking activities during this era, were seen to act solely in the interest of their foreign owners rather than of Nigerians and of the Nigerian economy (Brownbridge, 1996). Since there was neither a banking legislation nor a regulator, entry was relatively free. This created an avenue for all kinds of speculative investors who operated banks that were generally under-capitalised and poorly managed. Early exit was common among the domestic banks, which were clearly disadvantaged.

By 1940, the majority of indigenous banks had collapsed, with the only survivors being those that were established and, in all likelihood, patronised by the three regional governments. Yet this did not stop the incorporation of more banks: there were in fact 150 indigenous banks established between 1940 and 1952 (Adegbite, 2007). The experience of the banking crashes of the 1930s and 1940s possibly informed the government's decision to adopt in 1952 the banking ordinance, which

represents the first major attempt at regulating banking operations. However, this regulation appeared to make little or no impact in the way banking was conducted, as there was no regulator to enforce compliance. The CBN was established in 1959 to regulate and perform other overseeing functions (Hesse, 2007).

The second phase was the indigenisation period of the 1970s when the government introduced various control measures such as the nationalisation of foreign-owned banks, entry restrictions, a deposit rate floor or an interest rate ceiling. This period is known as the static period reflecting the low number of banks and the establishment of very few branches by the existing banks.

The next phase began in 1986 with the implementation of the Structural Adjustment Programme (SAP) prescribed by the World Bank/IMF. Some of the control measures such as entry conditions, sectoral credit allocation quotas and interest rate regulation of the indigenisation period were relaxed. This reintroduced dilution into the industry as the number of banks increased from 42 in 1986 to 107 in 1990, and by 1992 it had reached 120. The sharp increase in the number of banks without a correspondingly large increase in the capacity of the regulatory and supervisory mechanisms caused both off-site surveillance and on-site examination of banks to suffer (Oyejide, 1993).

Systemic failure resulted. Rather than mobilising and allocating resources to needy sectors, disintermediation was witnessed as many of the new banks, commonly referred to as new generation banks, preferred to make money through arbitrage and other rent-seeking activities (Lewis and Stein, 1997). Hesse (2007) suggests as a possible explanation the fact that the parallel exchange rate that prevailed in that period allowed banks quickly to make profits from various arbitrage opportunities rather than intermediate between depositors and lenders. Also, many of the banks owned by local investors seemed to have been set up primarily in order for their owners to obtain foreign exchange which could be sold at a premium (Brownbridge, 1996).

The banks that were owned by state governments, 25 as of 1989, accumulated bad debts because of the extension of proprietary loans to the state governments and to politically influential borrowers

(Brownbridge, 1996). This probably explains why some analysts believe that the distress in the banking sector originated from SAP as bureaucrats allocated resources through discretionary policies. Because of the high fragmentation and low financial intermediation of the banks, the government in 1991 established some prudential guidelines (Hesse, 2007) through the promulgation of the Banking and Other Financial Institutions Decree (BOFID) and placed an embargo on issuing new bank licences. Shortly after, 24 of the existing banks were found to be insolvent and were liquidated. Thus, by 2004, the number of banks had been reduced to 89.

Despite government intervention, the remaining 89 banks were characterised by a low capital base, insolvency and illiquidity, overdependence on public sector deposits and foreign exchange trading, poor asset quality and weak corporate governance (Soludo, 2006). This led to another round of recapitalisation in 2004 when banks were required to increase their minimum capital base from Naira 2 billion to Naira 25 billion by the end of 2005. This brought about radical changes to the structure and nature of banking operations.

Other important results of the consolidation process are that bank branch networks rose from 3382 prior to consolidation to 4500 post consolidation, aggregate bank assets increased from Naira 3209 billion in 2004 to Naira 6555 billion in 2006 and the capital adequacy ratio climbed from 15.2% in 2004 to 21.6% in 2006 (Balogun, 2007; Assaf, Barros and Ibiwoie, 2012). More information on the performance of the banking industry is provided in Table 1.

<<Insert Table 1 around here>>>

3. Literature Review

3.1 Banking Consolidation in the Developed Countries

Most studies on banks' efficiency (Altunbas, Gardener, Molyneux, and Moore, 2001; Berger, 1995; Berger and Humphrey, 1997; Berger and Mester, 1997; Bos and Schmiadel, 2007; Goddard, Molyneux, and Wilson, 2001; Maudos, Pastor, Pérez, and Quesada, 2002; Schure, Wagenvoort, and

O'Brien, 2004; Williams, Peypoch and Barros, 2009) focus on the US and Europe and neglect banks in emerging countries such as Nigeria. Multi-country analysis usually considers factors such as legal tradition, accounting conventions, regulatory structures, property rights, culture and religion as possible explanations for cross-border variations in financial development and economic growth (Beck, Demirgüç and Levine, 2003; Beck and Levine, 2004; La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1997; Levine, 2003; Stulz and Williamson, 2003). Studies at country level usually focus on market dynamics as determinants of efficiency (Arpa, Giulini, Ittner, and Pauer, 2001; Bikker and Haaf, 2002), or provisions for loan losses which can exert a negative impact on the level of economic activity (Cavallo and Majnoni, 2002; Cavallo and Rossi, 2001; Laeven and Majnoni, 2003).

Other factors such as market structure and bank-specific variables have been proposed on the basis of the structure–conduct–performance paradigm, and have been extended to test the role of ownership and governance in explaining bank performance (see Berger, 1995; Berger and Humphrey, 1997; Bikker and Haaf, 2002; Goddard et al., 2001; Molyneux, Altunbas, and Gardener, 1996). In general, the extensive empirical evidence does not provide conclusive proof that bank performance is explained by either concentrated market structures and collusive price-setting behaviour or superior management and production techniques. Bank performance levels are found to vary widely across banks and banking sectors (Altunbas, et al., 2001; Maudos et al., 2002; Schure et al., 2004).

Another strand of the literature analyses the impact of consolidation on banking costs. The need to reduce costs through economies of scales and scope, or to increase revenues through gaining additional market shares, are usually the main drivers of consolidation (Amel, Barnes, Panetta, and Salleo, 2004). The literature also discusses the linkage between mergers and acquisition activities and the transfer of knowledge between the acquiring and the acquired company. However, the relationship between consolidation and costs does not seem to be always positive. Some studies, for instance, suggest that efficiency gains from consolidation disappear after a certain size is reached

and that above a certain threshold a firm might start exhibiting diseconomies of scale (Amel et al., 2004).

The increase in size also creates further pressure on managers owing to the difficulty of managing large institutions. The evidence for the banking industry is mixed. Banal-Estañol and Ottaviani (2006, 2007), for instance, highlighted the need for diversification to ensure the success of bank mergers. They also argued that mergers are not always beneficial as they might make firms more aggressive when they compete in quantities.

The evidence on the effects of consolidation also seems to vary by country. This is because each country has its own market characteristics and regulations (Focarelli, Panetta, and Salleo, 2002; Vander Venet, 2002). In general, no strong evidence on the benefit of consolidation is found in the US, while in Europe the conclusions seem to be mixed (Carbo and Humphrey, 2004; Cavallo and Rossi, 2001; Diaz, Garcia, and Sanfilippo, 2004; Esho, 2001; Sathye, 2001). For Asian countries such as Japan the conclusions are also mixed and vary with the period analysed (Drake and Hall, 2003).

3.2 Banking Consolidation in the Emerging Countries

Banking consolidation in emerging countries is scarce. For example Maimbo (2008) reviews the design, development and implementation of licensing policies in the years preceding the 1995-1997/98 bank failures in Zambia and the licensing reforms that followed thereafter. Owusu-Frimpong (2008) examines the extent to which the marketing concept has been adopted and implemented by banks in Ghana. More in line with the present research, Assaf, Barros and Ibiowie, (2011) analyse the efficiency of Nigerian banks with a Bayesian frontier model; a further study was conducted by Hesse (2007) on the consolidation of banks in Nigeria. Porter (2007) analysed the relationship between the promotion of the banking habit and economic development.

4. Methodology

As mentioned above, the present paper aims to analyse the impact of consolidation on banking costs in Nigeria. The empirical specification is a cost function estimated with a dynamic log-linear model which includes a lagged dependent variable aiming to capture persistent effects and takes into account the possible endogeneity of the covariates. In particular, the Arellano-Bond (1991) approach is taken. Panel data are common in African context because of the small number of units present, in this case the banks. Observing the banks in several years ensures an adequate data span. This is commonly used in applied research (Baltagi et al, 2009; Bauxauli-Soler and Sanchez Marin, 2011) and has the following form:

$$C_{it} = \rho_1 C_{i,t-1} + \mathbf{x}_{it} \boldsymbol{\beta} + v_{it} \quad (1)$$

$$v_{it} = c_i + u_{it}, \quad i = 1, \dots, N; t = 1, \dots, T \quad (2)$$

where C_{it} is the dependent variable measuring bank cost performance, $C_{i,t-1}$ is the lagged dependent variable, \mathbf{x}_{it} is a vector of observable corporate governance covariates for firm $i=1, \dots, N$ and years $t=1, \dots, T$. ρ_1 and the vector $\boldsymbol{\beta}$ contains the parameters to be estimated. The error term v_{it} in equation (1) includes the unobservable time-invariant firm characteristics c_i (fixed effects) and u_{it} , which is the idiosyncratic error (equation 2). This model formulation is appropriate in our case, because it allows for dynamics in the dependent variable, a plausible assumption, since the best-performing banks are likely to remain so over the following year.

The reason for using a dynamic panel data model, namely the Arellano-Bond one, is that it deals with the following standard problems encountered in panel data analysis. First, the covariates can be endogenous because causality may run in both directions and, therefore, these regressors may be correlated with the error term. Second, the fixed effects c_i can be correlated with the covariates. Thirdly, the presence of the lagged dependent variable, which is the dynamic effect in the panel data equation, gives rise to autocorrelation. Finally, the panel dataset has a short time dimension and a medium banks dimension. The Arellano and Bond (1991) linear dynamic panel data estimation is the most suitable one in this context and includes the first lag of the dependent

variable (equation 1) as a covariate and unobserved fixed effects (as in equation 2). By introducing autocorrelation into the model, the unobserved effects c_i become correlated with the lagged dependent variables, thus making the standard estimators inconsistent. To address this, the Arellano and Bond (AB) procedure starts with the transformation of all regressors by differencing equation (1),

$$\Delta C_{it} = \rho_1 \Delta C_{i,t-1} + \Delta \mathbf{x}_{it} \boldsymbol{\beta} + \Delta u_{it} \quad (3)$$

In this way, the time-invariant parameter c_i in equation (2) is removed. Arellano and Bond (1991), building on Holtz-Eakin et al. (1988) and using the general method of moments (GMM) framework developed by Hansen (1982), identify the lags of the dependent variable that are valid instruments and how to combine these lagged variables into a larger instrument matrix. They found that lag 2 or higher of the dependent variable are valid instruments. Furthermore, if the explanatory variables are not strictly exogenous, lagged levels of these variables can also be added as additional instruments. This estimator is designed for datasets with many units and few periods, and it requires that there be no autocorrelation in the idiosyncratic errors.

5. Theoretical Background and Hypotheses.

The theoretical background to the present research is based on the microeconomic theory relating costs to covariates (see Varian, 1997). The covariates here are chosen based on common ownership in banking (Chiu et al., 2008), mergers and acquisitions in banking (Andrade, Mitchell and Stafford, 2001), bank size (Khanna and Palepu, 2000; Ghemawat and Khanna, 1998) and bank consolidation (Amel, Barnes, Panetta and Salleo, 2004). Our aim is to test the relationship between banks cost and the following covariates: foreign bank membership, banks involved in mergers and acquisitions, bank size and consolidation period. The reasons for the selection of each of these covariates and the hypotheses to be tested are explained below.

5.1 Foreign Ownership

Foreign ownership might have an impact on costs by contributing to the transfer of knowledge and economies of scale between banks belonging to the same group. Chiu et al. (2008), for example, tested this hypothesis on a sample of Taiwanese firms and reached the conclusion that group affiliation can be beneficial, though this might be dependent on the size of the group. Other studies have also linked the success of group affiliation to the type of market, firms with group affiliation tending to outperform those without in competing markets, since for the latter it is harder to gain new market shares (Khanna and Palepu, 2000; Ghemawat and Khanna, 1998; Cho, 2007; Griffith-Jones, 2007). Therefore it might be more profitable to join a foreign group, thereby sharing its resources and reputation to make up for external market failures (Khanna and Paleou, 2000).

H1: Foreign group ownership has a positive influence decreasing bank's cost. This hypothesis is tested with the variable foreign.

5.2 Mergers and Acquisitions

Mergers and acquisitions between similar companies are known as horizontal mergers (Andrade, Mitchell and Stafford, 2001), and aim to improve cost performance and synergy through a larger market share. In the former case the merged companies reduce operating costs but keep the premises of the merged or acquired company (Garette and Dussauge, 2000).

H2: Bank mergers and acquisitions have a positive impact on Nigerian banking reducing bank's costs. This hypothesis is tested with the variable M&A.

5.3 Firm Size

It is often argued that large firms might be more efficient, because they can use more specialised inputs, coordinate their resources better, and reap the advantages of economies of scale (Alvarez and Crespi, 2003) and make up for external market failures (Khanna and Palepu, 2000; Ghemawat

and Khanna, 1998). Related studies also indicated that firm size has a positive impact on efficiency and decreases costs (Altunbas et al., 1997, Berger and Humphrey, 1991, Alvarez and Arias, 2003).

H3: Bank size has a positive impact on the Nigerian banking reducing banks' costs. This hypothesis is tested with the variable total assets.

5.4 Banking Consolidation

Banking consolidation aims to improve cost performance (Amel, Barnes, Panetta and Salleo, 2004) and therefore it may have a negative impact on banks' costs. This hypothesis will be tested with a consolidation dummy variable.

H4: Banking consolidation reduces Nigerian banks' costs.

6. Data

The dependent variable in our model is banks' costs, that have been extensively analysed in the empirical literature (Francis, Hasan and Wang, 2008; Yildirim and Philippatos, 2007; Assaf, Barros and Ibiowie, 2011). The independent variables listed in Table 2 were selected on the basis of microeconomic theory (Varian, 2009).

Our sample includes all the 25 Nigerian banks that got past the recapitalisation hurdle. Data were collected from annual reports of the banks for the period 2000-2010 (275 observations). In the empirical banking literature, there are two approaches to measuring banks' outputs and costs (Berger and Humphrey, 1997). The production approach treats banks as producing accounts of various sizes by processing deposits and loans, and incurring capital and labour costs. Operating costs are thus specified in the cost function and output is measured as the number of deposits and loan accounts. The intermediation approach sees banks as transforming deposits and purchased funds into loans and other assets. Costs are expressed as total operating plus interest costs and output is measured in monetary units. These two approaches have been applied in different ways. Limited data availability means that in our case we are constrained to apply only the intermediation

approach, which is in fact the most commonly used one in banking studies (Sealey and Lindley, 1977; Berger and Humphrey, 1997). The estimated function is the following:

$$\begin{aligned}
\text{Ln} \frac{\text{Cost}_{it}}{\text{PD}_{it}} = & \alpha_{it} + \gamma_{CL} \text{CL}_{it} + \gamma_{SEC} \text{SEC}_{it} + \gamma_{PL} \text{Ln} \frac{\text{PL}_{it}}{\text{PD}_{it}} + \gamma_{PK} \text{Ln} \frac{\text{PK}_{it}}{\text{PD}_{it}} + \gamma_{CL,CL} \frac{1}{2} \text{LnCL}_{it} \text{LnCL}_{it} \\
& + \gamma_{SEC,SEC} \frac{1}{2} \text{LnSEC}_{it} \text{LnSEC}_{it} + \gamma_{PL,PL} \frac{1}{2} \text{Ln} \frac{\text{PL}_{it}}{\text{PD}_{it}} \text{Ln} \frac{\text{PL}_{it}}{\text{PD}_{it}} + \gamma_{PK,PK} \frac{1}{2} \text{Ln} \frac{\text{PK}_{it}}{\text{PD}_{it}} \text{Ln} \frac{\text{PK}_{it}}{\text{PD}_{it}} + \\
& \gamma_{CL,SEC} \text{LnCL}_{it} \text{LnSEC}_{it} + \gamma_{CL,PL} \text{LnCL}_{it} \text{Ln} \frac{\text{PL}_{it}}{\text{PD}_{it}} + \lambda_{CL,PK} \text{LnCL}_{it} \text{Ln} \frac{\text{PK}_{it}}{\text{PD}_{it}} + \gamma_{SECPL} \text{LnSEC}_{it} \text{Ln} \frac{\text{PL}_{it}}{\text{PD}_{it}} + \\
& \gamma_{SEC,PK} \text{LnSEC}_{it} \text{Ln} \frac{\text{PK}_{it}}{\text{PD}_{it}} + \gamma_{PL,PK} \text{Ln} \frac{\text{PL}_{it}}{\text{PD}_{it}} \text{Ln} \frac{\text{PK}_{it}}{\text{PD}_{it}} \\
& + \beta_1 \text{Foreign}_{it} + \beta_2 \text{M \& A}_{it} + \beta_4 \text{Size}_{it} + \beta_5 \text{Consolidation}_{it} + v_{it}
\end{aligned}$$

with the associated factor share equations.

The variables are defined as follows. Cost_{it} is the total cost defined as the banks' operational cost plus interest cost, which is standard in banking research. This variable is present in the bank income statement (Assaf, Barros and Ibiowie, 2011). PD_{it} is the price of deposits, measured by dividing the interest paid on deposits by the value of total deposits; CL_{it} is the total customer loans; SEC_{it} is the total securities; PL_{it} is the price of labour, measured by dividing total wages by the number of workers; PK_{it} is the price of capital premises, measured by dividing the total amortization by the value of total assets; Foreign is a dummy variable which takes the value of 1 for foreign banks and zero elsewhere; M \& A is a dummy variable that takes the value of one for banks that have been involved in mergers and acquisitions (M&A) activities and zero otherwise; Size is measured by total assets as a proxy for bank size as in Nairaset al. (2000) and Consolidation is a dummy variable which is one for the consolidation period 2004-2010 and zero elsewhere. Note that we have divided total cost, the price of labour and the price of deposits by the price of capital premises to ensure homogeneity in price for the cost function (Cornes, 1992).

The data characteristics are presented in Table 2.

<<Insert Table 2 around here>>

7. Results

The results based on the Arellano-Bond (1991) model using three different specifications are presented in Table 3. Model 1 does not include size and consolidation. Model 2 does not include consolidation and model 3 includes all variables. F-tests suggest that the model 3 specification should be the preferred one. The Hausman tests is used to test for endogeneity (omitted variable biased, measurement error, or reverse causality; Woldridge, 2002; Baltagi, 2001). The Hausman statistic is 145.41 (p-value 0.000) and therefore the hypothesis that the variables are endogenous is clearly rejected.

<<Insert Table 3 around here>>

The autoregressive parameter ρ_i is found to be positive and statistically significant in all cases, which supports the use of a dynamic panel data model. The Sargan test of over-identifying restrictions is used to assess the validity of the instruments and the results imply acceptance of the null hypothesis that the over-identifying restrictions are valid (Roodman, 2006). Furthermore, as expected, there is strong evidence against the null hypothesis of zero autocorrelation in the first-differenced errors at order 1 and 2. Overall, cost increases with positive covariates and decreases with negative ones.

8. Discussion and Conclusions

This paper analyses the cost performance of Nigerian banks over the period 2000-2010 using the Arellano-Bond panel method. Furthermore, it compares their performance in terms of costs before and after consolidation using a binary consolidation variable. The main finding is that the Nigerian

banking sector has benefited from the consolidation process, and specifically that foreign ownership, mergers and acquisitions and bank size decrease costs. These are important results for banking associations, often relying on simple methods and partial ratios in their analysis, as well as policy-makers: policies and regulations should take into account the endogeneity issue, namely the simultaneity between banks' costs and covariates.

The results show that the cost efficiency of Nigerian banks has increased post-2004, and that therefore the consolidation process has been beneficial. This is in contrast to some studies in the literature. For example, in the US there is little evidence of any improvement in cost-efficiency following a merger (Esho, 2001; Sathye, 2001). However, our findings are broadly consistent with those on the cost performance of banks in most (though not all) European countries (Huizinga, Nelissen, & Vander Venet, 2001).

None of the hypotheses considered with exception of 3 can be rejected. Foreign ownership (hypothesis 1), mergers and acquisitions (hypothesis 2) and consolidation (hypothesis 4) all appear to decrease banks' costs. By contrast, size (hypothesis 3) increases cost. These findings are in line with those of previous studies on consolidation (Assaf, Barros and Ibiwoie, 2012; Amel, Barnes, Panetta and Salleo, 2004.), on foreign ownership (Lensink, Meesters and Naaborg, 2008) and mergers and acquisitions (Rhoades, 1998). The implication of our analysis is that policies encouraging foreign ownership, mergers and acquisitions, bank size and consolidation should be adopted by African countries given their beneficial effects on cost efficiency.

Future research could also examine in depth the impact of the current financial crisis, as a result of which the large and sudden capital inflows that were injected by foreign investors during the consolidation exercise were abruptly withdrawn. Another development was the unwillingness of correspondent banks to confirm lines for Nigerian banks. However, with consolidation, fewer banks now require correspondent banks and the reverse is also true as fewer correspondent banks are needed. As for the capital outflows, the CBN has injected funds into some of the problem banks to prevent failure, and has drawn up a four-pillar strategy with the aim of improving the quality of the

banks by implementing risk-based supervision and reforming the regulatory framework (Sanusi, 2010). The recent creation of the Asset Management Corporation is a move in that direction. Given the fact that the impact of consolidation on cost efficiency is likely to differ depending on county characteristics, it would also be interesting to conduct the analysis for other economies in the West Africa sub-region, as well as check the robustness of the results to using alternative estimation methods.

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Table 1: Banks' characteristics

Group	Surviving Bank	Shareholders funds	Component institutions	No. In group
1	First Bank	58.996	First Bank of Nigeria Plc, FBN Merchant Bankers Ltd, MBC	3
2	First Inland	26.389	IMB, First Atlantic Bank, Inland Bank, NUB	4
3	FCMB	25.342	First City Monument Bank, Cooperative Development Bank, Nigeria-American Merchant Bank, Midas	4
4	Union Bank	106.97	Union Bank of Nigeria Plc, Broad Bank, UTB, Union Merchant Bankers	4
5	Wema Bank	26.230	Wema Bank, National Bank	2
6	Unity Bank	29.425	Intercity Bank, First Interstate, Tropical Commercial, Pacific, Societe Bancaire, Centre-Point, NNB, Bank of the North, New Africa Bank Ltd.	9
7	ETB	28.41	ETB, Devcom	2
8	Fidelity Bank	25.596	Fidelity, FSB International, Ma	3
9	IBTC/Chartered	33.494	Regent, IBTC, Chartered	3
10	Intercontinental	57.25	Intercontinental, Global, Equity, Gateway	4
11	Oceanic Bank	36.505	Oceanic Bank, International Trust Bank	2
12	Platinum-Habib	28.491	Platinum, Habib	2
13	Sterling Bank	25.31	NAL, Trust Bank of Africa, INBM, Magnum Trust, NBM	4
14	UBA Plc	47.624	UBA, Standard Trust Bank, CTB	3
15	Spring Bank	41.29	Citizens, Guardian Express, ACB, Omega, Trans International, Fountain Trust	6
16	Access Bank	28.894	Access, Marina International, Capital Bank	3
17	Afribank	25.085	Afribank, Afribank Merchant Bankers	2
18	Citibank-NIB	33.375	Citibank, Nigeria International	2

			Bank	
19	Diamond Bank	34.97	Diamond Bank, Lion Bank, Africa International	3
20	Skye Bank	31.469	Prudent, EIB, Bond, Reliance, Coop Bank	5
21	Zenith Bank	95.324	Zenith	1
22	Stanbic Bank	28.386	Stanbic Bank	1
23	Standard Chartered	33.760	Standard Chartered	1
24	Ecobank	25.763	Ecobank	1
25	GTB	36.420	GTB	1
Total number of merging banks				75
Failed banks				14
Pre Consolidation Total				89

Table 2: Description of the Variables

Variable	Description	Min ^a	Max ^b	Mean	Std. Dev
Cost	Operational cost at 2000 in Nairas	1266.27	91207.29	17889.44	18694.06
CL	Customer loans at 2000 in Nairas	1944.95	244149.1	52933.98	51442.01
SEC	Securities at 2000 in Nairas	3464	114484.7	23470.32	22166.1
PL	Price of labour measured dividing the wages by the number of employees	0.2026	8.878	2.357	1.370
PD	Price of deposits measured dividing the interest paid in deposits by the value of deposits	0.0048	0.5823	0.0964	0.1034
PK	Price of capital measured dividing amortization by fixed assets	0.0002	0.355	0.055	0.0591
Foreign	Dummy variable for Foreign bank	0	1	0.12	
M&A	Dummy variable for Banks involved in M&A activities	0	1	0.92	
Size	Size is measured by total assets				

	as a proxy for bank size in Nairas at 2000	6,798.00	851,241.00	139,018.83	155,553.69
Consolidation	Dummy variable equal to one for the period 2004-2010 and zero elsewhere	0	1	0.636	

^a Min – Minimum; ^b Max – Maximum.

Table 3: Dynamic Panel Data Model Results

	Model 1	Model 2	Model 3
Constant	2.319 (0.036)*	0.890 (0.035)*	0.852 (0.015)*
L.Cost _{t-1}	0.794 (0.034)**	0.501 (0.016)**	0.62 (0.013)*
CL	0.0005 (0.051)	0.0087 (0.005)*	0.0011 (0.003)*
SEC	-0.0004 (-0.0006)*	-0.0008 (-0.006)*	-0.00011 (-0.0005)*
PL	0.101 (0.020)**	0.112 (0.003)*	0.132 (0.003)*
PK	-0.936 (-0.021)*	-0.832 (-0.002)*	-0.013 (-0.007)*
½ CL ²	0.528 (0.154)	-0.182 (-0.002)*	-0.623 (-0.001)*
½ SEC ²	0.968 (0.053)	-0.936 (-0.001)*	-0.9189 (-0.002)*
½ PL ²	0.980 (0.051)	-0.5219 (-0.031)**	-0.96957 (-0.003)*
½ PK ²	0.004 (0.055)	0.0180 (0.002)*	0.200 (0.005)*
CL*SEC	0.968 (0.002)*	0.944 (0.005)*	0.658 (0.0015)*
CL*PL	0.980 (0.005)*	0.719 (0.003)*	0.853 (0.004)*
CL*PK	0.012 (0.040)**	0.038 (0.014)**	0.085 (0.007)*
SEC*PL	0.980 (0.054)	0.946 (0.0054)*	0.753 (0.003)*
SEC*PK	0.853 (0.056)	0.501 (0.0012)*	0.713 (0.002)*
PL*PK	0.011 (0.046)**	0.012 (0.0045)*	0.020 (0.001)*
Foreign	-0.025 (-0.051)	-0.062 (-0.0002)*	-0.140 (-0.002)*
M&A	-0.032 (-0.053)	-0.0259 (-0.001)*	-0.019 (-0.003)*
Size		0.012	0.024

		(0.008)*	(0.004)*
Consolidation			-0.815 (-0.002)*
Nobs	275	275	275
F-Statistic (p-value)	17.50 (0.000)	17.83 (0.000)	17.91 (0.000)
First order serial correlation ^a (p-value)	-7.68 (0.000)	-7.63 (0.000)	-7.66 (0.000)
Second order serial correlation ^a (p-value)	0.27 (0.003)	0.11 (0.002)	0.12 (0.007)
Sargan test ^b (p-value)	0.80 (0.931)	0.611 (0.214)	0.435 (0.153)

Notes: All models were estimated in Stata 12. Model 1 does not include size and consolidation. Model 2 does not include consolidation and model 3 includes all variables.

The standard errors are presented in parentheses below the parameters; those followed by * are statistically significant at the 1% level; those followed by ** are statistically significant at the 5% level.

^aArellano-Bond test for zero autocorrelation in first-differenced errors. H0: no autocorrelation.

^bSargan test of over-identifying restrictions. H0: over-identifying restrictions are valid.