QUASI-EXPERIMENTAL DESIGN ANALYSIS OF THE PERFORMANCE EFFECT OF BANK RECAPITALIZATION POLICY IN NIGERIA

By Walter Anuku & Stella Madueme

Abstract

Financial performance and its role as a primary objective of a business organization is encapsulated in the measure of assets conversion to profitability. Financial performance measures such as Return on Assets (ROA) and Profit After Tax (PAT) signify the achievement of an essential organizational objective in a merger. As a result, this work examined the effect of mergers on the performance of money deposit banks in the Nigerian banking industry. Fourteen banks were selected; seven merged and seven non-merged banks. Secondary data were sourced from the banks' financial statements, covering 21 years from 2000 to 2020 pre and post-consolidation periods. Variables analyzed are: Return on Assets, customer deposits, fixed assets, customer loans, efficiency, and profit after tax. The judgmental sampling technique has been used in selecting the banks as a firm that has survived the consolidation policy of CBN. The banks are listed on the Nigerian stock exchange market, therefore enabling easy access to the financial reports, which are the major source of the secondary data. The Difference in Differences (DiD) model was used to ascertain the performance effect of mergers in the banking sector. Root test analysis shows the data was stationary at levels using Philips Peron. Difference-in-differences models estimate the effect of exposure by using changes over time in a treatment group relative to a control group. The study finds a non-significant Return on Assets (ROA) and a significant merger effect on profit.

Keywords: Merger, Bank reforms, Consolidation, Performance measures

JEL classification: E5, E6, G21, G28, G34

1.0 INTRODUCTION

Consolidation in the banking industry raises concerns among policymakers that it may lead to reduced availability of credit for small business owners. If reduced availability for credit for small business owners occurs, the result could include a decrease in the number of small banks specializing in extending loans to small and medium scale entrepreneurs. Experts argued that the banking industry's consolidation in Nigeria which occurred in 2004, will harm the amount of credit available to small and medium scale enterprises (Babajide et al., 2016). Banks are a significant source of credit for small and medium enterprises. Unlike large firms which have access to the capital market, small and medium scale enterprises rely heavily on self-financing supported by bank credit. According to Black and Strahan (2002), if large banks increasingly acquire small banks in the form of consolidation, the merger will affect the performance of enterprises.

Banks' profitability is paramount to bank management, financial markets, supervisors, and academics. Performance and profitability interest are driven by increasing consolidation in the banking sector, production technology, regulation changes, and border barriers (Goddard et al., 2007). As a result, explaining the banks' profitability changes is essential in banking literature. The first consideration related to bank profit maximization concerns the concepts of risk and diversification (Hughes et al., 2001). Shareholders balance for the need for maximizing expected profits and minimizing costs against the amount of risk they are willing to take (Froot, 2007). Abstracting from speculative motives, shareholders are generally assumed to be indifferent to the distribution of profits based on receiving a return on investment in the bank either through an increase in the bank's share price or through dividends received (Chirico et al., 2020). If all banks shared the same risk-return preferences, there could be control of a bank's risk preferences (Fagereng et al., 2019). Achieving performance in service organizations is difficult because of some features involving service, such as heterogeneity, perishability, intangibility, and simultaneity that is challenging due to the difficulty in quantifying the performance (Goddard et al., 2007). In the financial organizations, the focus is to measure profitability instead of performance using ROA (Moore, 2000). Since the 1980s and early 1990s, the interest in academic studies in business performance has increased because of bank failures and liberalization despite growth in profit (Ikhide & Alawode, 2001). This paper is organized as follows: discussion on the concept of performance, then empirical literature, before the methodology of study, subsequently, the results and discussion are presented, and finally the conclusion and policy recommendations.

1.1 THE CONCEPT OF PERFORMANCE

The concept of business performance lends to an endless variety of definitions, many of which relate to specific contexts or functional perspectives. McTighe et al. (2020) gave a general and wellcrafted definition of performance, sharing the concept of two primary components, efficacy and effectiveness. Several other definitions of performance contained focus on showing financial results as a primary measure of performance and the size of efficiency. Subsequently, performance concept definitions have evolved, especially with the emergence of the Balanced Scorecard (Kaplan & Norton, 1992) and includes the financial perspective and customer perspective, the internal perspective, and innovation. Performance can equally be expressed through a balanced set of parameters that describe the results and processes needed to achieve these results. For example, the construction business performance is ascertained by balancing and interrelation of four forces (Kaplan & Norton, 2001): Shareholders' meeting requirements, customer satisfaction, efficiency of production processes, and capacity of the growth and development including staff skills which are; training, satisfaction, the degree of innovation, and the use of opportunities. Performance will always be a contested concept and in continuous development (Richters & Siemoneit, 2019). Getting to a consensus regarding the definition of performance is complex at the level of the organization because of the need to keep account of all activities that take place in an organization and of all different interests involved. Often the objectives of organizational leaders tend to be ambiguous, constantly changing, controversial, and sometimes contradictory.

However, performance is a multifaceted and subjective phenomenon. In a company, usually stakeholders can affect or be affected by the activities of that company and there may be widely divergent perspectives on what constitutes performance (Tripathi & Lamba, 2015). To define performance, it is important to monitor the evolution of the meaning of this concept. Performance is explained according to the level of achievement of objectives; based on productivity and enterprise efficiency with regards to value creation (Pintea & Achim, 2010). The performance content is completely dependent on strategic objectives and not independence of objectives. Also, performance evaluation is dependent on setting goals (Surroca et al., 2020). For example, what is performing in a given situation, characterized by certain objectives, maybe in another situation characterized by other objectives. Performance means to achieve goals in convergence with the company mission (Haseeb et al., 2019). Importantly, performance is not simply finding a product but rather a comparison result and objective (Didier Noyer, 2002).

Another perspective is one in which performance is defined according to effectiveness and productivity. Performance can be defined as the company's competitiveness reaching a level of effectiveness and efficiency or productivity that provides a reliable market presence (Buckley et al., 1988). Additionally, performance is an unstable equilibrium between efficiency and productivity. A company registers performance theoretically when performance becomes productive and effective. If efficacy were identical to productivity, expectations would become the source of endogenous business. In these circumstances, the environmental prospects or economic enterprise will disappear. So, there is no absolute economic performance without the mention of Return on Assets (ROA). In the analysis of financial statements, this ratio is highlighted because it can indicate company success to create profits. ROA can be used to measure the ability of a company to generate past profits to be projected in the future (Gunadi et al., 2020). Assets in question are company properties obtained from capital or foreign capital converted into company assets used for corporate sustainability.

ROA serves as a useful framework for understanding how the longer-term forces of the big shift affect the firm performance (Feng et al., 2015). There has been an increase in companies requiring more assets to generate an equivalent income since the 1960s. Initially, this is surprising given the shift toward service industries that are less fixed asset-intensive and the widespread outsourcing and offshoring of asset-intensive activities like manufacturing and logistics. The long-term ROA path for a company is always revealing. Researching into the components of ROA and the operating metrics that drive the components that have the biggest impact on long-term financial performance can yield insight into the forces that reshape the business environment while requiring companies to zero in on the operating metrics that are critical for performance improvement. The ROA provides a more balanced view of performance compared to traditional metrics such as ROE (Al-Busaidi & Al-Muharrami,2020). According to Akinroluyo and Dimgba (2022), metrics like Return on Equity (ROE) disregard the risk that financial leverage creates. In addition, an increase in leverage improves the asset balances through cash and further changes in leverage are equally reflected in assets. The additional importance of ROA is the ability to measure business operations holistically (Naseem et al., 2020). The move to falsely improve net income would create a smaller change in ROA because the measure weighs net income as a proportion of assets. The ROA reflects the cumulative outcome of decision making in the organization and gives ROA the benefit of holding management accountable for the collective decisions made in deploying assets (Uyemura et al., 1996). The ROA will stagnate if resources are used in projects that constantly yield little value. Alternatively, ROA will soar if management utilizes assets in projects that create value.

1.2 EMPIRICAL LITERATURE

DeYoung (1993) found that mergers improved cost efficiency when both the acquirer and target are poor performers. In addition, DeYoung (1993) reviewed literature containing information that employs standard corporate finance measures that analyze the effect of mergers on bank performance. Srinivasan and Wall (1992) examined all commercial bank and holding company mergers between 1982 and 1986 and determined that mergers did not reduce non-interest expenses. Srinivasan (1992) reached a similar conclusion. Both studies focused solely on non-interest expenses, resulting in an incomplete picture of the cost savings associated with mergers. To gain a complete understanding of bank costs, the total interest and non-interest expenses must be examined. Various funding and investment strategies have different impacts on the two cost components. For example, an increased purchase fund increases interest costs but lowers non-interest costs.

In an earlier study, Rhoades (1987) examined the impact of mergers on net income ratios before extraordinary items to assets and non-interest expenses to assets using 13 mergers. Rhoades (1987) conducted a profit analysis involving billion-dollar banks in which a dummy variable distinguishing non-merger banks from banks merged by multibank holding companies was the dependent variable. Performance measures and several control variables served as the independent variables (Elumilade, 2010). Rhoades determined that neither income nor interest expenses were impacted by merger activity. The research further determined that there is no performance effect due to mergers. Linder and Crane (1992) analyzed the operating performance of 47 bank-level intrastate mergers in New England between 1982 and 1987. The researchers found that of the 47 mergers in the sample, 25 were consolidations of bank subsidiaries owned by the same holding company. The authors combined merger and target data one year before and compared it to data performed one and two years after the merger. The performance of merged banks was adjusted by the performance of all non-merging banks in the same state as the merging entities. The results indicated mergers did not improve operating income when measured by net interest income plus net non-interest income to assets. Several researchers found evidence of merger gains, but the results of these studies must be scrutinized (Oloye & Osuma, 2015). Spindit and Tarhan (1993) found a gain in their sample of 192 commercial bank mergers completed in 1986. Non-parametric tests comparing the performance changes of merged banks with a group of matched pairs indicated that mergers led to operating improvements. The results, however, may be due primarily to economies of scale. The existing evidence in the literature suggests that scale economies exist for institutions holding less than $100 million in assets. The results were based on a sample of mergers involving banks holding less than $100 million. Since economies of scale may drive the results at small institutions, it is unclear whether their findings are relevant to large mergers. Chamberlain (1992) demonstrated the importance that sample selection can have in influencing the results of a merger study. The sample consisted of 180 bank subsidiaries that bank holding companies acquired between 1981 and 1987. The unit of analysis was the individual target bank that experienced a change in ownership but was not consolidated into another bank. For each merger, matched pair analysis was conducted, as pre-merger and post-merger performances of the merged bank were compared to those of a non-merged bank from the same area and of similar size and leverage. While Chamberlain (1992) found evidence of overall gains when Texas mergers are omitted from the sample, the full sample yields no evidence of gains. Wadhwa and Syamala (2015) conducted the first of these studies and examined 30 large holding company mergers between 1982 and 1987. The authors found that profitability, as measured by cash flow returns on the market value of assets, improved significantly after the merger. These findings, however, must be viewed closely because the market value of assets may be an inappropriate measure for standardizing income.

Given the nature of banks as financial intermediaries, it is unclear why deposits are not included in this liability-based definition; the appropriateness of subtracting cash holdings is also debatable. Cornett and Tehranian (1992) found that net income to assets, a more traditional measure of bank profitability, does not change significantly. In addition, the findings of Cornett and Tehranian may also be partially driven by adjusting performance by an improper benchmark. Cornett and Tehranian (1992) used a sample of banks throughout the country traded on either the New York Stock Exchange or other equivalent in the West that did not merge during the sample period. This comparison set of banking organizations may not be relevant to the sample institutions with significantly different regional characteristics. Sample observations with several questionable deals accentuate this problem. As a result, the findings of post-merger improvements relative to a benchmark may be due to the unique data used for the study. The authors also found that changes in several performance measures, including cash flow returns on the market value of assets, were positively correlated with value-weighted abnormal returns. These relationships suggest that the market could have accurately forecasted the eventual benefits of individual mergers. However, net income to total assets is not one of the variables correlated to value-weighted abnormal returns. Pilloff (1996), like Cornett and Tehranian, combined both approaches found in the literature to analyze a sample of 48 publicly traded banking organizations that merged between 1982 and 1991. The study improved upon Cornett and Tehranian by addressing some problems in the paper. First, results were based on traditional measures of performance that were appropriate for a study of banking organizations. Second, the performance of merging banks was compared to a more accurate benchmark that controls for geographic location. Third, and perhaps most importantly, the merger sample was larger, with substantially fewer poorly suited observations for analysis. Pilloff (1996) obtained results consistent with the bulk of the merger literature. In general, mergers were not associated with any significant change in performance, suggesting that managers could not generate benefits from the deals on average. Moreover, the overall mean change in shareholder value was also small. Although there was no average change in operating performance or shareholder value, there was much variation among banks. Some mergers proceeded successfully, and others failed.

Likewise, the dispersion of changes in market values indicates that investors expected some mergers to increase and others to decrease firm value.

1.3 METHODOLOGY

Difference in Differences (DID) models treatment group's exposure status, changes over time due to changes at a more aggregate level or policy change, while the control group experiences no change in the policy or the rule governing exposure. The DID design mimics a controlled trial with no randomized assignment to the two groups. In a randomized trial, the exchangeability of the groups is necessary because it balances all characteristics in expectation. In a DiD model, exchangeability is asserted based on examining time trends before the policy change similar to a case time control design. DID analysis is a statistical technique that analyzes data from a nonequivalence control group design and makes a causal inference about an independent variable (Penfold & Zhang, 2013). A nonequivalence control group designs the temporal order of the independent and dependent variables, generating which variable is the cause and which the effect (Kenny, D. A., 1975). A nonequivalence control group design does not arbitrarily assign respondents to the control or treatment group, so control and treatment groups may not be equivalent in the attributes and reactions to the treatment. Incorporating a control group eliminates many threats, except the selection bias to internal validity so researchers do not need to control every confounding variable in the analysis statistically. According to Lechner (2011), the DID is intuitive and can be easily understood within a regression framework. The data used as proxies for measuring performance is Return on Assets (dividing net income by total assets, efficiency (dividing a bank's expenses by net revenues)), fixed assets (Total Fixed Asset Purchase Price + capital improvements) – (Accumulated Depreciation + Fixed Asset Liabilities), customer loans (are assessed directly from customers' investments in banks), profit after tax (subtracting all expenses and income taxes from the revenues the business has earned), customer deposits (are assessed directly from customers' investments in banks).

1.4 MODEL SPECIFICATION

The DID model will be deployed as follows:

DID set up:

Two groups:

D = 1: treated units

D = 0: control units

Two periods:

T = 0: pre-treatment
period T = 1: post-
treatment period Potential
outcomes:
$Y1t$ (t): outcome unit i attains in period t if treated before
t $Y0t$ (t): outcome unit i attains in period t if treated
before t
Treatment effect for unit i at time t is

$$Y1i(t)-Y0i(t) \quad (1)$$

Observed outcomes $Y_i(t)$ are realized as

$$Y_i(t) = Y_{0i}(t)(1-D_i(t)) + Y_{1i}(t)D_i(t) \quad \ldots\ldots(2)$$

Since the treatment occurs only after $t = 0$, we define

$$D_i = D_i(1)$$

It follows that,

$$Y_i(0) = Y_{0i}(0), \quad \ldots\ldots(3)$$

$$Y_i(1) = Y_{0i}(1)(1-D_i) + Y_{1i}(1)D_i \quad \ldots\ldots(4)$$

Let

$$\alpha ATET = E[Y1(1)-Y0(1)|D = 1] \quad \ldots\ldots(5)$$

If the treated and non-treated would have exhibited the same trend in the absence of the treatment

$$E[Y0(1)-Y0(0)|D = 1] = E[Y0(1)-Y0(0)|D = 0] \quad \ldots\ldots(6)$$

Then:

$$\alpha ATET = [E[Y(1)|D = 1]-E[Y(1)|D = 0] - [E[Y(0)|D = 1]-E[Y(0)|D = 0] \quad \ldots\ldots(7)$$

The regression version of the DID with the covariates, will be the model for measuring performance as follows:

$$YR = \beta 0 + \beta 1 D^{post} + \beta 2 D^{Tr} + \beta 3 D^{post} D^{Tr} [+ \beta 4 X] + \varepsilon \quad \ldots\ldots(8)$$

YR = ROA

D^{post} = Time Dummy (1 = after merger)

D^{Tr} = Treatment group Dummy

$D^{post}D^{Tr}$ = Time x Treatment interaction

B3 = DID estimate

X = Vector of control variables

DID estimate = $(\bar{Y}_{B,2} - \bar{Y}_{A,2}) - (\bar{Y}_{B,1} - \bar{Y}_{A,1})$ ……………………………………..(9)

$(\bar{Y}_{B,2} - \bar{Y}_{A,2})$ = the difference across types after treatment

$(\bar{Y}_{B,1} - \bar{Y}_{A,1})$ = difference before treatment

To examine the effect of merger on bank profitability the regression analysis with the same variables was used, only the independent variable was changed to reflect profitability as the regressand. The new model used is as follows:

Ypat = $\beta 0 + \beta 1 D^{post} + \beta 2 D^{Tr} + \beta 3 D^{post} D^{Tr}$ [+ $\beta 4X$] + ε ………………(10)

Ypat = profit after tax, while other definitions remain the same.

for respondents in a treatment (or a control group) at a certain time point; Time is coded as 0 at t0 and 1 at t1; X is coded as 0 for the control group and 1 for the treatment group, so that:

Yc1 = B0

Yc2 = B0 + B1

Yt1 = B0 + B2

Yt2* = B0 + B1 + B2

Yt2 = B0 + B1 + B2 + B3

DID estimates the difference between Yt2 and Yt2* = (B0 + B1 + B2 + B3) - (B0 + B1+ B2) = B3

1.5 Descriptive Statistics, Diagnostic, and Normality Test

Result of summary of variables

PRE-TREATMENT						
Variable	**eff**	**cloan**	**roa**	**cdeposit**	**pat**	**fassets**
Mean	0.675256	38.57692	0.032051	38.41026	38.19231	38.10256
Std. Dev	0.20495	22.23868	0.01155	21.81649	22.0201	21.56572
Min	0.05	1	0.01	1	1	1
Max	1	75	0.06	76	76	75
Variance	0.042005	494.5589	0.000133	475.9594	484.8846	465.0803
Skewness	-0.476459	0.002889	0.611798	0.011652	0.016787	-0.016234
Kurtosis	3.554299	1.760586	3.169666	1.839897	1.804175	1.813118
obs	79	79	79	79	79	79
POST-TREATMENT						
Variable	**eff**	**cloan**	**roa**	**cdeposit**	**pat**	**fassets**
Mean	.7084186	106.5953	.0304186	108	107.9628	106.0093
Std. Dev	.2437102	61.57117	.017676	62.20932	62.14739	61.19236
Min	0.01	1	0.01	1	1	1
Max	1	213	0.11	215	214	212
Variance	-1.247816	3791.008	.0003124	3870	3862.298	3744.505
Skewness	-1.34262	.0105816	2.063442	0	-.0031705	.0148
Kurtosis	4.082249	1.801606	9.563913	1.799948	1.796103	1.802243
obs	215	215	215	215	215	215

*** p<0.01; ** p<0.05; * p<0.1

Table 1: STATA Output by author

The descriptive statistics explain the data deployed for the analysis. The standard deviation values showed the extent to which the observations are dispersed around their respective means. The standard deviation to the mean of the variables greater than 0.5 suggests a high coefficient of variation or high dispersion. The skewness measures the level of asymmetry of the series; On the whole, the data are reliable, having been controlled for heteroscedasticity and correlation. The mean values are not far from the median values either in the pre-treatment or post-treatment period, and these values generally lie between the maximum and the minimum values in all cases. This shows that the data do not contain expanded outliers. As expected, the standard deviations indicate that all the variables witnessed substantial variations.

GLS Model Output

ROA		EFF		CDEPOSIT		PAT		CLOAN	
Regressors	Coef/Prob.	Regressors	Coef/Prob.	Regressors	Coef/Prob.	Regressors	Coef/Prob.	Regressors	Coef/Prob.
Eff	-.0014117 0.002***	Roa	-.3707304 0.308	Roa	124.3871 0.322	Roa	56.64491 0.778	Roa	103.1941 0.434
Fassets	-2.39e-06 0.295	Fassets	.0002408 0.003***	Fassets	-.089396 0.000***	Fassets	.060879 0.053**	Fassets	.0840904 0.000***
Cdeposit	-1.01e-06 0.718	Cdeposit	-.0000233 0.765	Eff	.694921 0.912	Eff	4.182424 0.674	Eff	1.139678 0.816
Cloan	.000011 0.000***	Cloan	.0000398 0.559	Cloan	.0666633 0.005***	Cloan	.0509011 0.184	Pat	.066421 0.010**
Pat	4.98e-07 0.809	Pat	.0001978 0.003***	Pat	.0400746 0.047**	Cdeposit	-.0212533 0.580	cdeposit	.0845014 0.010**
Cons	.0317614 0.000***	Cons	.6369673 0.000***	Cons	139.3418 0.000***	Cons	127.8731 0.000***	Cons	108.8029 0.000***
common AR(1) coefficient for all panels(0.6275)		common AR(1) coefficient for all panels (0.2983)		common AR(1) coefficient for all panels (0.4925)		common AR(1) coefficient for all panels (0.3023)		common AR(1) coefficient for all panels (0.4602)	

*** p<0.01; ** p<0.05; * p<0.1

Table 2: STATA Output by author

Since the individual characteristics are not random but fixed and has the capacity to impact the outcome of regressand and the regressors, there is need to control for them. Output result show that heteroscedasticity, fixed effects, and serial correlation was found in some of the variables in this study as shown under appendix 3 (Diagnostic test). To correct the issue so that the result of this study can be used to forecast and generalized to relative economies, Feasible Generalized Least Squares (FGLS), where the syntax in Stata is XTGLS was used. From the results of all models (0.6275, 0.2983, 0.4925, 0.3023, and 0.4602), the coefficients for all panels exceed 0.05 therefore, we cannot reject the null hypothesis of the absence of serial correlation and heteroscedasticity but rely on the p-values to accept the data. According to Bai, Choi & Liao

(2021), by estimating the large error covariance matrix consistently, the proposed FGLS estimator is more efficient than the Ordinary Least Squares (OLS) in heteroscedasticity and serial correlations. Also, Hausman and Kuersteiner (2008), stated that FGLS based test outperforms other tests on OLS and can reduce the effect of serial correlation. The cross sectional results indicated that the data deployed in this study is not significant with cross sectional correlation.

Jarque-Bera Normality Test Output

Skewness/Kurtosis Tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
myResiduals	294	0.5552	0.1208	2.77	0.2501

*** p<0.01; ** p<0.05; * p<0.1

Table 3: STATA Output by author

The normality test preceded the DiD analysis. The skewness measures the degree of asymmetry of the data series, whereas the Kurtosis pictures the peakedness or flatness of distribution. Before the analysis, the data log was extracted to check the negative values before creating residuals derived from a regression model and the parameters were estimated; then, the normality test was carried out on the residuals. From the output result, the skewness probability of 0.5552 is connected to the sample of the skewness only of the residuals from the regression model: which is normal. Also, the Kurtosis p-value of looking at the Kurtosis sample is 0.1208: which is asymptotically normally approximately distributed. Jarque-bera uses skewness and Kurtosis test to create an adjusted Chi-square figure for the data under evaluation, and the p-value of the adjusted Chi-square is 0.2501. Obviously, because the p-values are not under the standard significant threshold of 5% (0.05), we cannot reject the null hypothesis of normality but rely on the p-values to accept the data residuals as normally distributed.

Outcome Var.		**ROA**	**|t|**	**P>|t|**
Before				
	Control	0.031		
	Treated	0.032		
	Diff (T-C)	0.001	0.25	0.806
After				
	Control	0.029		
	Treated	0.031		
	Diff (T-C)	0.002	0.78	0.438
Diff-in-Diff		0.001	0.18	0.857

*** p<0.01; ** p<0.05; * p<0.1

Table 4: STATA Output by author

Return on assets, is used as a measure of performance in the regression model and is calculated by dividing the net profit by the total assets. It defines the investor's idea of how effective the company is in converting the money it invests into net income, which indicates the profitability compared to the total assets by determining how well a company performs to its total assets. Return on Assets in the pre-treatment era shows a marginal value in the treated group compared to the control. In the control group, the figure stands at 0.031, while it is 0.032 in the treated group, implying that the entire banking system in Nigeria was not performing in their outputs because the values were almost similar. Evaluating the problems that plagued the banking system is evident from the data of ROA in the pre-treatment period. From the pre-treatment period, the difference is 0.001, which of course, is minimal and suggests the banking sector suffered non-performance equally either with the treated or control group. Not necessarily because they do not have a huge capital base but a decay in the system that needed to be repaired; whether the bank capitalization increase can solve the problem is what we will find out in the post-treatment period data. Nevertheless, the data in the pre-treatment era presents similar issues of non-performance probably because of weak management, round-tripping, and weak balance sheet, among others mentioned under the problem statement.

After the exercise, the output data shows no difference from the post-treatment era. Performance issues persist after the CBN consolidation policy; although the policy might improve the ROA effect beyond 2020, but as it stands from the data output of this study, the post-treatment era is not different from the pre-treatment. Thought of the antagonists of the restructuring programme resonates in the output data of the post-treatment era of ROA. For example, contrary to the theoretical expectation that higher bank capital levels promote banking sector performance, Okafor (2011) argues that high bank capitalization does not automatically translate to improved bank performance, but depends on the optimality of the investment portfolio mix generated by the expanded capital base. Also, Asedionlen (2004) posits that although recapitalization may enhance short-term liquidity levels, it does not guarantee a conducive macroeconomic environment necessary for promoting high asset quality and enhanced performance levels. High implementation costs may also impair the capacity of enhanced bank capital to promote operational performance in banks. Okafor (2011) explains that compliance with new capitalization requirements often involves vast costs and enormous marketing efforts and that a short transitional period only offers affected banks ample time to evaluate all implementation options to choose the best and most cost-effective option. In addition, Akinbuli and Kelilume (2013) stated that banking events support the idea that mergers are not a veritable solution to the problem of financial distress in corporate financial organizations, especially when mergers are more regulatory imposed than business environment driven.

Under the difference in differences section, output data of 0.001, is also minimal to warrant significance, yet points to weak performance and ROA similarities in banks: control, or treated notwithstanding. Additionally, the t-stat values of 0.25 in the pre-treated is small, which indicates a small standard error because of the control on heteroscedasticity using the Feasible Generalized Least Squares (FGLS). A closer look at figure 0.25 suggests a weaker performance of ROA in the pre-treatment era and this supports the claim that the merger has yet to make the banks increase their ROA during the post-treatment with t-stat 0.78. In the post-treatment era, the t-stat value is 0.78 which is higher than 0.25 in the pre-treatment era. The 0.75 indicates higher support for the null hypothesis under the model but implies that the post-treatment period is more significant than the pre-treatment. Also, 0.18 is the figure under the diff-in-diff for t-stat and represents the lowest when compared to the pre-treatment or the post-treatment. Merger effect is at its weakest considering the differences between the period (pre-treatment and post-treatment) and the groups (control and treated). In the section of the p-value of ROA output data, the pre-treatment period of 0.806 is non-significant. While the post-treatment period p-value of 0.438, is also non-significant, and the difference in differences p-value is 0.857; all of them show that at all times, ROA was never significant, which supports non-performance in the banking sector as a result of mergers. The result is confirmed by the findings of (Akinbuli &

Kelilume (2013); Musah, Abdulai, & Baffour (2020); Yusuf & Sheidu, 2015)) that merger has no significant effect on performance.

Outcome Var.		**PAT**	**|t|**	**P>|t|**
Before				
	Control	121.414		
	Treated	71.652		
	Diff (T-C)	-49.762	-2.56	0.011**
After				
	Control	95.013		
	Treated	113.702		
	Diff (T-C)	18.689	1.63	0.105
Diff-in-Diff		68.451	3.03	0.003***

*** p<0.01; ** p<0.05; * p<0.1

Table 5: STATA Output by author

Profit After Tax (PAT) before the merger of the control group is larger compared to the treated group indicating that the profitability of the treated bank was weak and deserving of the merger exercise. With a negative PAT of -49.762, the treated banks' policy intervention is justified because it exhibited lack of profits before the merger exercise. The period after the merger shows a lower PAT for the control group than the treated group. By implication, PAT p-value of 0.105 is insignificant but the merger PAT value of 113.702 support the treated group improvement in profitability because that value is higher than 95.013 of the control group. A 0.003 p-value shows that merger has influenced banks' profits, especially the treated. The positive value of the DID (68.451) supports improved profitability of treated banks. The difference between the control and the treatment after the merger is 18.689, which is a positive value tells us of the increase of profits between groups in the post-merger in favor of the merger policy. Profits in the treated group are expected to add more resources for transactions, compensate shareholders, and execute projects. More importantly, profit from the treated group in part justifies policymakers' expectations of consolidation and mergers. The expectation is that banks with more profits can support the economy and grow the right sectors while competing internationally. A negative t-stat value of -2.56 expresses a low value of the standard error because in calculating t-stats, we divide the coefficient with the standard error. Therefore, the t-stats value of -2.56 before the merger supports the evidence of low profitability before the merger between the group (control and treated). A t-value of 1.63 after the merger indicates that profits have increased, and points to the relevance of the policy effect. The low value of the t-stats measures the number of standard errors that the coefficient is from zero, therefore, more significant value of 1.63 in the post-merger era between groups in the same period compared to the t-stat value of -2.56 before the merger shows that the period after the merger is more significant. The t-stat value of 3.03 which is the difference in differences between the groups (control and treated) between the periods (before and after) is higher than the t-value before or after and supportive of the p-value of 0.003, meaning that the merger effect on banks profitability is positive. From the data analysis, we can conveniently submit that Nigerian banks' profitability has improved after the merger exercise. Overall, the merger p-value of 0.003 indicates that PAT is significant to bank mergers. A significant profit in bank merger effect aligns with the study of Ado, Rashid, Mustapha, and Ademola (2020) that bank profits are significant with mergers.

1.6 CONCLUSION AND RECOMMENDATIONS

The result shows that bank performance is not significant due to the merger exercise. The choice of return on assets is a better metric of organizations financial performance than income statement profitability measures. The ROA explicitly considers the assets used to support business activities and determines whether the company can generate an adequate return on these assets rather than simply showing huge PAT. Asset-heavy companies need a higher level of net income to support the business relative to low asset companies where small margins can generate a very healthy return on assets. Banks should improve on total asset turnover to diversify their funds in such a way that they can generate more income on their assets, to improve their return on equity. Central Bank of Nigeria should monitor banks methods and process of giving out loans to customers to get the maximum value of the shareholders' fund while increasing the profitability of the banks. The result is confirmed with the findings of Musah, Abdulai, and Baffour, (2020), that merger has no significant effect on performance.

The results indicate a recommendation that the performance of banks be examined regularly and preferably quarterly to increase stability and predictability. Monetary stability is a prerequisite to a performing financial system and indeed for the economic development of any country. Regulatory and supervisory authorities should formulate and implement monetary policies effective enough in helping the banks to improve operations to improve efficiency in resource allocation and utilization. Mergers that do not perform can hardly be regarded as successful. As such, banking sector consolidation should be allowed to be market-driven to achieve the benefits that accompany such exercise. Merged banks should improve total asset turnover and diversify investments in such a way to generate more income, to avoid the lopsided profit.

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2. Ethical Approval: All papers must include the following TWO statements irrespective as to whether or not they involve human participants or their data.

• Ethical approval : Ethical approval: If applicable include the following details:

(a) Full name of the committee that approved the research;

(b) Confirmation that all research was performed in accordance with relevant guidelines/regulations applicable when human participants are involved (e.g. Declaration of Helsinki, or similar);

(c) If a study was granted exemption from requiring ethics approval, the reason for this should be explained in sufficient detail.

• Informed consent: ***This article does not contain any studies with human participants performed by any of the authors.***

*Author's contribution: Please include a statement that specifies the contribution of every author in order to promote transparency. ***The two authors contributed equally in all aspects either the theoretical part or the empirical part***

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APPENDICES

Appendix 1: Diagnostic Test

Unit Root Test

```
. xtunitroot llc ln_roa

Levin-Lin-Chu unit-root test for ln_roa

---------------------------------------

Ho: Panels contain unit roots           Number of panels  =     14

Ha: Panels are stationary               Number of periods =     21

AR parameter: Common                      Asymptotics: N/T -> 0

Panel means:  Included

Time trend:   Not included

ADF regressions: 1 lag

LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)

----------------------------------------------------------------------

                    Statistic      p-value

----------------------------------------------------------------------

 Unadjusted t        -8.3531

 Adjusted t*         -2.6399        0.0041
```

```
xtunitroot llc ln_fassets1


Levin-Lin-Chu unit-root test for ln_fassets1

--------------------------------------------

Ho: Panels contain unit roots          Number of panels  =     14

Ha: Panels are stationary              Number of periods =     21

AR parameter: Common                      Asymptotics: N/T -> 0

Panel means:  Included
```

```
Time trend:   Not included

ADF regressions: 1 lag

LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)

---------------------------------------------------------------------

                    Statistic      p-value

---------------------------------------------------------------------

 Unadjusted t        -8.3119

 Adjusted t*         -3.1080        0.0009

---------------------------------------------------------------------

xtunitroot llc cdeposit1

Levin-Lin-Chu unit-root test for cdeposit1

------------------------------------------

Ho: Panels contain unit roots           Number of panels  =     14

Ha: Panels are stationary               Number of periods =     21

AR parameter: Common                       Asymptotics: N/T -> 0

Panel means:  Included

Time trend:   Not included

ADF regressions: 1 lag

LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)

---------------------------------------------------------------------

                    Statistic      p-value

---------------------------------------------------------------------

 Unadjusted t        -8.6435

 Adjusted t*         -2.5022        0.0062

xtunitroot llc pat1


Levin-Lin-Chu unit-root test for pat1
```

```
-------------------------------------
Ho: Panels contain unit roots           Number of panels  =     14
Ha: Panels are stationary               Number of periods =     21
AR parameter: Common                       Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included
ADF regressions: 1 lag
LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)
---------------------------------------------------------------------
                    Statistic      p-value
---------------------------------------------------------------------
 Unadjusted t       -10.6181
 Adjusted t*         -5.5692        0.0000
```

```
xtunitroot llc eff
Levin-Lin-Chu unit-root test for eff
------------------------------------
Ho: Panels contain unit roots           Number of panels  =     14
Ha: Panels are stationary               Number of periods =     21
AR parameter: Common                       Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included
ADF regressions: 1 lag
LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)
---------------------------------------------------------------------
                    Statistic      p-value
---------------------------------------------------------------------
 Unadjusted t       -11.8935
```

```
 Adjusted t*          -6.4164        0.0000
----------------------------------------------------------------------
xtunitroot llc cloan1
Levin-Lin-Chu unit-root test for cloan1
----------------------------------------
Ho: Panels contain unit roots            Number of panels  =     14
Ha: Panels are stationary                Number of periods =     21
AR parameter: Common                        Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included
ADF regressions: 1 lag
LR variance:     Bartlett kernel, 8.00 lags average (chosen by LLC)
----------------------------------------------------------------------
                    Statistic      p-value
----------------------------------------------------------------------
 Unadjusted t         -8.9810
 Adjusted t*          -3.3476        0.0004
----------------------------------------------------------------------
```

Cointegration Test

```
xtcointtest pedroni pat1 eff roa fassets1 cdeposit1 cloan1
Pedroni test for cointegration
------------------------------
Ho: No cointegration                   Number of panels       =     14
Ha: All panels are cointegrated        Number of periods      =     21
Cointegrating vector: Panel specific
Panel means:          Included              Kernel:            Bartlett
Time trend:           Not included          Lags:           1.00 (Newey-West)
AR parameter:         Panel specific        Augmented lags:    1
----------------------------------------------------------------------
```

	Statistic	p-value
Modified Phillips-Perron t	2.3230	0.0101
Phillips-Perron t	-3.9413	0.0000
Augmented Dickey-Fuller t	-3.9563	0.0000

Heteroscedasticity Test

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of eff
         chi2(1)      =     3.33
         Prob > chi2  =   0.0682


Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of pat1


         chi2(1)      =     0.21
         Prob > chi2  =   0.6447
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ln_roa
         chi2(1)      =     0.02
         Prob > chi2  =   0.8898
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ln_cloan1
         chi2(1)      =   154.65
```

```
         Prob > chi2  =   0.0000
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ln_cdeposit1
         chi2(1)      =     4.19
         Prob > chi2  =   0.0407
```

Autocorelation Test

```
Pesaran's test of cross sectional independence =  0.156, Pr = 0.8761
Average absolute value of the off-diagonal elements =     0.224

Pesaran's test of cross sectional independence =  2.090, Pr = 0.0366
Average absolute value of the off-diagonal elements =     0.214

Pesaran's test of cross sectional independence =   2.645, Pr = 0.0082
Average absolute value of the off-diagonal elements =     0.289

Pesaran's test of cross sectional independence =   0.054, Pr = 0.9572
Average absolute value of the off-diagonal elements =     0.245

Pesaran's test of cross sectional independence =  0.768, Pr = 0.4426
Average absolute value of the off-diagonal elements =     0.192
```

Serial correlation Test

```
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F( 1,      13) =      4.018
           Prob > F =      0.0663

Wooldridge test for autocorrelation in panel data
```

```
H0: no first order autocorrelation
    F(  1,      13) =      4.600
           Prob > F =      0.0515
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,      13) =     11.779
           Prob > F =      0.0045
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,      13) =     23.923
           Prob > F =      0.0003
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,      13) =     29.310
           Prob > F =      0.0001
```

Feasible Generalized Least Square (FGLS) Output

```
Cross-sectional time-series FGLS regression
Coefficients:  generalized least squares
Panels:        heteroskedastic with cross-sectional correlation
Correlation:   common AR(1) coefficient for all panels  (0.6275)
Estimated covariances      =       105          Number of obs      =        294
Estimated autocorrelations =         1          Number of groups   =         14
Estimated coefficients     =         6          Time periods       =         21
                                                Wald chi2(5)       =      47.84
                                                Prob > chi2        =     0.0000
------------------------------------------------------------------------------
         roa |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         eff |  -.0014117   .0004563    -3.09   0.002     -.002306   -.0005174
```

fassets1	-2.39e-06	2.28e-06	-1.05	0.295	-6.85e-06	2.08e-06
cdeposit1	-1.01e-06	2.80e-06	-0.36	0.718	-6.49e-06	4.47e-06
cloan1	.000011	1.66e-06	6.63	0.000	7.74e-06	.0000142
pat1	4.98e-07	2.06e-06	0.24	0.809	-3.55e-06	4.54e-06
_cons	.0317614	.0006806	46.66	0.000	.0304274	.0330954

```
Cross-sectional time-series FGLS regression
Coefficients:  generalized least squares
Panels:        heteroskedastic with cross-sectional correlation
Correlation:   common AR(1) coefficient for all panels  (0.2983)

Estimated covariances      =       105          Number of obs     =        294
Estimated autocorrelations =         1          Number of groups  =         14
Estimated coefficients     =         6          Time periods      =         21
                                                Wald chi2(5)      =      24.43
                                                Prob > chi2       =     0.0002
```

eff	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
roa	-.3707304	.363916	-1.02	0.308	-1.083993	.3425319
fassets1	.0002408	.000082	2.94	0.003	.0000802	.0004015
cdeposit1	-.0000233	.0000779	-0.30	0.765	-.000176	.0001294
cloan1	.0000398	.000068	0.59	0.559	-.0000935	.0001731
pat1	.0001978	.0000671	2.95	0.003	.0000663	.0003293
_cons	.6369673	.0265576	23.98	0.000	.5849153	.6890192

```
Cross-sectional time-series FGLS regression
Coefficients:  generalized least squares
Panels:        heteroskedastic with cross-sectional correlation
Correlation:   common AR(1) coefficient for all panels  (0.4925)
```

```
Estimated covariances      =       105          Number of obs      =        294
Estimated autocorrelations =         1          Number of groups   =         14
Estimated coefficients     =         6          Time periods       =         21
                                                Wald chi2(5)       =      22.64
                                                Prob > chi2        =     0.0004

------------------------------------------------------------------------------
   cdeposit1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         roa |   124.3871   125.5512     0.99   0.322    -121.6888     370.463
    fassets1 |   -.089396   .0224782    -3.98   0.000    -.1334525   -.0453396
         eff |    .694921   6.292297     0.11   0.912    -11.63775     13.0276
      cloan1 |   .0666633   .0240024     2.78   0.005     .0196194    .1137072
        pat1 |   .0400746   .0201316     1.99   0.047     .0006173    .0795318
       _cons |   139.3418   8.073554    17.26   0.000      123.518    155.1657
------------------------------------------------------------------------------

Cross-sectional time-series FGLS regression
Coefficients:  generalized least squares
Panels:        heteroskedastic with cross-sectional correlation
Correlation:   common AR(1) coefficient for all panels  (0.3023)

Estimated covariances      =       105          Number of obs      =        294
Estimated autocorrelations =         1          Number of groups   =         14
Estimated coefficients     =         6          Time periods       =         21
                                                Wald chi2(5)       =       6.42
                                                Prob > chi2        =     0.2678

------------------------------------------------------------------------------
        pat1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         roa |   56.64491   201.1398     0.28   0.778    -337.5818    450.8716
    fassets1 |    .060879   .0327087     1.86   0.053    -.0032288    .1249869
         eff |   4.182424   9.953634     0.42   0.674    -15.32634    23.69119
```

```
     cloan1 |   .0509011   .0382807     1.33   0.184    -.0241277      .12593
  cdeposit1 |  -.0212533   .0383832    -0.55   0.580    -.0964829    .0539764
      _cons |   127.8731   15.41116     8.30   0.000     97.66782    158.0785
```

```
Cross-sectional time-series FGLS regression
Coefficients:  generalized least squares
Panels:        heteroskedastic with cross-sectional correlation
Correlation:   common AR(1) coefficient for all panels  (0.4602)

Estimated covariances      =       105          Number of obs      =       294
Estimated autocorrelations =         1          Number of groups   =        14
Estimated coefficients     =         6          Time periods       =        21
                                                Wald chi2(5)       =     25.45
                                                Prob > chi2        =    0.0001

------------------------------------------------------------------------------
     cloan1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        roa |   103.1941   131.8403     0.78   0.434    -155.2081    361.5963
   fassets1 |   .0840904   .0220578     3.81   0.000     .0408579    .1273229
        eff |   1.139678    4.90061     0.23   0.816     -8.46534     10.7447
       pat1 |    .066421   .0259112     2.56   0.010     .0156358    .1172061
  cdeposit1 |   .0845014   .0328394     2.57   0.010     .0201372    .1488655
      _cons |   108.8029   10.16984    10.70   0.000     88.87041    128.7354
------------------------------------------------------------------------------

Cross-sectional time-series FGLS regression
Coefficients:  generalized least squares
Panels:        heteroskedastic with cross-sectional correlation
Correlation:   common AR(1) coefficient for all panels  (0.4552)
```

```
Estimated covariances      =       105          Number of obs      =       294
Estimated autocorrelations =         1          Number of groups   =        14
Estimated coefficients     =         6          Time periods       =        21
                                                Wald chi2(5)       =     34.56
                                                Prob > chi2        =    0.0000
------------------------------------------------------------------------------
    fassets1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         roa |  -30.71197    112.563    -0.27   0.785    -251.3313    189.9074
      cloan1 |   .0560632   .0210573     2.66   0.008     .0147917    .0973347
         eff |   5.073879   7.522503     0.67   0.500    -9.669956    19.81771
        pat1 |   .0692451   .0210913     3.28   0.001     .0279068    .1105833
   cdeposit1 |  -.1011368   .0249021    -4.06   0.000    -.1499441   -.0523296
       _cons |   134.4742   8.429531    15.95   0.000     117.9526    150.9957
```

Normality Test

```
                    Skewness/Kurtosis tests for Normality
                                                          ------ joint ------
    Variable |        Obs  Pr(Skewness)  Pr(Kurtosis) adj chi2(2)   Prob>chi2
-------------+---------------------------------------------------------------
 myResiduals |        294     0.5552        0.1208        2.77         0.2501
```

Appendix 2: Analysis Output

```
DIFFERENCE-IN-DIFFERENCES ESTIMATION RESULTS
Number of observations in the DIFF-IN-DIFF: 294
            Before         After
   Control: 28             119          147
   Treated: 51             96           147
            79             215
--------------------------------------------------------
 Outcome var.   | roa     | S. Err. |   |t|   |  P>|t|
----------------+---------+---------+---------+---------
```

```
Before          |         |         |         |
   Control      | 0.031   |         |         |
   Treated      | 0.032   |         |         |
   Diff (T-C)   | 0.001   | 0.004   | 0.25    | 0.806
After           |         |         |         |
   Control      | 0.029   |         |         |
   Treated      | 0.031   |         |         |
   Diff (T-C)   | 0.002   | 0.003   | 0.78    | 0.438
                |         |         |         |
Diff-in-Diff    | 0.001   | 0.005   | 0.18    | 0.857
--------------------------------------------------------
R-square:    0.01
* Means and Standard Errors are estimated by linear regression
**Robust Std. Errors
**Inference: *** p<0.01; ** p<0.05; * p<0.1

DIFFERENCE-IN-DIFFERENCES ESTIMATION RESULTS
Number of observations in the DIFF-IN-DIFF: 294
            Before         After
   Control: 28             119          147
   Treated: 51             96           147
            79             215
--------------------------------------------------------
 Outcome var.   | pat1    | S. Err. |   |t|   |  P>|t|
----------------+---------+---------+---------+---------
Before          |         |         |         |
   Control      | 121.414 |         |         |
   Treated      | 71.652  |         |         |
   Diff (T-C)   | -49.762 | 19.444  | -2.56   | 0.011**
After           |         |         |         |
```

```
   Control      | 95.013  |         |         |
   Treated      | 113.702 |         |         |
   Diff (T-C)   | 18.689  | 11.487  | 1.63    | 0.105
                |         |         |         |
Diff-in-Diff    | 68.451  | 22.597  | 3.03    | 0.003***
--------------------------------------------------------
R-square:    0.06
* Means and Standard Errors are estimated by linear regression
**Robust Std. Errors
**Inference: *** p<0.01; ** p<0.05; * p<0.1
```