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Bank mergers and acquisitions and the post-merger and acquisition performance of combined banks: evidence from Sub-Saharan Africa

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ABSTRACT

This study sought to ascertain the effects of bank mergers and acquisitions on the performance of merged banks in Sub-Saharan African (SSA) countries between 2003 and 2019. Specifically, the study aimed to investigate the impact of regulation-induced bank (M&A's) on the post-merger profitability of merged banks in SSA. The motivation for the study is to provide evidence for or against the regulator's claims that regulation-induced bank M&As will improve the performance of merged banks in SSA. The article presents the results of the total sample of all mergers and acquisitions examined in the study and two sub-samples: the regulation-induced M&A sub-sample and the voluntary M&A sub-sample. We measure profitability by return on assets, return on equity, and net interest margin. The paper employed the dynamic panel Generalized Methods of Moments approach to analyse the relationship between bank M&As and profitability. The study found no profitability improvement after M&A across all profitability measures for the total sample and the two sub-samples. Instead, the empirical results reveal that bank profitability suffers after mergers and acquisitions across all profitability measures. The results show that, for regulation-induced mergers and acquisitions, a merged bank's profitability is adversely affected from the beginning of the merger or acquisition to the sixth year of mergers and acquisitions. The findings also reveal that bank risk negatively affect profitability, while liquidity positively affect profitability except returns on equity. Bank costs-to-income ratios as expected all show negative relationship with profitability. All macroeconomic variables show the expected relationship, positive for GDP growth and negative for inflation.

IMPACT STATEMENT

Over the years, some Sub-Saharan African country's banking markets have undergone reforms, leading to banking consolidations in these countries. After many years of banking consolidations through bank mergers and acquisitions in SSA, regulators' claims have yet to be confirmed or refuted to guide other nations who intend to do the same. Empirical research has yet to be conducted to inform future policy decisions of other countries in the sub-region. This study will provide insight into the long-run effects of regulation-induced bank M&As on performance in SSA. Therefore, the study will guide other regulatory authorities in considering bank consolidations as a means to strengthen their banking systems. Bank executives will also be helped by the findings of this study when considering bank M&As as performance improvement and growth opportunities.

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Introduction

Several African countries' banking sectors experienced major transformations at the turn of the Century. The primary catalyst for this transformation is changes in the regulatory environment. Critical regulatory changes included increased minimum capital requirements, capital compositions to conform to the Basel Capital Accords, and single borrower limits (Radha & Johnson, 2015). In Sub-Saharan Africa, for example, in Kenya, there were frequent increases in regulatory capital from \$3.2 million in 2000 to \$3.45 million and \$4.61 million in 2005 and 2009, respectively. By 2012, the minimum capital had reached \$12.4 million in Kenya. Nigeria also saw a significant increase in minimum capital, from about \$14 million to

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about \$175 million in 2004 (Alford, 2010; Radha & Johnson, 2015). Regulatory changes were part of broader banking sector reforms in Africa to fortify and strengthen banks to withstand any further macro-economic shocks leading to banking crises and to compete globally (Yusuf & Raimi, 2019).

These banking sector reforms in SSA triggered a series of bank consolidations through mergers and acquisitions. Many banks needed to be in a position to raise the minimum capital required to operate as commercial banks in the banking markets. Consequently, the undercapitalised banks were absorbed by other banks or were encouraged to join forces with other banks to raise the required minimum capital. This type of bank consolidation in Africa, particularly SSA, has yet to be witnessed elsewhere. Bank M&A, as it happened in some SSA, can best be described as regulation-induced M&A. Regulation-induced bank M&A's are a type of bank M&A's where the regulator compelled banks to merge, or healthy banks absorbed weaker banks as a result of regulatory changes that made it difficult for these banks to operate as independent banks. Voluntary mergers and acquisitions are mergers and acquisitions deals conducted at arm's length without the government or a third party's undue intervention (Jayadev & Sensarma, 2007). The closest to regulation-induced mergers and acquisitions of SSA is the forced M&A scheme in Malaysia. In the Malaysian forced merger program, there was heavy government involvement in the choice of partners. Even though the government later relaxed its role in the process, it still influenced many merger deals. Government involvement in the selection of partners was less in regulation-induced bank mergers and acquisitions in SSA. Merging banks chose their partners, yet there were marriages of convenience and not arm's-length transactions.

Voluntary mergers and acquisition studies dominate the literature on the market for corporate control in response to the merger waves recorded in the developed world and some emerging markets driven mainly by deregulations in the banking sector (Goddard et al., 2012). However, the findings of these studies have yet to be conclusive. While earlier studies by Healy et al. (1992), Cornett and Tehranian (1992), Blanco-Oliver (2021), and Coccoresse and Ferri (2020) conclude that positive and significant post-merger performance exists following bank mergers. Other studies by Ismail et al. (2009), Haneda et al. (2012), Sufian et al. (2012), and Du and Sim (2016) indicate that no such gains exist in bank mergers. Some recent studies still maintain that bank mergers and acquisitions do not improve post-merger performance (Jain et al., 2023; Karlsson et al., 2021; Yusuf & Raimi, 2019). The inconsistent findings of bank M&A studies in the international literature imply that there is room for specific regional studies instead of relying on findings from other regions. Therefore, this study contributes to understanding the impact of bank M&As on the post-merger performance of merged banks in SSA. Although much research exists regarding the effects of voluntary M&As on bank performance post-merger, little research exists on the influence of regulation-induced M&A on bank performance.

After many years of regulation-induced bank mergers and acquisitions in SSA, the claims of regulatory authorities have yet to be confirmed or refuted to guide other nations that want to follow suit. In this regard, empirical research has yet to be conducted to inform future policy decisions of other countries in the sub-region. Therefore, this study seeks to assess the effect of banking sector consolidation through bank M&A on the long-run post-merger profit performance of merged banks in SSA countries. Examine the impact of regulation-induced bank M&As on the post-merger profit performance of merged banks in SSA. The study also assessed the years it takes after bank mergers and acquisitions for the post-merger performance of combined banks to improve or deteriorate.

This study is the first to comprehensively investigate the long-run effects of regulation-induced bank M&As on performance in SSA. This study will guide other regulatory authorities considering bank consolidations to strengthen their banking systems. Bank executives should manage their expectations of bank M&A, especially regulation-induced M&A, as performance improvement and growth opportunities.

The remainder of this article is organised as follows: The second section contains the literature. The methodology employed is presented in the third section. The fourth section presents the results and discussion, and the fifth section concludes with a summary of the findings and policy recommendations.

Literature review

The literature on bank M&As in Africa, especially in SSA, is limited mainly due to the need for more data or the difficulty in accessing bank M&A data in the sub-region. The literature on corporate takeovers is

dominated by studies that seek to ascertain whether any merger gains exist and whether acquirer shareholders or target shareholders gain from M&A. Researchers have employed two methodological approaches to understand the existence of M&A gains. These are accounting-based measures and event study methodology using market data.

Whether M&As ensure any benefits to stakeholders has yet to be convincingly answered since the merger waves of the early 1980s. The following studies, using event study methodology or both event study and accounting-based methodologies, have not agreed on the existence of merger and acquisition gain. Cornett and Tehranian (1992) examined the post-acquisition performance of large US bank M&As between 1982 and 1987, using accounting measures and event studies following M&As. Their study finds that merged banks outperform the banking industry. Healy et al. (1992), used operating cash flow returns as a performance measure in their study of bank mergers and acquisitions. By comparing pre-merger operating cash flow returns and post-merger cash flow returns, they found that post-merger performance improved relative to pre-merger performance. The authors attributed the improved post-merger performance to an improvement in the merged bank's ability to attract loans and deposits, growth in employee productivity, and asset growth post-merger.

In a recent study, Leledakis et al. (2021) extended the US bank consolidation literature by assessing the acquirer announcement of abnormal returns in deals involving public and private targets. The study results show no definitive response to whether bank M&A gains exist. The authors reveal that merged banks gain when they acquire a private firm and lose when they acquire a public firm. The findings indicate the role of information asymmetry in M&A gains between private and public targets, as gains in private offers are even higher when acquirers engage financial advisers, while the opposite is true for public transactions. However, Amewu and Alagidede (2018), who studied the wealth creation effects of M&A announcements by acquiring firms in Africa between 2002 and 2015, found positive post-merger performance improvements. The study shows positive abnormal returns earned by acquiring firms' shareholders upon M&A announcements in African markets. The study investigated M&A across various industries, not just the banking sector.

The regional studies below and the accounting-based methodology also provide inconsistent results. In their study, Cui and Leung (2020), confirmed the performance improvement after the M&A using M&A data from the US. However, according to Cui and Leung (2020), post-merger performance improvement is only possible when the acquiring firm's managerial ability is high. The study found a positive correlation between performance improvement after M&As and the managerial ability of the acquiring entity. In a European study, Ismail et al. (2009) examined the post-merger operating performance of publicly listed bank mergers completed between 1992 and 1997. The study finds that industry-adjusted mean cash flow returns did not significantly change post-merger but remained positive. Bernad et al. (2013) studied the effect of bank M&As on the profitability of Spanish savings banks, the study revealed profitability improvement after mergers and acquisitions. Bernad et al. (2013) investigated the long-run profitability performance effects of banks M&As in Spain. In similar studies, Blanco-Oliver (2021) and Coccoresse and Ferri (2020) have also reported positive post-merger and acquisition performance in European banking studies. Blanco-Oliver (2021), for instance, analyzed the impact of banking systems reforms through banking consolidations (Bank M&As) in European savings banks. The study reveals that the reforms (bank M&As) positively impacted the performance of savings banks post-mergers and Acquisitions. Tampakoudis et al. (2020) investigated the wealth effects of bank mergers and acquisitions in Greece from 1997 to 2018. This study assesses the wealth effects of bank M&As using both univariate and multivariate frameworks. The authors provide conclusive evidence that M&A completions are value-destroying events for acquiring banks; however, these findings relate to the financial crisis period. Karlsson et al. (2021), in a study of Swedish commercial bank mergers and acquisitions, confirm that bank mergers and acquisitions destroy the combined bank's value rather than value creation.

A study involving acquirers from India and China shows that Indian acquiring firms' performance deteriorated post-mergers and acquisitions. In contrast, their Chinese counterpart's post-merger and acquisitions performance showed no significant change (Jain et al., 2023). Chong et al. (2006) studied the wealth effects of forced M&As in Malaysia. The study showed that the forced merger scheme destroys economic value. The authors attributed the poor post-merger performance of forced M&As to cronyism. Again, Sufian and Habibullah (2013) in a study that examines the impact of forced bank

mergers and acquisitions on the total factor productivity of Malaysian banks. However, their study reveals that Malaysian banks achieved a higher mean total factor productivity level during the post-merger period. Multivariate regression analysis shows that income diversification and operating expenses are positively and significantly related to Malaysian banks' factor productivity. The study further revealed that acquirers outperformed target and peer banks in the control group.

The few M&A studies in Africa, except the work of Amewu and Alagidede (2018) mentioned above, did not find any improved post-merger performance for merged firms. Yusuf and Raimi (2019) examined the relationship between bank mergers and acquisitions (M&As) and bank profitability (asset turnover) in Nigeria following the country's banking sector reforms between 2004 and 2008. The study concluded that no positive relationship between M&As and bank profitability exists. Merged banks' profitability deteriorated, and non-merged banks outperformed merged banks following M&A in Nigeria. In a similar single-country study, Musah et al. (2020) investigated the effects of bank mergers and acquisitions in Ghana (2009–2018). The study also reported a negative relationship between bank mergers and acquisitions and the post-mergers and acquisitions performance of combined banks in Ghana.

From the literature review, it is evident that there has not been any time in M&A studies that researchers have agreed on the existence or non-existence of M&A gains. Some researchers have attributed the divergence of opinions on M&A gains to differences in methodologies and the specificities of the samples used in the analysis. Consequently, there are calls amongst scholars for regional, national, or even case studies on M&A research and long-run rather than short-run effects of mergers and acquisitions (Bernad et al., 2013; Calomiris, 1999). In light of the above literature, this study hypothesizes that banking sector consolidations in SSA may not lead to improved profit performance, especially where bank M&A is not voluntary but regulation-induced.

Methodology

Data

Data for this study was sourced from Bank scope, websites of the Central Banks of the countries involved and World Development Indicators (WDI). Bank-specific variables were extracted from Bank scope, while information on bank mergers and acquisitions and macroeconomic variables were obtained from Central Banks' websites and WDI. This study is based on eight selected sub-Saharan African countries, Kenya, Nigeria, Ghana, Botswana, Cote d'Ivoire, Cameroon, Burkina Faso, and Malawi, for the period 2003–2019. A total of 23 M&As for this period were included in the study. Out of the 23 mergers, 13 were regulation-induced, and 10 were voluntary. The study sample period was chosen to cover early consolidation drives in Kenya and Nigeria. The sample selection was based on the following criteria. There should be at least one year of pre-acquisition data for the participating firms and two years of post-merger/acquisition data for the combined bank. To avoid confounding events, the merged bank should not engage in another M&A transaction in subsequent years. The distribution of the mergers and acquisitions allows us to investigate the long-run effect of bank M&As, as most of the M&As occurred in the early part of the study period.

Table 1 lists the distribution of sample bank M&As by year of completion. Table 1 shows a high concentration of bank M&As in the early part of the study period (2004–2008) for regulation-induced bank M&A. The distribution of the data reflects the regulation-induced M&As of Kenya and Nigeria. For voluntary M&As, there is a relatively even distribution of bank M&As during the study period.

Model specifications and description of variables

This study adopt a model based on the structure-conduct-performance (SCP) paradigm, as Bernad et al. (2013) did, to examine the effects of bank M&As on the profitability of merged banks. The SCP model postulates that a firm's performance in a given period depends on the market structure. Hence, the market structure in this study is represented by market concentration (CON) and captured by the Herfindahl–Hirschman Index. However, concentrated markets are populated by large and efficient banks; therefore, not controlling for efficiency may incorrectly attribute improved performance to bank M&A

Table 1. Yearly breakdown of bank M&A between 2004 and 2017 in the selected SSA countries.

Years	Forced		Voluntary		Full sample	
	No of mergers	% of total	No of mergers	% of total	No of mergers	% of total
2004	1	0.08	1	0.10	2	0.09
2005	4	0.31	1	0.30	5	0.22
2006	4	0.31	0	0.40	4	0.17
2007	1	0.08	0	0.10	1	0.04
2008	1	0.08	0	0.00	1	0.04
2009	0	0.00	3	0.00	3	0.13
2010	0	0.00	0	0.00	0	0.00
2011	0	0.00	2	0.00	2	0.09
2012	0	0.00	1	0.00	1	0.04
2013	0	0.00	1	0.00	1	0.04
2014	0	0.00	0	0.00	0	0.00
2015	0	0.00	0	0.00	0	0.00
2016	0	0.00	0	0.00	0	0.00
2017	2	0.15	1	0.10	3	0.13
Total	13	100	10	100	23	100

Compiled by the author based on information on the websites of central banks of selected SSA and participating bank's websites.

(Berger, 1995; Bernad et al., 2013). Therefore, the study includes two variables measuring bank efficiency: CI, bank cost to income, and CTA, which represents bank cost to total assets. Using both CI and CTA in the model helps us understand which efficiency measure affects bank profitability the most in SSA.

Other bank-specific variables including, bank risk, liquidity and bank size, are also controlled for in this study. The study represents bank risks by gross loans to total assets GLTA and banks' Z-score. Total credit as a percentage of total assets reveals a bank's exposure to credit defaults and asset quality status. The Z-score on the other hand, measures volatility of a bank's profit, it reveals the number of standard deviations that the return on assets of a bank must fall before the bank becomes insolvent. Bank liquidity in this study is measured by gross loans to deposits ratio GLD. Gross loans to deposits ratio GLD is also a deposit utilization ratio, it was included in the study not just as a measure of liquidity but also to understand whether merged banks are making good use of liabilities in their balance sheet. BSIZE denotes bank size in this study, and it is included to assess the effects of size and scale on bank profitability. Larger banks are assumed to have the financial strength to advance more credit to generate higher interest income. Again large banks are also well-diversified and are in a better position to earn higher non-interest income. Hence, a positive relationship between bank size and profitability is expected (Ayagre et al., 2022). However, a negative relationship could occur between size and profitability due to diseconomies of scale.

The study also controlled for macroeconomic conditions to ensure that post-merger performance of merged banks is not just a reflection of economic conditions and changes in the business cycle in participating SSA countries. The macroeconomic factors included in the study are gross domestic product growth (GDPG) and inflation (INFL). The variables $M\&A_{i,t}$ and $M\&A_{i,t+n}$ are dummies for the year of the merger and subsequent years after, up to six years after M&A. Table 2 provides detailed summary of all variables employed in this study.

The general model is specified below as

$$\Pi_{it} = \Pi_{it-1} + BX'_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

where Π_{it} is a measure of bank profitability, Π_{it-1} is a one-period lagged dependent variable, i represents individual banks, and t is the time period, $t = 1, 2, 3 \dots T$. X_{it} is a $1 \times k$ vector of observations on the explanatory variables, including Mergers and Acquisitions and B represent a vector of unknown parameter coefficients to be estimated for the explanatory variables. The time-fixed effects and individual bank fixed effects are represented by δ_t , and μ_i respectively, while ε_{it} stands for the idiosyncratic error term.

The dynamic Model 1 is specified below in models (2–4). The dynamic form is preferred as it captures the possibility of profit persistence over time resulting from market imperfections or sensitivity to auto-correlated regional and macroeconomic factors (Flamini et al., 2009).

Table 2. Summary of variables employed.

Symbols	Names	Measurements	Expected Signs	Sources
ROA	Return on assets	Profit before taxation and extraordinary items as a percentage of total assets		BankScope
ROE	Return on Equity	Shareholders fund as a percentage of total assets		BankScope
NIM	Net interest margin	Net interest income as a percentage of total assets.		BankScope
CON CI	Market Concentration Bank cost to income	Herfindal Hirschman Index Approach	±	BankScope
		Total operating expenses to total operating income. It is a measure of bank efficiency and an indicator of management quality.	–	BankScope
GLTA	Gross loans to total assets	Total loans scaled over total assets. It is a measure of bank risk-taking behavior.	±	BankScope
BSIZE CTA	Bank Size Bank cost to total assets	Natural log of total assets	±	BankScope
		Total operating expenses to total assets. This ratio is also a measure of bank efficiency.	–	BankScope
GLD	Gross loans to deposit	Total loans scaled over total deposits. It is a measure of bank risk-taking behavior.	±	BankScope
ZSCORE	Bank stability	(Capital ratio + ROA)/ δ ROA	±	BankScope
GDPG	Gross Domestic Product Growth	Changes in GDP	±	World Development Indicators
INFL	Inflation	Consumer Price Index.	±	World Development Indicators
M&A	Mergers & Acquisitions	Dummy variable that takes the value one if a bank participated in M&A in year t and zero otherwise.	±	Central banks and BankScope
M&At + n	Years after mergers	Dummy variable that equals one, n years after the merger.	±	Central banks and BankScope

The authors recomputed data from sources to suit the purpose of the study.

The specific models are;

$$ROA_{it} = \beta_1 ROA_{it-1} + \beta_2 CON_{it} + \beta_3 CI_{it} + \beta_4 GLTA_{it} + \beta_5 BSIZE_{it} + \beta_6 CTA_{it} + \beta_7 GLD_{it} + \beta_8 ZSCORE_{it} + \beta_9 GDPG_{it} + \beta_{10} INFL_{it} + \beta_{11} M\&A_{it} + \beta_{12} M\&A_{it+n} + \mu_i + \delta_t + \varepsilon_{it} \dots \quad (2)$$

$$ROE_{it} = \alpha_1 ROE_{it-1} + \alpha_2 CON_{it} + \alpha_3 CI_{it} + \alpha_4 GLTA_{it} + \alpha_5 BSIZE_{it} + \alpha_6 CTA_{it} + \alpha_7 GLD_{it} + \alpha_8 ZSCORE_{it} + \alpha_9 GDPG_{it} + \alpha_{10} INFL_{it} + \alpha_{11} M\&A_{it} + \alpha_{12} M\&A_{it+n} + \mu_i + \delta_t + \vartheta_{it} \dots \quad (3)$$

$$NIM_{it} = \gamma_1 NIM_{it-1} + \gamma_2 CON_{it} + \gamma_3 CI_{it} + \gamma_4 GLTA_{it} + \gamma_5 BSIZE_{it} + \gamma_6 CTA_{it} + \gamma_7 GLD_{it} + \gamma_8 ZSCORE_{it} + \gamma_9 GDPG_{it} + \gamma_{10} INFL_{it} + \gamma_{11} M\&A_{it} + \gamma_{12} M\&A_{it+n} + \mu_i + \delta_t + \tau_{it} \dots \quad (4)$$

Models (2)–(4) measure the impact of bank-specific, industry, and mergers and acquisitions on bank profitability in sub-Saharan African countries following (Bernad et al., 2013; Karlsson et al., 2021). The generalized-methods-of-moments (System GMM), as proposed by Arellano and Bond (1991) and Arellano and Bover (1995) for estimating panel data, is used to estimate models 2–4 above. GMM differences the dependent variables and uses the lagged values as regressors or instruments. Thus, including the lagged dependent variables as independent variables transforms the models into dynamic panel instrumental variable models. Dynamic panel estimation techniques using instrumentations allow researchers to exploit and gain an understanding of the cross-sectional and time series dimensions of panel data. GMM makes it possible to remove any bias created by unobserved country-specific effects by taking the first difference of the level equations. Again, GMM controls for potential endogeneity bias, as the direction of causality between dependent and independent variables may run in both directions. For example, while it is established in the literature that bank mergers and acquisitions impact bank performance through market concentration, it is also possible that bank performance may lead to banking sector consolidations through mergers and acquisitions. The possibility of reverse causality between bank mergers and

acquisitions and bank performance means the problem of endogeneity is real, which is taken into account by the GMM estimation technique.

The study also compared the pre- and post-merger fixed effects of merged banks to ascertain the short-run impact of bank M&As on merged bank profitability in SSA. Bernad et al. (2013) argue that when two or more firms merge, a new fixed effect is assigned to the new firm. Consequently, the impact of M&A can be determined by comparing the fixed effect of the firm before the merger with the fixed effect of the combined firm. Where the fixed effect before the merger is greater than the fixed effect after the merger, the merger is said to hurt profitability, while a higher fixed effect after the merger is considered an improvement in profitability. This methodology has been employed for European bank M&As by Valverde and Humphrey (2004), Bernad et al. (2010) and Bernad et al. (2013).

Empirical results and discussions

Table 3 presents descriptive statistics of variables employed in the study, and the main empirical results. Descriptive statistics provide a global overview of the variables under consideration and determine whether there are outliers.

From Table 3, the minimum and maximum values for return on equity and bank cost to income look strange. However, considering that the study period included periods of banking sector crisis, the values are plausible.

Discussion of regression results

The regression diagnostics indicate that the error terms and instruments used are not serially correlated, as the AR(2) tests for all models are insignificant. The results of the Hansen tests for the validity and adequacy of the instruments included in the estimations are insignificant, meaning that the results are consistent and adequate. The GMM results in Tables 4, 5 and 6 show that the previous year's bank profitability affects current bank profitability, indicating profit persistence in SSA. The lagged dependent variables were all positive and significant, confirming the appropriateness of GMM for the study.

From the regression results for the total sample (voluntary M&As and regulation-induced M&As), market concentration shows a strong negative relationship with net interest margin, implying that increased market concentration lowers bank's ability to earn higher interest income in SSA countries. This results resonates with Nartey et al. (2020). However, a weak positive and significant relationship is revealed between return on equity and market concentration. This results also mean that banks in SSA can leverage market power in concentrated markets to earn higher returns on equity for shareholders. This finding are consistent with that of Bernad et al. (2013), who found similar results in a study of Spanish savings banks mergers and acquisitions.

As expected, the coefficients for the efficiency variables are negative and significant for returns on assets and equity in Table 4. High bank operating costs adversely affect merged bank profitability in

Table 3. Summary statistics of selected variables-total sample.

Variable	Obs	Mean	Std. Dev	Min	Max
ROA	672	3.317	12.650	-20.270	315.126
ROE	667	27.091	133.073	-195.883	3359.425
NIM	667	5.783	3.683	-0.762	35.438
CON	651	20.458	19.811	0.000	91.119
CI	668	88.276	239.600	-1371.97	4495.062
GLTA	671	47.034	17.411	0.000	107.485
BSIZE	672	8.725	0.627	5.481	11.182
GLD	644	73.450	53.184	0.000	583.849
CTA	671	5.600	3.203	-0.221	33.447
ZSCORE	671	33.373	403.284	-3.910	8455.077
GDPG	672	5.873	3.328	-7.652	14.047
INFL	672	17.672	5.144	5.871	27.845

Source: Computed by author based on data from Bank Scope – ROA- return on assets, ROE- return on equity, NIM- net interest margin, GLTA – gross loans to total assets; CI – cost to income ratio; CON- HHI – market concentration; BSIZE-bank size, GLD-gross loans to deposit ratio, CTA- cost to total assets ratio, M&A_{t,t+n}- mergers and acquisitions variable for each year of merger, ZSCORE-(Capital ratio + ROA)/ β ROA, GDPG –changes in GDP, INFL- inflation.

Table 4. Impact of bank M&As on bank profitability-total sample.

VARIABLES	(1a) ROA	(1b) ROA	(2a) ROE	(2b) ROE	(3a) NIM	(3b) NIM
Lag Dep. Variable	0.00172 (0.001)	0.00349*** (0.001)	0.0132*** (0.001)	0.015*** (0.002)	0.534*** (0.001)	0.527*** (0.001)
CON	-0.019* (0.011)	-0.006 (0.010)	0.136* (0.073)	0.148* (0.082)	-0.013*** (0.005)	-0.013*** (0.004)
CI	-0.001 (0.001)	-0.001 (0.001)	-0.005* (0.003)	-0.006** (0.003)	-0.001*** (0.0002)	-0.001*** (0.0003)
GLTA	-0.036*** (0.004)	-0.038*** (0.009)	-0.236*** (0.031)	-0.194*** (0.051)	-0.010*** (0.002)	-0.011*** (0.001)
BSIZE	0.260 (0.287)	0.069 (0.351)	3.780 (2.513)	3.782 (3.169)	0.336*** (0.093)	0.381*** (0.095)
CTA	-0.284*** (0.031)	-0.247*** (0.034)	-1.925*** (0.238)	-1.773*** (0.334)	0.200*** (0.010)	0.205*** (0.009)
GLD	0.007*** (0.002)	0.005*** (0.002)	-0.022* (0.013)	-0.036** (0.015)	0.006*** (0.001)	0.005*** (0.001)
ZSCORE	0,000 (0,000)	0,000 (0,000)	-0.005*** (0.002)	-0.006*** (0.001)	-0.0001*** (0,000)	-0.0002*** (0,000)
GDPG	0.066*** (0.018)	0.103*** (0.023)	0.499*** (0.107)	0.513*** (0.180)	-0.004*** (0.001)	-0.002 (0.001)
INFL	-0.204 (0.130)	0.194 (0.129)	-4.338*** (0.543)	-4.114*** (0.755)	-0.344*** (0.022)	-0.250*** (0.021)
Merger t		-1.055*** (0.151)		-0.467 (1.487)		-0.996*** (0.206)
Merger t + 1		-1.111*** (0.175)		5.446*** (0.983)		-0.604*** (0.211)
Merger t + 2		-0.540*** (0.148)		-3.281** (1.346)		-0.741*** (0.155)
Merger t + 3		-1.145*** (0.260)		-5.594*** (1.676)		0.032 (0.220)
Merger t + 4		-0.896*** (0.208)		-6.549*** (1.561)		-0.531 (0.331)
Merger t + 5		-1.572*** (0.256)		-9.930*** (1.604)		-0.323 (0.318)
Merger t + 6		-0.928*** (0.091)		-5.576*** (0.610)		-0.819*** (0.241)
Constant	3.396 (2.599)	4.274 (3.212)	13.62 (22.55)	14.00 (27.39)	-0.363 (0.868)	-0.727 (0.879)
Observations	553	553	550	550	548	548
AR(1)	0.014***	0.008***	0.036***	0.034***	0.000***	0.000***
AR(2)	0.211	0.169	0.291	0.297	0.690	0.750
Hansen	0.104	0.307	0.444	0.678	0.293	0.521
F-Statistic	166.2***	231.69***	71.32***	101.41***	298.27***	395.55***

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Computed by author based on data from Bank Scope – ROA- return on assets, ROE- return on equity, NIM- net interest margin, GLTA – gross loans to total assets; CI – cost to income ratio; CON- HHI – market concentration; BSIZE-bank size, GLD-gross loans to deposit ratio, CTA- cost to total assets ratio, ZSCORE-(Capital ratio + ROA)/ δ ROA, GDPG –changes in GDP, INFL- inflation, M&A_{i,t+n}- mergers and acquisitions variable for each year of merger.

SSA. Thus, the study concludes that bank efficiency impacts merged bank's profitability positively. However, the relationship between bank cost to total assets (CTA) and NIM is positive and highly significant, suggesting that high operating costs increase banks' net interest margin. This finding is consistent with the works of Gupta (2015). Khan and Jalil (2020) whose studies also indicate a positive relationship between bank costs and the net interest margin. The bank efficiency variables are also measures of the quality of bank management; therefore, from the results, high managerial quality of banks positively affects bank profitability. High managerial quality (low cost-to-income ratio) implies prudent resource utilization and expense management, which leads to better profitability. The results are consistent with the studies of Garcia and Guerreiro (2016), Bernad et al. (2013), Cui and Leung (2020), who found similar results for bank profitability studies in Portugal, Spain, and Greece, respectively.

There is a negative relationship between bank loans to total assets (credit risk) and profitability in SSA, which may result from improvement in non-performing loans in the region. A low loan book may mean high-quality assets and, hence, improved profitability. The Z-score, which is a measure of bank risk also shows an inverse relationship with profitability. The Z-score has a strong negative relationship with returns on equity, implying a higher Z-score results in lower returns for equity holders. Bank size is positively related to bank's net interest margin, suggesting economies of scale in SSA. That is big banks

Table 5. Impact of bank M&As on bank profitability-regulation induced sub-sample.

VARIABLES	(1) ROA	(2) ROA	(3) ROE	(4) ROE	(5) NIM	(6) NIM
Lag Dep. Variable	0.007*** (0.001)	0.008*** (0.001)	0.012*** (0.001)	0.012*** (0.001)	0.365*** (0.004)	0.373*** (0.004)
CON	-0.114*** (0.035)	-0.084** (0.034)	-0.263 (0.183)	-0.066 (0.198)	-0.163*** (0.010)	-0.154*** (0.011)
CI	-0.0003 (0.0004)	-0.001 (0.001)	-0.003 (0.003)	-0.004 (0.003)	-0.001*** (0.000)	-0.001*** (0.000)
GLTA	-0.019 (0.017)	-0.023 (0.016)	-0.047 (0.090)	-0.012 (0.091)	-0.007*** (0.002)	-0.004 (0.003)
BSIZE	-0.620* (0.365)	-0.403 (0.312)	-0.948 (2.393)	3.104 (2.789)	0.172 (0.108)	0.0909 (0.109)
CTA	-0.253** (0.098)	-0.315*** (0.087)	-1.700*** (0.529)	-1.409** (0.567)	0.212*** (0.014)	0.206*** (0.016)
GLD	0.008 (0.010)	0.011 (0.010)	-0.036 (0.058)	-0.022 (0.054)	-0.009*** (0.002)	0.007*** (0.001)
ZSCORE	0.000 (0.0001)	0.0001 (0.0001)	-0.006*** (0.001)	-0.005*** (0.001)	-0.000*** (0.000)	-0.0005*** (0.000)
GDPG	0.083*** (0.030)	0.109*** (0.028)	0.232** (0.089)	0.319* (0.165)	-0.019*** (0.001)	-0.011*** (0.002)
INFL	0.557** (0.270)	1.002*** (0.254)	-4.628*** (1.224)	-0.266 (1.098)	0.175*** (0.054)	0.236*** (0.061)
Merger t		-0.693*** (0.240)		-6.411*** (1.023)		-0.586*** (0.168)
Merger t + 1		-0.972*** (0.236)		-5.037*** (1.261)		-0.197 (0.216)
Merger t + 2		-1.221*** (0.282)		-7.998*** (2.350)		-0.580*** (0.168)
Merger t + 3		-1.217** (0.495)		-12.42* (6.361)		0.167 (0.145)
Merger t + 4		-1.617*** (0.367)		-13.67*** (2.663)		-0.900*** (0.291)
Merger t + 5		-1.125** (0.518)		-15.21*** (3.924)		-0.830*** (0.306)
Merger t + 6		-1.207** (0.571)		-11.96** (4.958)		-1.013*** (0.355)
Constant	10.16*** (3.110)	7.729** (2.963)	51.96** (20.51)	5.784 (25.13)	2.606*** (0.946)	3.281*** (0.785)
Observations	387	387	386	386	386	386
AR(1)	0.036***	0.026***	0.013***	0.011***	0.000***	0.000***
AR(2)	0.517	0.488	0.189	0.165	0.538	0.523
Hansen	0.293	0.395	0.512	0.519	0.683	0.362
F-Statistic	243.65***	249.86***	1051.1***	1680***	4523***	6503***

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Computed by the author based on data from Bank Scope – ROA- return on assets, ROE- return on equity, NIM- net interest margin, GLTA – gross loans to total assets; CI – cost to income ratio; CON- HHI – market concentration; BSIZE-bank size, GLD-gross loans to deposit ratio, CTA- cost to total assets ratio, ZSCORE-(Capital ratio + ROA)/ δ ROA, GDPG –changes in GDP, INFL- inflation. $M\&A_{i,t+n}$ -mergers and acquisitions variable for each year of merger.

leverage on their scale advantage to mobilise deposits which are lent to customers at higher interest rates to generate more interest income than smaller banks.

Bank liquidity is positively and significantly related to return on assets and net interest margin, as expected. The results show that banks with liquid resources can deploy these productively to generate higher income. Flamini et al. (2009) find a positive and significant relationship between liquidity and bank profitability in SSA for merged and non-merged banks. Bernad et al. (2013) find the same relationship in a European banking study. Therefore, we conclude that higher bank liquidity impact bank profitability positively.

The macroeconomic variables are shown to have significant impact on bank profitability in SSA. GDP growth is revealed to have a positive impact on bank profitability as expected. As output increases, banks activities increases, thus resulting in increased profitability. This result is confirmed by numerous other studies including; Nartey et al. (2020), Marinković and Radović (2014) and Flamini et al. (2009). However, contrary to Flamini et al. (2009), inflation is inversely related to bank profitability in SSA.

The M&A dummies are negative and significant for all years, right from the year of the merger, for return on assets. The results show that merged banks suffer reduced profitability (ROA) and NIM after M&A in SSA. These findings are consistent with the findings of Karlsson et al. (2021), which reveal

Table 6. Impact of bank M&As on bank profitability-voluntary mergers sub-sample.

VARIABLES	(1a) ROA	(1b) ROA	(2a) ROE	(2b) ROE	(3a) NIM	(3b) NIM
Lag Dep. Variable	-0.003*** (0.001)	0.001 (0.001)	0.012*** (0.001)	0.013*** (0.002)	0.591*** (0.021)	0.560*** (0.021)
CON	-0.011 (0.009)	-0.012 (0.009)	0.158*** (0.052)	0.180*** (0.058)	-0.004 (0.004)	-0.004 (0.004)
CI	-0.029*** (0.010)	-0.016 (0.013)	-0.442*** (0.061)	-0.496*** (0.070)	-0.007* (0.004)	-0.009** (0.004)
GLTA	-0.0201** (0.009)	-0.0341*** (0.012)	-0.155 (0.093)	-0.0359 (0.116)	-0.00875* (0.004)	-0.009* (0.005)
BSIZE	0.503 (0.344)	0.641 (0.421)	3.877 (3.055)	4.231 (3.720)	0.135 (0.126)	0.130 (0.130)
CTA	-0.113 (0.101)	-0.103 (0.101)	0.114 (0.297)	0.525 (0.363)	0.188*** (0.026)	0.210*** (0.027)
GLD	0.005*** (0.002)	0.005*** (0.002)	-0.034*** (0.011)	-0.045** (0.017)	0.004*** (0.001)	0.004*** (0.001)
ZSCORE	-0.000 (0.0001)	0.000 (0.000)	-0.005*** (0.001)	-0.005*** (0.001)	0.000 (0.000)	-0.000* (0.000)
GDPG	0.0418*** (0.015)	0.091*** (0.024)	0.201** (0.093)	-0.080 (0.258)	-0.020*** (0.005)	-0.017*** (0.005)
INFL	-0.825*** (0.171)	0.179 (0.396)	-4.051*** (1.464)	-3.652 (3.552)	-0.669*** (0.0646)	-0.678*** (0.0746)
Merger t		-1.032*** (0.255)		19.83*** (3.018)		-0.581 (0.455)
Merger t + 1		-0.569*** (0.210)		18.22*** (3.465)		-0.395 (0.392)
Merger t + 2		-0.0732 (0.285)		-9.223*** (3.199)		-1.177*** (0.253)
Merger t + 3		0.0165 (0.499)		1.038 (3.216)		0.0195 (0.326)
Merger t + 4		-0.318 (0.504)		0.959 (3.849)		1.157*** (0.349)
Merger t + 5		-0.295 (0.497)		-9.287** (3.697)		1.151*** (0.254)
Merger t + 6		0.273 (0.382)		5.211 (4.347)		-0.0677 (0.393)
Constant	2.281 (3.262)	-0.676 (3.982)	28.01 (27.70)	20.96 (33.63)	2.051* (1.096)	2.256* (1.151)
Observations	330	330	328	328	326	326
AR(1)	0.012***	0.125	0.001***	0.001***	0.146	0.162
AR(2)	0.110	0.258	0.297	0.350	0.305	0.316
Hansen	0.100	0.330	0.100	0.128	0.879	0.635
F-Statistic	980.46***	824.87***	0.000***	0.000***	2781***	127.80***

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Computed by the author based on data from Bank Scope – ROA- return on assets, ROE- return on equity, NIM- net interest margin, GLTA – gross loans to total assets; CI – cost to income ratio; CON- HHI – market concentration; BSIZE-bank size, GLD-gross loans to deposit ratio, CTA- cost to total assets ratio, ZSCORE-(Capital ratio + ROA)/ δ ROA, GDPG –changes in GDP, INFL- inflation. M&A_{i,t+n}-mergers and acquisitions variable for each year of merger.

negative and significant post-merger and acquisition performance from year one through to year three for Swedish bank M&A. Return on equity suffers from year two after bank mergers and acquisitions, through year six after mergers and acquisitions, except the merger year and one year after mergers and acquisitions. From Table 4, there is a positive and significant improvement in the bank's return on equity one year after M&A. Profit improvement one year after M&A may be a result of either cost savings from the consolidation of operations, discontinuation of some redundant cost centers, or revenue synergies (Cornett et al., 2006). Therefore, the study conclude that bank mergers and acquisitions do not improve performance for merged banks in SSA, according to the total sample results.

Tables 5 and 6 represent the two subsamples (regulation-induced and voluntary M&As). The results of the control variables for the two sub-samples are similar to the total sample except market concentration and bank size. The relationship between market concentration and profitability is positive and significant for both the total sample and the voluntary M&As sub-sample, but the relationship is stronger for the voluntary M&As sub-sample at one percent. However, the relationship between market concentration and profitability is negative for the regulation induced sub-sample. Similarly, bank size is negatively related to bank profitability for the RIM&As, suggesting diseconomies of scale in banking markets where regulation induced bank mergers and acquisitions occurred. This finding confirms the studies of Bernad et al. (2013) and Kohlscheen et al. (2018), who found a negative relationship between bank size

Table 7. Fixed effects.

Bank	Pre-merger	Post-merger	t-test
2	27.218	7.126	9.718**
4	29.934	-4.767	7.604**
5	-44.022	-23.980	-2.501
6	21.008	-8.276	4.046*
7	20.907	-16.849	3.030*
8	10.745	-18.601	6.319**
9	10.117	-23.543	2.462
10	15.063	-16.629	37.723***
11	5.580	-22.529	3.220*
12	10.379	-14.202	1.813
13	19.072	-17.198	3.114*
14	21.219	-21.756	5.101*
15	5.697	-1.260	0.749
16	8.275	-34.074	22.244***
17	21.080	-17.435	42.573***
18	41.113	24.793	2.493
19	19.334	-11.006	4.438*
20	-12.859	-5.972	-0.265
21	-63.673	28.324	-0.390
22	-46.148	-23.183	-0.690

and profitability. The voluntary M&A subsample did yield a positive relationship between bank size and profitability, yet the relationship is not significant.

The merger dummies for the subsamples are similar to the total sample results. Table 5 (regulation-induced) subsample shows no profit improvement but profit reduction from the merger year to the sixth year of M&A. Therefore, we conclude that regulation-induced bank mergers and acquisitions result in profitability reduction of merged banks in SSA. The results are consistent with those of Karlsson et al. (2021) and Tampakoudis et al. (2020), who found similar results in their studies of banking reforms through bank M&A and bank performance.

We also tested for statistical differences in the fixed effects coefficients to ascertain the specific impact of bank M&As on the profits of the individual banks that engaged in M&As (Table 7) before and after the mergers. A higher fixed effect coefficient post-M&A implies improved profitability performance and a lower coefficient post-merger reveals post-merger profit reduction. A comparison of the fixed effects shows that 16 of the 20 banks suffered a profit reduction after M&A, and 11 of the 16 banks revealed a significant profit reduction. That is about 80% of merged banks in the sample countries in SSA experience profit decline post-mergers and acquisitions.

The results are at variance with those of Bernad et al. (2013), who apply the same methodology to European bank mergers and acquisitions. The results indicate that the decline in profit performance is not general but specific to the type of M&A. An investigation into the banks that suffer profit reduction post-merger reveals that all are regulation-induced mergers and acquisitions. The comparison of fixed effects before and after the mergers confirms the findings of the regression results.

Conclusions

This study investigates the long-run impact of bank mergers and acquisitions (M&A's) on the post-merger profitability performance of merged banks in SSA. This study supports the persistence of bank profit in SSA due to market imperfections. The previous year's profit affects the current year's profit in all profitability measures. The study concludes that there is no profit improvement after bank M&As in SSA. The study results from both the GMM results and the comparison of the fixed effects before and after bank M&A conclude that there is a significant profit reduction for merged banks post-merger. All profitability measures (return on assets, equity, and net interest margin) declined in almost all the post-merger years studied for the total sample, regulation-induced and voluntary M&As. The regression results for regulation-induced M&A indicate even worse profit performance after M&As. Therefore, we conclude that regulation-induced mergers and acquisitions lead to significant profit reductions in merged banks from the year of the merger and acquisition through to six years after mergers and acquisitions.

Market concentration, bank size, efficiency, bank risk and the macroeconomic variables are significant determinants of bank profitability in SSA countries. This study concludes that bank efficiency significantly influences profitability. Efficient management of bank costs is crucial for better profit performance in SSA. The study also concludes that bank risks influence bank profitability negatively contrary to theoretical expectation of the risk return nexus. The credit risk and the Z-score the two bank risk measures in this study impact bank profit negatively. The study again concludes that banks with higher liquidity are more profitable in SSA. Bank size positively and significantly influences profitability, but only for the net interest margin. Thus, the study concludes that big banks in SSA enjoy economies of scale, which earns them higher interest income. However, for the regulation-induced bank M&As subsample, bank size hurts banks return on assets. The study again concludes that macroeconomic conditions impact banking performance significantly. Output growth in SSA increases bank profitability, while price changes has an inverse relationship with profitability.

Based on the results of this study, encouraging banks to merge or acquire weaker banks in crisis time is not the best policy option for banking regulators in their bid to strengthen the banking system. The regulator should not sanction the merger of two or more weak banks, as in some SSA countries. However, healthy banks may voluntarily merge to form sufficiently big banks to leverage economies of scale and scope for profitability enhancement. The regulator may consider providing liquidity support to troubled banks instead of compelling these banks to merge. In addition, experienced managers should be appointed to run these banks, as the study reveals that higher managerial ability in efficiently managing bank resources relates positively to bank performance.

Authors' contributions

All four authors were involved in this study from conception to analysis and interpretation of data. Philip Ayagre Atimbire wrote the paper and interpreted the data, while Anthony Q.Q. Aboagye, E. Sarpong-Kumankoma, and Patrick Opoku Asuming reviewed the study for important intellectual content and final approval for publication. Therefore, all authors agree to be accountable for all aspects of this work.

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Data availability

Data is available upon request.

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