




# “The effect of bank-specific dynamics on profitability under changing economic conditions: Evidence from Ghana”

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# THE EFFECT OF BANK-SPECIFIC DYNAMICS ON PROFITABILITY UNDER CHANGING ECONOMIC CONDITIONS: EVIDENCE FROM GHANA

## Abstract

Analysts continue to demand explanations for the continuous flow of depositors' and investors' funds to persistently underperforming banks, while universal banking is premised on the ability to outperform the market. This study examines the effect of bank-level factors on the profitability of banks under changing economic conditions, using a dynamic panel system Generalized Method of Moments (GMM) technique for panel data collected from 18 universal banks in Ghana. The data collection period was from 2007 to 2021. The analysis revealed that lagged return on assets, capital adequacy ratio, and deposit to total asset ratio have a positive influence on bank profitability, whereas lagged return on equity, bank size, expenditure, and asset quality negatively impact profitability. While the effect of these variables on profitability is expected considering the literature, the evidence obtained for asset quality is inconsistent with the explanations in the literature as an increase in asset quality is expected to drive an impressive trend in profitability. Furthermore, a negative relationship was found to exist between economic growth and bank performance when economic expansion exerts a deteriorating effect on the returns on bank assets. This can be linked to the dispersion of investors' and customers' funds to other investments, which limits the amount of funds available to the banks to grant credits for interest income. Based on the findings, it can be concluded that bank-specific dynamics adapt to changes in economic conditions which can be explained by the normative guidelines of the Adaptive Market Hypothesis.

## Keywords

profitability, economic growth, asset quality, capital adequacy ratio, bank size, liquidity, expenditure management, deposits

## JEL Classification

G20, G21, F62

## INTRODUCTION

The combined assets of banks in Ghana continue to increase by significant margins year on year, despite the inability of individual banks to report stronger performances compared to the market index. Evidence shows that the total operating assets of the banking sector in Ghana appreciated from GHS 71.77 billion in 2017 to GHS 80.67 billion at the end of 2018, denoting a significant increase of 11.3 percent in value (PwC, 2019). The banking industry of Ghana, however, continue to report significant credit losses emanating from high levels of non-performing loans, high operational overheads, and liquidity challenges (BoG, 2021).

The inconsistency in bank asset flow and performance relations distorts the prices of financial assets on the market, which alters the informational efficiency of the financial system and creates opportuni-

ties for arbitrageurs to earn extraordinary returns (Fama, 1970). However, changes in economic conditions exert varying predictive influences on individuals and corporate incomes which affects their investment decisions on banks depending on the direction of the economic growth (Ferreira et al., 2013; Gupta et al., 2019). Periods of positive trend in GDP growth and less systemic volatility (i.e., expansive economic conditions) support business growth and bank profitability, while negative GDP growth and increased systemic volatility trends (i.e., contractionary economic conditions) adversely impact bank profitability (Le & Ngo, 2020; Amalia, 2021). As a result, the effect of the bank-level dynamics on profitability requires further analysis as the existing works on bank performance in Ghana do not account for the impact of changing economic conditions on the interaction between the bank-specific variables and profitability (Gyamerah & Amoah, 2015; Musah et al., 2018).

## 1. LITERATURE REVIEW AND HYPOTHESIS

The dynamics of bank performance, much like other financial variables, are subject to change under different economic conditions. In this regard, the effect of bank-specific factors on profitability is unlikely to be the same when there is a change-over in the direction of economic growth. Ali and Puaah (2019) assess the internal determinants of bank profitability and stability in Pakistan using panel regression analysis. From the analysis, bank-specific factors (i.e., bank size, credit risk, funding risk, and stability indicators) exert an important predictive influence on the profitability of banks. Bank size, credit risk, and bank stability have a positive impact on banks' operational profits, which implies that increases in these internal variables enhance the performance momentum of bank managers. However, the study found that bank size and liquidity risk impact adversely stability, while funding risk and profitability support bank stability. This result implies that larger banks are generally prone to liquidity challenges as they grow at a slower pace than their smaller counterparts. Incorporating a variable for financial crises in the regression, the analysis showed that financial market dynamics have an insignificant effect on bank profitability and stability. While the findings of the study generally reflect the realities of banks' performance and management, using a dynamic panel model offers a more adequate technique to estimate the effect of lagged profitability on subsequent performance.

Employing correlation and multivariate regression analyses, Lipunga (2014) assesses the determinants of quoted commercial banks. The study found that bank-level factors such as bank size, li-

quidity, and management efficiency are predictors of bank performance with a positive influence on profitability. This evidence is consistent with the results of Ali and Puaah (2019), which document a positive influence of bank size on profitability. Furthermore, the results of Lipunga (2014) show that bank size, capital adequacy, and management efficiency exert significant predictive influences on earning yield. Bank size and management efficiency have a positive effect, while the impact of capital adequacy is negative. This indicates that larger banks generate more profits than their smaller counterparts as the large banks benefit from economies of scale to minimize operational overheads.

In an analysis of the determinants of bank profitability, Batten and Vo (2019) estimate fixed effect and dynamic panel GMM models. Consistent with the results of Lipunga (2014), Batten and Vo (2019) document that bank size, capital adequacy, risk, expense, productivity, and macroeconomic dynamics have a predictive influence on profitability. More importantly, the impact of the effect of these bank-level and macroeconomic factors on bank performance is comparable with return on assets and return on equity. Similarly, the results of Chronopoulos et al. (2013) in an analysis of the predictors of banks suggest that market competition impacts adversely banks' long-term excess profits, while policy adjustment retards their performance momentum. The study, however, documents persistence in the operational profitability of banks during crisis periods, considering the changes in market conditions. This implies that strategic banks can adapt to changing market conditions and the macroeconomic environment to achieve extraordinary persistence by leveraging on asset size and customer goodwill, through efficient cost management strategies.

Using the random effects method to estimate the determinants of commercial bank profitability in the context of a cost-efficiency model, Francis (2013) found that bank capital adequacy and deposit growth drive positive influences on bank profitability. The positive effect of these factors is largely linked to regulatory reforms in the form of the banking sector liberalization, which has led to market openness to foreign investors and market competitiveness. These dynamics have boosted the liquidity positions of banks to meet the credit needs of private-sector corporations. However, the analysis has found that bank size, management efficiency, and liquidity exert a negative effect on banks' profitability trends. This evidence is largely attributable to expensive bank merger arrangements and overtrading practices that result in the accumulation of excess overhead costs.

Applying a Pooled Ordinary Least Squares (POLS) technique, Hossain and Ahamed (2021) conduct tests on the effect of internal and external drivers of bank profitability. The results show that issues about bank size and macroeconomic stability remain important determinants of bank profitability, where increased bank assets and GDP growth imply deteriorating trends in profitability. It is known in the literature that large banks grow at a slower pace than their smaller counterparts, which may affect trading momentum and hence reduce profit margins (Corté et al., 2020). However, the results obtained for GDP growth by Hossain and Ahmed (2021) are inconsistent with the generally positive effect of GDP growth on bank profitability explained in the literature (Le & Ngo, 2020; Isayas, 2022). Furthermore, the analysis does not account for the impact of changes in economic conditions on bank performance, while the use of the linear test tool (POLS) is inadequate to ensure the generation of accurate conclusions about the relationship between bank profitability and its determinants, the dynamics of their interaction is subject to change over time, and hence requires a conditional analysis.

Through a dynamic panel model analysis, Syed and Aidyngul (2022) investigate the determinants of non-performing loans and their impact on bank performance. Like the findings of an earlier study direction of GDP growth represents a key predictor of non-performing loans (Hossain & Ahmed, 2021). The effect of GDP growth on non-perform-

ing loans is negative, which implies that a unit increase in GDP will drive the quality of bank assets on a downward spiral. While a positive effect of economic growth is expected on bank performance based on the literature, the availability of wider investment options for asset owners during the expansionary phase of the economy can reduce the flow of investors' funds to the banks and affect their profitability. Beyond the economic growth, higher capital adequacy ratio and deposit ratio were identified as having negative and positive, respectively, influence on asset quality in terms of non-performing loans. As explained in the preceding paragraph, the negative impact of higher capital adequacy on loan performance can be linked to the inability of larger banks to grow at a faster pace compared to smaller banks. The impression impact of deposits on loan performance can be explained by the increase in bank operating assets to enhance interest earnings to offset the loss of income from impaired loans.

In a related analysis of the drivers of bank profitability, Dogan and Yildiz (2023) employ fixed effect and GMM models. From the analysis, expenditure management, bank size, and liquidity were identified as the key bank-level variables with predictive influences over profitability. The influence of expenditure over profitability was found to be negative, which implies that an increase in operational overheads impends the banks' capacity to finance long-term investments, while it reduces profits. This evidence is consistent with the findings of Batten and Vo (2019) and Dang et al. (2021), which suggest an adverse impact of expenditure on profitability. Bank size reports a positive relationship with profitability, while liquidity exerts a negative impact on the profits of private banks. This implies that well-capitalized banks can generate more revenue and can withstand systemic shocks from changes in macroeconomic dynamics. This can be explained by the advantages of economies of scale and high clientele confidence.

A recent report by the Bank of Ghana suggests a significant deterioration of the universal banks' asset quality ratio over the last five years (BoG, 2021). The ratio of banks' non-performing loans (NPLs) to total loan advances increased from 14.8 percent in 2020 to 15.2 percent in 2021. In 2017, NPLs ratio was 21.6 percent. It improved to 18.2

percent in 2018 and then it improved further to 13.9 percent. The recent incremental trajectory of the NPL ratio indicates problems, namely the inefficiency of banks' credit assessment and recovery strategies, and their resultant adverse long-term consequences for profitability. Similarly, the statistics of banks' capital adequacy ratio in five years (2017 to 2021) suggest instability in banks' capacity to withstand significant macroeconomic shocks based on the percentage of shareholder equity to total assets. According to the central bank's report, CAR was 15.6 percent in 2017, increased to 21.9 percent in 2018, declined significantly to 17.5 percent in 2019, and leaped to 19.8 percent in 2020. A slight decline to 19.6 percent was recorded in 2021.

The pattern of asset quality and capital adequacy in Ghana indicates that the drivers of bank performance are generally unpredictable and thus require conditional modeling to explain the effects of their changing dynamics on profitability. This study thus, makes an original contribution to the literature on bank performance in Ghana through the application of the conditional test tool to the dynamics of profitability, considering the time-varying changes in economic conditions. Explanations posited under the Adaptive Markets Hypothesis (AMH) suggest that the interaction between economic variables is subject to change under different market conditions (Lo, 2012; Kumar, 2021). In this way, the effect of the bank-specific factors on profitability is unlikely to be the same when there is an economic changeover, which calls for an investigation. This study thus presents a means to validate the normative guidelines of the Adaptive Markets Hypothesis (AMH) in the context of the relationship between bank profitability and its determinants in the changing economic environment. Moreover, the findings of the study will provide important impetus for investors, analysts, and bank managers to engender sustainable banking and optimal stock-picking in banking investments. Generally, the effect the bank-specific factors, namely, size, liquidity, expenditure, asset quality, deposits, and capital adequacy on profitability are unlikely to be the same under different economic conditions, while the extant literature does not provide accurate inferences about their behavior for which an investigation is required.

This study is aimed at assessing the effect of bank-specific factors on bank profitability under changing economic conditions in Ghana. The study conjectures that the effect of the bank-specific determinants of bank profitability is more pronounced under bearish economic conditions than bullish conditions. This hypothesis will be tested through the estimation of the empirical model, and its confirmation will be based on the economic interpretation of the results.

$H_0$ : *There is no relationship between profitability and bank-specific factors under bullish and bearish economic conditions.*

$H_1$ : *The profitability is more sensitive to bank-specific factors under bearish economic conditions than bullish conditions.*

## 2. METHODS

This study employs the annual data of 18 banks in Ghana covering the 2007 to 2021 period. Data on bank-level variables are obtained from the published financial statements on the websites of sampled banks and the Ghana Stock Exchange (GSE) while macroeconomic data are sourced from the Bank of Ghana (BoG) official website. The sample period was selected to account for the effect of the global financial meltdown and the recent financial sector clean-up in Ghana on banks' performance dynamics. The sample of 18 banks from a population of 23 banks were selected based on a sampling criterion of six-year data availability.

Following Ali and Pua (2019), this study adopts a two-step dynamic panel system GMM model to test the effect of bank-level and systemic variables on profitability. Scholars explain that a dynamic panel GMM technique is capable of accounting for likely dynamic endogeneity biases, which an Ordinary Least Square (OLS) technique does not eliminate by its estimation (Arellano & Bond, 1991; Kripfganz & Schwarz 2019). The GMM approach presents a theoretical and more enhanced estimation instrument that captures the endogeneity problems of simultaneity and unobservable heterogeneity (Wintoki et al., 2012). The literature indicates that the two-stage approach is more robust than the difference GMM estimator

that obtains all parameter estimates simultaneously (Blundell & Bond, 1998; Roodman, 2009). Moreover, the predictive ability of the difference GMM tends to be low for a small sample data with a small number of periods as utilized in this study (Alhassan et al., 2014). Thus, this study employs the system GMM technique to address the inadequacies of the difference GMM. The adopted model is first estimated for ROE, followed by ROA as a proxy for bank profitability. The panel model for analysis is thus represented as follows:

$$\begin{aligned} ROE_{it} = & K_i + \beta_1 ROE_{it-1} + \beta_2 CAR_{it} + \\ & + \beta_3 ASQ_{it} + \beta_4 LIQ_{it} + \beta_5 EXP_{it} + \\ & + \beta_6 DTA_{it} + \beta_7 BSIZE_{it} + \\ & + \beta_8 ECCON_{[t-1]} + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} ROA_{it} = & K_i + \beta_1 ROA_{it-1} + \beta_2 CAR_{it} + \\ & + \beta_3 ASQ_{it} + \beta_4 LIQ_{it} + \beta_5 EXP_{it} + \\ & + \beta_6 DTA_{it} + \beta_7 BSIZE_{it} + \\ & + \beta_8 ECCON_{[t-1]} + \varepsilon_{it} \end{aligned} \quad (2)$$

where  $ROE_{it}$  and  $ROA_{it}$  denote return on equity and return on assets of bank  $i$  at time  $t$ . They are calculated as the ratio of a bank's net income to its shareholder equity, and the ratio of the bank's annual net income to average total assets, respectively, and they are employed as proxies for profitability in this study. Prior studies employed both  $ROE$  and  $ROA$  as measures of banks' profitability and explain that the  $ROE$  value indicates the bank's efficiency in generating income on new investments, while  $ROA$  reflects the bank manager's ability to use its existing assets to generate net income (Athanasoglou et al., 2008; Batten & Vo, 2019). The bank-specific variables  $CAR$ ,  $ASQ$ ,  $LIQ$ ,  $EXP$ ,  $DTA$ , and  $BSIZE$  lagged once to control for endogeneity problems (Ibrahim & Rizvi, 2018). The error term of the equation is denoted by  $\varepsilon_{it}$ .  $BSIZE$  denotes bank size (measured as the natural logarithm of the bank  $i$ 's total asset in time  $t-1$ ), and it is included in the analysis to account for the effect of bank asset base on its general performance (Batten & Vo, 2019).  $EXP$  highlights the expenditure management of bank  $i$  in time  $t-1$ , and it is computed as the ratio of a bank's operating expense to operating income. A lower expenditure

management ratio is preferable because it implies higher managerial efficiency.

$CAR$  is the capital adequacy ratio of the bank  $i$ 's in time  $t-1$ , which is calculated as the ratio of shareholders' equity to the total assets of the bank. A higher  $CAR$  is preferable as it indicates the bank's capacity to finance its operations without external funding (Govori, 2013; Batten & Vo, 2019).  $LIQ$  is the liquidity level of bank  $i$  in time  $t-1$ , and it is measured as the ratio of total loan advances to total assets. According to the literature, a high liquidity ratio is critical to avoid a run on the bank by customers and investors (Ali & Puah, 2019; Lipunga, 2014).  $DTA$  denotes the ratio of the bank's total deposits to total assets in time  $t-1$ . It is included in the analysis to account for the effect of net interest margins on bank performance, as banks' profitability is linked to the amount of interest receivables from loans granted vis-à-vis interest payables on customers' savings and investors' funds (Erina & Lace, 2013).  $ASQ$  represents asset quality; it is included in the regression to capture the effect of non-performing loans on bank profitability.  $ASQ$  is thus computed as the ratio of non-performing loans to total loan advances where a higher  $ASQ$  ratio value indicates a higher portfolio risk of bank assets (Alper & Anbar, 2011).

$ECCON$  is incorporated in the equation as a dummy variable for economic conditions to test the effect of changes in economic conditions. It takes the value 1 if the real  $GDP$  (computed as the natural logarithm of  $GDP$ ) for the past year is greater than zero,  $\ln GDP_{t-1} > 0$ , indicating an expansionary phase; and takes a value of 0 if the real  $GDP$  growth for the past year is less than or equal to zero,  $\ln GDP_{t-1} \leq 0$ , implying a contractionary phase of the economy. In the analysis, a significant positive coefficient of the economic condition variable,  $ECCON$ , indicates that the sensitivity of profitability to the bank-specific variables is more pronounced under expansionary economic conditions than under contractionary conditions. On the other hand, a significant negative coefficient of the economic condition variable implies that the sensitivity of profitability to changes in the bank-specific factors is more evident under bearish economic conditions than bullish conditions. However, an insignificant coefficient by the market condition variable indicates that there no re-

relationship between the bank-specific factors and profitability under bullish and bearish economic conditions. Scholars explain that the direction of economic growth is linked to the performance of banks, while investor reactions to macroeconomic fluctuations impact bank profitability (Erina & Lace, 2013; Elekdag et al., 2020).

### 3. RESULTS AND DISCUSSION

Table 1 presents the descriptive statistics of the variables employed in the study. *ROE*, *ROA*, *CAR*, *BSIZE*, *LIQ*, *EXP*, *DTA*, and *ASQ* represent the return on equity, return on assets, capital adequacy ratio, bank size, liquidity, expenditure management, deposit to asset, and asset quality, respectively. From Table 1, a large difference is observed between the minimum and maximum statistics of the return on equity (ranges from 0.00 percent to 3.25 percent), bank size (4.19 percent to 9.41 percent), expenditure management (from 0.01 percent to 6.63 percent), and deposit to total asset (from 0.07 percent to 6.79 percent) variables, while return on assets, capital adequacy ratio, liquidity, and asset quality vary between 0.10 percent and 0.00 percent, 0.72 percent, and 0.02 percent, and 0.73 percent and 0.00 percent, respectively. Similarly, return on equity, bank size, expenditure, and deposits to total assets ratio reports the highest standard deviation statistics of 0.33 percent, 3.41 percent, 0.51 percent, and 0.56 percent respectively. These results indicate significant dispersion in the distribution of the data of these variables, which implies that the performance characteristics of the sampled banks vary based on size, expenditure efficiency, and the flow of depositors' funds to the banks.

Table 2 reports the correlations between the independent variables employed in the study's analysis. As can be observed from the table, return on assets reports a significant positive correlation (0.65)

with return on equity. This indicates that return on equity is expected to respond directly and affirmatively to an increase in return on assets. The capital adequacy ratio reports a significant positive correlation (0.18) with return on assets, while its correlation with return on equity is significantly negative. This suggests an increased capital adequacy ratio causes a corresponding increase in return on assets, while its increase drives a decrease in return on equity. From Table 2, expenditure and asset quality ratios report significant negative correlations with return on equity and return on assets. The correlation coefficients of expenditure and asset quality with return on equity are  $-0.18$  and  $-0.22$ , while their coefficients with return on assets are  $-0.23$  and  $-0.20$ , respectively. This result indicates that an increase in bank expenditure and asset quality leads to a decrease in banks' returns. In addition, the results in Table 2 show the existence of a significant negative correlation between asset quality and liquidity, which suggests that an increase in asset quality results in a decrease in liquidity ratio. Similarly, it can be observed from the table that there exists a significant negative relationship between both ROE and ROA and asset quality which implies that an increase in asset adversely affects the return on investors' funds as well as the return on the bank's existing assets. Considering the literature, correlation analysis is conducted primarily to determine whether the independent variables are highly intercorrelated regarding the presence of multicollinearity issues (Dormann et al., 2013). Beyond issues about multicollinearity, correlation analysis is conducted to ascertain the association between the independent variables. Generally, a correlation of 0.7 and below is preferable as it implies the non-existence of multicollinearity issues among the independent variables. As can be observed from Table 2, return on equity (ROA), and return on assets (ROE) report the highest correlation of 0.65, which is below the acceptable level of 0.7. Besides, the ROE and ROA are employed as dependent variables in the

**Table 1.** Descriptive statistics

Variables	ROE	ROA	CAR	BSIZE	LIQ	EXP	DTA	ASQ
Mean	0.2381	0.0283	0.1638	18.3567	0.5755	0.6165	0.7269	0.0480
Maximum	3.2449	0.1023	0.7185	9.4151	1.6615	6.6283	6.7938	0.7329
Minimum	0.0002	0.0005	0.0147	4.1889	0.0605	0.0126	0.0645	0.0033
Std. dev.	0.3312	0.0181	0.0838	3.4078	0.2434	0.5060	0.5568	0.0724
Observations	231	231	231	231	231	231	231	231

**Table 2.** Correlation matrix

Variables	ROE	ROA	CAR	BSIZE	LIQ	EXP	DTA	ASQ	VIF
ROE	1.000	–	–	–	–	–	–	–	1.211
ROA	0.649***	1.000	–	–	–	–	–	–	1.079
CAR	–0.209***	0.179***	1.000	–	–	–	–	–	1.091
BSIZE	0.038	0.029	–0.090	1.000	–	–	–	–	1.023
LIQ	0.097	0.064	0.057	0.089	1.000	–	–	–	1.065
EXP	–0.178***	–0.225***	0.069	–0.026	0.057	1.000	–	–	1.069
DTA	–0.040	0.022	–0.059	0.041	–0.093	–0.019	1.000	–	1.018
ASQ	–0.219***	–0.202***	0.061	0.089	–0.151**	0.071	–0.021	1.000	1.093

Note: 10%, 5%, and 1% levels of statistical significance are denoted by \*, \*\*, and \*\*\*, respectively.

analysis. The highest correlation (–0.15) among the independent variables is between asset quality (ASQ) and liquidity (LIQ), which is also below the theoretically acceptable level of 0.7. Moreover, the highest variance inflation factor (VIF) value (1.093) among the independent variables is below the acceptable level of 10 (Saeed, 2014). This eliminates any problem of multicollinearity between the explanatory variables.

Table 3 presents the system GMM results for the determinants of banks' profitability under different economic conditions. Return on equity (ROE) and return on assets (ROA) are employed as proxies for bank profitability. In Table 3, the lags of both ROE and ROA proxies of profitability report significant coefficients. While the coefficient of lagged ROE is negative, the value for lagged ROA is positive. This suggests that the past performance of a bank posits important implications for the direction of its future performance, where an increase in ROE drives a deteriorating trend in subsequent ROE, while an increase in ROA exerts an impressive effect on future ROA. Larger banks, much like other financial enterprises, grow at a slower pace compared to their smaller counterparts (Stulz, 2019). As such, the effect of diminishing returns occurs after a period of a significant increase in shareholders' funds, which causes the return on the investors' equity to plummet in the subsequent trading period. However, the bank manager's ability to effectively use existing assets drives positive returns on assets in the following period. It is explained in the literature that the past superior performance of banks acts as a catalyst to propel them into impressive future performance (Le & Ngo, 2020). In practice, the achievement of superior trading results by banks sustains the

customers' and investors' confidence to allocate more funds to enhance profitability.

From Table 3, the lagged capital adequacy ratio (CAR) reports an insignificant coefficient under ROE, while it is positive and significant under the ROA measure of profitability. This result suggests that an increase in the ratio of shareholder funds to total assets does not impact the banks' future profitability in terms of ROE. However, an increase in CAR drives a positive trend in ROA under changing economic conditions. This evidence is consistent with the findings of Batten and Vo (2019) that posit a positive relationship between capital adequacy and bank performance. Banks with large equity capitalization are more solvent and can finance their operations without significant external funding, while they remain financially strong to withstand the impact of systemic fluctuations (Almaqtari et al., 2019).

It is known in the literature that large banks have the advantage of economies of scale as they undertake a wider scope of transactions and thus, minimize the per unit cost of their operations to improve earnings (Bertay et al., 2013; Batten & Vo, 2019). In addition, large banks benefit from regulatory protection because of their market power (Kořak, & Ćok, 2008; Ali & Puah, 2018). In this way, current and prospective investors are motivated to allocate more funds to the larger banks compared to their smaller counterparts. However, in Table 3, the variable for bank size (BSIZE) reports a significant negative coefficient under ROE, while it is insignificant under ROA. This implies that an increase in the size of the bank's assets adversely impacts the returns on shareholders' equity, while it does not influence the return on its total underlying assets. The adverse effect of size on



ROE can be explained by the slow growth pace of that larger banks, which diminishes the yields on shareholder funds over time (Stulz, 2019).

From Table 3, the variable for liquidity (LIQ) reports insignificant coefficients under both ROE and ROA. This result suggests that an increase in a bank's liquidity position does not affect its profitability. This evidence contradicts the position of the literature that an increase in a bank's liquidity ratio drives an adverse effect on its profitability because strong liquidity positions deteriorate the bank's lending capacity, which has a deflating effect on interest revenue (Sahyouni & Wang, 2018). Likewise, profitability is adversely affected where short-term liquid investments and loan advances are non-performing (Francis, 2013). However, a higher liquidity ratio implies that the bank can finance its short-term debt and meet customer withdrawal demands to avoid insolvency challenges (Francis, 2013).

As can be observed from Table 3, expenditure (EXP) reports a significant negative coefficient under ROE, while it is insignificant under ROA. This evidence suggests that an increase in the bank's operational expenditure impedes its ability to generate shareholders' funds. This result is consistent with the results of prior studies that an increase in a bank's overhead impairs the bank's ability to expand rapidly, which reduces revenue (Alexiou & Sofoklis, 2009; Francis, 2013). The expenditure ratio indicates the managerial efficiency of the bank regarding the minimization of costs during revenue, whereas a lower expenditure ratio reflects high managerial efficiency, and vice versa. However, higher profitability may be associated with a higher cost where the competition requires banks to make substantial investments in product advertisement and technology to achieve a significant market share (Hasan et al., 2020). On the other hand, in less competitive markets the banks with significant market power can transfer a greater proportion of their overheads to customers through high administrative charges and lending rates (Athari, 2021).

Customer deposits represent a major means by which banks obtain funding for their operational and investment activities as the cost of deposit mobilization is lower compared to other means such as bond and equity issues (Ahmed et al., 2021). Banks make a profit when interest

income margins exceed interest expense, thus implying a positive net interest margin for the banks. In this way, a positive correlation is expected between deposits and profitability as the more the deposits are transformed into loans, the higher the interest revenues for the banks. In Table 3, deposit to total assets (DTA) reports an insignificant coefficient under ROE, while it is significantly positive under ROA. This evidence confirms the position of the literature that an increase in customer deposits enhances bank managers' ability to generate new revenue from existing assets. An increase in the deposit avails more funds to the bank to grant more loans to boost interest earnings income (Ozgun & Gorus, 2016; Rahman et al., 2020). From Table 3, asset quality (ASQ) reports significant negative coefficients under both ROE and ROA. This indicates that an increase in asset quality exerts a deteriorating impact on the bank's profitability. This finding contradicts the results of Masood and Ashraf (2012) and Almaqtari et al. (2019) who found a positive relationship between high asset quality and profitability. They explain that a reduction in banks' non-performing loans improves banks' credit risk exposure, which boosts the bank's financial stability and enhances profitability.

Economic condition (ECCON) reports an insignificant coefficient under ROE but a significant negative coefficient under ROA. This evidence implies that economic growth does not impact the return on bank shareholder funds, but it leads to deterioration in the return on the banks' assets. This finding deviates from the positive effect of economic growth on bank performance posited in the extant literature (Chronopoulos et al., 2015; Alam et al., 2021). An increase in the real GDP growth rate implies an expansion of the market and the availability of a conducive environment for banks to thrive. This creates opportunities for new investments, expansion, job creation, and increased income generation to support the banks' viability (Supriyono & Herdhayinta, 2019). Moreover, the significant negative coefficient of the economic condition variable suggests that the sensitivity of the profitability to the bank-specific dynamics is more pronounced under economic recessions than economic booms for which reason the null hypothesis can be accepted.

**Table 3.** Determinants of bank profitability under changing economic conditions

Independent variables	Dependent variables					
	Coefficients		Standard errors		P-values	
	ROE	ROA	ROE	ROA	ROE	ROA
ROE (t-1)	-0.544***	-	0.193	-	0.005	-
ROA (t-1)	-	0.269**	-	0.113	-	0.018
CAR	-5.591	0.489***	5.362	0.109	0.005	0.000
BSIZE	-0.156***	-0.065	0.046	0.052	0.001	0.213
LIQ	1.108	-0.022	1.285	0.018	0.388	0.217
EXP	-0.252**	-0.004	0.104	0.011	0.015	0.679
DTA	-0.025	0.095**	0.632	0.045	0.968	0.032
ASQ	-0.443**	-0.011*	0.222	0.005	0.046	0.082
ECCON	0.299	-0.010**	0.342	0.003	0.138	0.042
Variables			ROE		ROA	
No. of observations			213		213	
No. of groups/instruments			18/15		18/16	
AR (1) test (p-value)			0.072		0.209	
AR (2) test (p-value)			0.655		0.386	
Hansen test of over-identification (p-value)			0.633		0.819	
Diff-in-Hansen test of Exogeneity (p-value)			0.450		0.885	

Note: 10%, 5%, and 1% levels of statistical significance are denoted by \*, \*\*, and \*\*\*, respectively.

The study's hypothesis is tested through the estimation of the empirical model. As can be observed from Table 3, the variable for economic conditions reports a significant negative coefficient under ROA measure of profitability. This implies that profitability is more responsive to changes in bank-specific dynamics during contractionary periods of the economy than expansionary periods based on the economic interpretations explained in section 2. As a result, the alternative hypothesis can be accepted.

## CONCLUSION

This study was aimed at analyzing the effect of bank-level variables on profitability under time-varying economic conditions. The results revealed capital adequacy and deposit-to-asset ratios as the set of bank-level factors with positive influences on profitability, whereas bank size, expenditure ratio, and asset quality exert adverse impacts on profitability. This implies that an increase in capitalization and customer deposits strengthens the trading momentum of the bank as the availability of more funds enables the bank to extend more credits to borrowers to boost interest income. The adverse influences of bank size and expenditure ratio on profitability can be linked to the slower pace of growth of large banks which reduces profitability.

In addition, the analysis revealed that the past performance of banks posits important implications for the direction of their future performance. While a past increase in return on equity adversely impacts the value of future return on equity, the banks' return on assets in the previous period drives the impressive value of this variable in the subsequent period. This dynamic implies that banks that exhibit a superior ability to generate new revenue through existing assets attract additional funds from customers to boost profitability, while the profits of equity-dominated banks diminish over time owing to their inability to grow rapidly. Moreover, a negative relationship was found to exist between economic conditions and bank profitability. This implies that economic growth leads to a dispersion of investors' funds to other investments, which diminishes the financial capacity of the banks and their ability to generate more administrative and interest revenues. As a result, this study posits the effect of the internal determinants of bank profitability is sensitivity to the periodic changes in economic conditions, which validates the underlying explanations of the AMH in the context of bank performance.

As a policy recommendation, bank managers should implement strategies that consolidate the banks' financial stability, as economic growth drives a dispersion in bank fund flows, which reduces profitability. Likewise, increased bank size and expenditure drive a decline in return on investors' equity. As a result, larger banks should strategize to remain visible in the industry through advertisements and product promotions, as investor fund allocation decisions tend to favor smaller banks over larger banks. Future studies can test the effect of inflation on profitability, as inflation can affect bank performance. The limitation of this study pertains to the use of annual data, which restricts the scope of the data points for the analysis. The annual data were employed because of data availability issues from the sampled banks. The use of high-frequency data represents a plausible means of improving upon the results in the future.

## AUTHOR CONTRIBUTIONS

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Investigation: Richard Apau.

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