

AN EMPIRICAL ANALYSIS ON THE IMPACT OF ECONOMIES OF SCALE AND COMPETITION LEVEL ON BANKRUPTCY RATE OF COMMUNITY BANKS IN TANZANIA. A RANDOM EFFECT MODEL APPROACH

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<http://doi.org/10.35409/IJBMER.2023.3505>

ABSTRACT

This paper analyses the impact of economies of scale and competition level on bankruptcy rates of community banks for the period ranging from 2006 to 2021. The explanatory variables employed in this study are competition level and economies of scale, while the dependent variable is the bankruptcy rate of community banks. The research approach is quantitative and the research strategy is based on secondary data collection from published financial statements of community banks and Bank of Tanzania reports. The employed sample size is 11 community banks, with total number of 176 observations. The study employed a purposive sampling approach as the basis for sample selection in order to obtain a sample that fit the research objective. The data was analysed using both descriptive and inferential for hypothesis testing, and the model was evaluated using structural equation modelling and panel technique analysis (Shone, 2015). Due to its reliability, the study has applied random effect model versus fixed effect model to generate regression results. The findings indicated significant negative correlations between the explanatory and dependent variables.

Keywords: Competition Level, Hhi Index, Bankruptcy Rate, Economies Of Scale, And Altma's Model.

1. INTRODUCTION

The global financial crisis, which took place in 2007 and 2008, indicated that risk management for community and commercial banks was not adequate to caution against shocks that emanated from both macro and micro-economic environments. The magnitude of the financial crisis clearly demonstrated the interconnectedness of financial institutions, including community banks, and the world economy (Buthiena, 2019). Among the factors standing behind the crisis were poor risk management stemming from low economies of scale, stiff competition levels, and low levels of market share, which together enlarged the vulnerabilities of the bankruptcy rate for financial institutions, including community banks (Veitch, 2019).

In Africa, different studies have identified different challenges facing banks' operations in many countries with diverse bank types and financial systems. For instance, different experiences are being drawn in Kenya where several authors have explained that effective credit risk management enhances the financial performance of microfinance banks and thus reduces the bankruptcy rate by putting in place strong management, diversification of economies of scale, enhanced market share and improved asset quality (Kipkirui, 2018). Further, capital adequacy, loss given default ratio (asset quality), loan loss provision, and non-performing loan ratios were being referenced as the major determinants of credit risk management and the bankruptcy rate of

banks in Kenya (Mugo, 2018). The upsurges of bank distress and bankruptcy rates in Nigeria raised many questions, which justified the need to investigate the source of this failure in order to reduce contagion effect (Akani & Uzah, 2018).

In Tanzania context, seven community banks were closed by a Regulator for the period ranging from 2017 to 2019 due to undercapitalization and liquidity problems caused by low economies of scale and high competition levels among rival banks. The sub-sector is very essential in the financial system as it predominantly targets the unbanked population with low income levels and thus assists in promoting financial inclusion (BOT, 2020; Lucas, 2019). Generally, the variables in this study have been linked with three theories, namely, the contagion theory, theory of market structure and financial intermediation theory of banking (Lucas, 2019). The banking sector in Tanzania has different banks with peculiar capacities in terms of competition level among themselves, in which a few big banks dominate the market in terms of deposits, loans, and total assets compared to small banks (BOT, 2021). The high dominance of a few big banks in the market had resulted in an increase in the bankruptcy rate of other small banks, such as community banks, which had a low capacity to compete and low economies of scale. Subsequently, this situation led to the closure and merger of some banks for the period ranging from 2017 to 2021 (BOT, 2021). The HHI index evidenced the presence of a low competition level in the sector, which stood below 1000 index as of the end of December 2021 (BOT, 2021). Further, some small banks, like community banks, have low economies of scale, which makes it difficult to compete with other strong banks. The low economies of scale for community banks normally intensify the trend of bankruptcy rates due to a decrease in competitive advantage resulting in poor financial performance (BOT, 2021).

However, some studies ended with different views. For instance, Jing (2020); BOT (2021); IMF (2019); Lucas (2019); Stefan, Troy & George (2020) and Pahlevi & Ruslan, 2019) pointed out negative relationship between the explanatory variables, namely, economies of scale and competition level with banks' failure while other such as Asongu & Odhiambo (2019); Peter, (2018) and Lucas (2019) explained presence of low correlations between the explanatory and dependent variables. Further, many referenced studies in Tanzania context did not focus on community banks sub-sector, thus creating a contextual gap while there is no any researcher who computed the proxy of the bankruptcy rate of community banks as a dependent variable, hence creating a methodological gap. In addition, some studies such as Jing (2020) used a case study strategy, key informant interviews, and questionnaires as methods to collect primary data from the purposively selected respondents, thus creating a methodological gap.

Theoretical gap exists as constructed with facts from contagion theory. The theory explained that good banks may fail due to fail of another bank caused by bank run (massive deposits withdrawal) as the effect of public panic (Muriithi, 2017). This theory is also supported by the view of the theory of lemons that evidenced a massive deposits withdrawal by customers (bank runs) when one bank fails in the market as a result of public panic. However, the theory is being challenged by not taking into consideration of other individual specific factors that absorb shocks exerted from the failed banks or have great influence on bank's failure rather than focusing only on the failure of a bank due to spillover effect of bank runs. In that regard, the ultimate intention of the study is also to address the key identified gaps.

The primary objective is to assess the impact of explanatory factors, namely, economies of

scale and competition level, which affecting the bankruptcy rates of community banks based in Tanzania banking sector. In that regard, this study has disintegrated the general objective into specific objectives for effective assessment of correlations between the variables. The first objective is to analyze the effect of competition level on the bankruptcy rate (Altman's Z-Score) of community banks in Tanzania banking sector; while the second objective is to analyze the effect of economies of scale on the bankruptcy rate (Altman's Z-Score) of community banks.

The study uses some assumptions as a combination of the underlying study variables for effective and successful completion of the study. The first assumption is that the financial intermediation is the main activity of community banks in Tanzania, which gather deposits and lend to deficit borrowers as evidenced by the financial intermediation theory of banking (Asima, 2021 and Josephat, 2019). The Second assumption is that there is certain competition level in any banking sector, which may cause some firms with low competitive advantage to fail and thus, exit the market as evidenced by theory of market structure (Michael, 2021, Muli, 2019 & Asima, 2021). Lastly, the third assumption is that there is a significant level of interconnectedness among banks, which may expose the sector into bankruptcy vulnerabilities via contagion and systemic risks (BOT, 2021).

The study concepts and variables have been constructed based on theoretical framework of three theories, namely, Theory of market structure, contagion theory and intermediation theory of banking. Therefore, specifically, the study intends to contribute to the contagion theory by addressing the addressed theoretical gap. The three theories operate effectively when the underlying factors are well monitored and controlled by banks, such as community banks. The contagion theory explained that if one bank fails due to the internal factors that are only in that one bank such as fraud and reported losses then other banks could be adversely affected in the long run (Schoenmaker, 1996 and Diamond & Dybvig, 1983). The theory further stated that banks are interconnected to each other by virtue of their linked and heterogeneity assets (Muriithi, 2017). Thus, in banking context, the theory concluded that good banks may fail due to fail of another bank caused by bank run as the effect of public panic. However, the theory is being challenged by not take into consideration individual specific factors that may absorb shocks exerted from the failed banks or have great influence on bank's failure rather than focusing only on the failure of a bank due to spillover effect of bank runs emanated from other failed banks (Mohamed & Magdy, 2020; Muriithi, 2017). Sutton (2006) and Ezenekwe (2019) in their study about Market Structure, explained main variables in the theory of market structure, which include competition, market concentration (market share) and economies of scale (barrier to entry). This implying that the bank with high economies of scale and competitive advantage than other banks, tends to dominate the market and increase its going concern (Ezenekwe, 2019, Basharat, 2020, Mohamed & Magdy, 2020). However, the theory of market structure is being challenged by not considering other factors that may increase barriers for a new entrant firm such as political influence and poor management of the respective firm (Basharat, 2020). According to financial intermediation theory of banking, banks typically generate liquidity by borrowing short and lending long. This implies that banks borrow from depositors with short maturities and lend to borrowers with longer maturities. Further, different authors have explained that the term "banking" means negotiation between grantors of credit and grantees of credit (Asima, 2021, and Josephat, 2019). Therefore, during the process of intermediation, community banks are exposed to credit and liquidity risks that may eventually lead to bankruptcy (Buthiena, 2019). The major variables explained in the financial intermediation

theory of banking include deposits, loans, capital adequacy, and the cost of the intermediation process, as major determinants of economies of scale and competitive advantage (Werner, 2016, Asima, 2021; Josephat, 2019). The Financial Intermediation Theory of Banking is relevant as it provides fundamental understanding that the survival or failure of any community bank is a function of deposits, lending and cost of intermediation, which also depends on the strength of the market, whether stiff or low competitive market. However, experience from most African countries appears to challenge the theory. For instance, in Africa, there might be other determinants of bank survival or failure, which include low economies of scale, watch loans, poor management skills, low economies of scale, insufficient funds, and market structure, which is dominated by few large banks.

Theoretical literature in this study focuses on the recent episode where failure of community banks has become a big challenge in the banking sector of different countries with different financial systems. Therefore, different literatures were conducted to investigate the major influences on the bankruptcy rate of banks, including community banks. Various literature reviews in recent years have shown that unfavourable macro- and microeconomic conditions, such as high competition levels, economies of scale and low market share, primarily influenced bank bankruptcy rates (Buthiena, 2019 and Lucas, 2019). It is further noted that when a bank has low competitive advantage and economies of scale, it becomes difficult to expand business and compete with other rival banks in terms of lending portfolio and deposits, thus exposing it to the risk of bankruptcy (Asima, 2021). Therefore, it is worth to note that community banks' management is responsible for enhancing economies of scale and is central to the success of any financial institution; thus, when there is weakness in this aspect, it leads to a loss of competitive advantage and a fall in economies of scale (Josephat, 2019). Further, in the banking sector, with high network intensity and a strong competition level among commercial and community banks, many banks will try to increase their competitive advantage to upgrade their survival rate or raise their going concern and therefore reduce their bankruptcy rate (Peter, 2018). Furthermore, the higher the market share and economies of scale of the community banks, the higher the probability of surviving in the rival market against big banks (Werner, 2016; Lucas, 2019; Buthiena, 2019). In addition, other thoughts has justified that the competition level among banks is very difficult to manage for small banks with low economies of scale, poor competitive advantage and low bank size. In same perspective, other concepts have indicated that the level of competition among community banks is very difficult to manage in the financial system due to unpredictable micro- and macroeconomic variables that are peculiar to the banking industry or specific to a particular bank (Ghislain, 2018). Also, in other avenues, it is believed that organization management everywhere throughout the world needs improvement and development in competition capacity against the rival firms in order to achieve the desired investment objective, which includes profit maximization. Previously, when putting resources into a business, investors frequently guaranteed that the business was monetarily secure and unchanging, creating profits in the long run and thus reducing the bankruptcy rate for firms and other financial institutions operating the respective financial system. As a result, when the organization's management position is poor (adverse), different stakeholders are less interested in investing their funds thus even competition capacity decreases, such as deposits (in the case of a bank), and thus increase bankruptcy rate. This inability to draw in enough investment frequently results in unfriendly outcomes for the business and the national economy due to the high failure rate of firms in the market (Kingu, Macha, 2018).

In addition, competition level is contributed by corporate governance as an instrument for any bank to achieve its objectives. The objective focus is on how to defend capital owners' opportunistic provisions and to make sure that executives perform their best to accomplish the interests of the stakeholders. The matter of competition capacity and corporate governance has become one of the most popular and communal subjects within the business environment relating to investment, especially in banks and community banks (Martins, 2019). Therefore, a vital role and exertion by raising competition capacity through corporate governance (management) is to increase benefits and it guarantee responsibility and accountability to different stakeholders through many standards, which ought to be bonded into all aspects of the organization management (Kingu, Macha, 2018 and Jeremiah, 2016). Likewise, high competition capacity increases level of management efficiency encompasses functional behaviors on the part of bank owners and bank executives that push banks to survival. However, some of the bank's directors who are major shareholders saw their appointments as an opportunity for self-enrichment and the best time to eat the fruits of the organization and thus forget to put strategies that potentially increases competition capacity. Different literature pointed out that the high distress in the banking system was experienced in 2008 and 2009 during global financial crisis when many banks failed both government and privately owned banks due to, among others, low competitive advantage relative other rival firms. In addition, one of the major causes of bank failure was the high profile of non-performing loans and advances and discounts by banks, which enlarged poor competitive advantage and credit risk, and thus increased the bankruptcy rate accordingly (Pahlevi and Ruslan, 2019). This scenario also has been observed in the recent years in Tanzania banking system and other countries where by banks, which are government owned experienced high level of non-performing loans, thus threats survival rate and going concern of these banks (BOT, 2021; Lucas, 2019; and Faqera, 2019). Therefore, the present prudential approach must ensure that the community banks remain in banking business without the burdens of risk assets in their lending portfolio and at the same time maintain sustainable competitive advantage (BOT, 2021 and Lucas, 2019).

The low economies of scale are believed to be the most critical cause of the increase in the bankruptcy rate for community banks due to the fact that most banks with poor economies of scale tends to loose competitive advantage (BOT, 2019; and Lucas, 2019). Various studies have also shown that high economies of scale indicate banks' willingness to expand banking activities and improve profitability, lowering the risk of bankruptcy (BOT, 2019; Lucas, 2019). Other reviews, have argued that despite the fact that poor economies of scale are the main contributor to the bankruptcy rate for community banks, there are other contributors, which include level of market share, watch loans, and competition level among commercial and community banks (BOT, 2021; Lucas, 2019). Various financial and supervisory data showed that the scale of economies in community banks with weak assets (loan portfolios) typically have a chance to develop and grow after decreases in interest expenses and provisions for loan losses (Federal Deposit Insurance Corporation through Report No. 2020-06). The financial crisis of 2008 and 2009 affected the financial costs of banks and increased industry-wide, but a generally more cost-efficient industry re-emerged, returning in recent years to pre-crisis trends (Lucas, 2019; and Federal Deposit Insurance Corporation through Report No. 2020-06). In the context of the banking sector, scale economies exist when the cost per dollar of loans (or assets) declines as the number of loans (or assets) increases (FDIC, 2020). An efficient community bank is operating at the lowest cost per

dollar of assets or loans extended to clients (FDIC, 2020). They use estimation periods that begin in 2008, the year of the financial crisis, and observe trends during the crisis's buildup, immediate aftermath, and subsequent return to more normal economic conditions (FDIC, 2020). The analysis also sheds light on how the crisis affected the economies of scale and efficiency of community banks across different segments of the banking industry. In addition, different literature analyses that built upon previous work about economies of scale have found that in order for community banks to increase their survival rate among rival markets, they have to strengthen their economies of scale (FDIC, 2020). In same perspective, other studies focused only on community banks, they find no indication of significant scale benefits beyond about \$500 million of asset size for most lending specializations. Some of the other studies and literature reviews estimate input distance functions and find scale economies to be economically small, while others, like that of Kumar (2018), emphasize the role of market power in studying economies of scale (FDIC, 2020). Others, such as Wilson (2018), take issue with the complicated econometric techniques used in recent studies. They further stated that measuring of economies of scale at banks is far from a straightforward approach.

Most of the reviewed empirical evidence suggested that the trend in banks' bankruptcy rates has a connection with downturns in economies of scale and competitive advantage (Peter, 2018; Lucas, 2019). Further, the empirical studies suggested that industry and individual bank factors such as market share, management efficiency, and high watch loan ratios normally influence the bankruptcy rates of community banks (BOT, 2020; Lucas, 2019). Simplice A. Asongu and Nicholas M. Odhiambo (2019), in their study of "Size, Efficiency, Market Power, and Economies of Scale in the African Banking Sector," analysed the impact of economies of scale on the bankruptcy rates of different banks. The study used a panel of 162 African banks for a period ranging from 2001 to 2011. The authors analysed the empirical data using instrumental variables and fixed effect regressions, with overlapping and non-overlapping thresholds for bank size. They stated that the interest rate spreads in Africa are higher for big banks compared to small banks, implying higher economies of scale. The major concern was that big banks might be using their market power to charge higher lending rates as they become larger (higher economies of scale), more efficient, and unchallenged. They found that market power and economies of scale do not increase or decrease the interest rate margins significantly (Simplice & Nicholas, 2019). In contrast, several studies found that when bank size increases beyond certain thresholds, diseconomies of scale are introduced that lead to inefficiency. Further, the Financial Stability Report produced by the Bank of Tanzania in December 2021 indicated that a few banks in Tanzania still have low economies of scale as measured by total cost divided by gross loans. Furthermore, only a few studies in Tanzania had investigated the causes of the rise in the bankruptcy rate of community banks by taking into account the economies of scale of various banks at different levels (BOT, 2021 & Lucas, 2019).

Stefan Jacewitz, Troy Kravitz, and George Shoukry (2020) published a report on "Economies of Scale in Community Banks" in December 2020. Using financial and supervisory data from the past 20 years, they showed that economies of scale in community banks with less than \$10 billion in assets emerged during the run-up to the 2008 financial crisis, as a result of declines in interest expenses and provisions for losses on loans and leases at larger banks (Stefan, Troy, and George, 2020). They added that economies of scale could lead to consolidation within an industry as smaller firms have difficulty competing with larger and, therefore, more efficient institutions

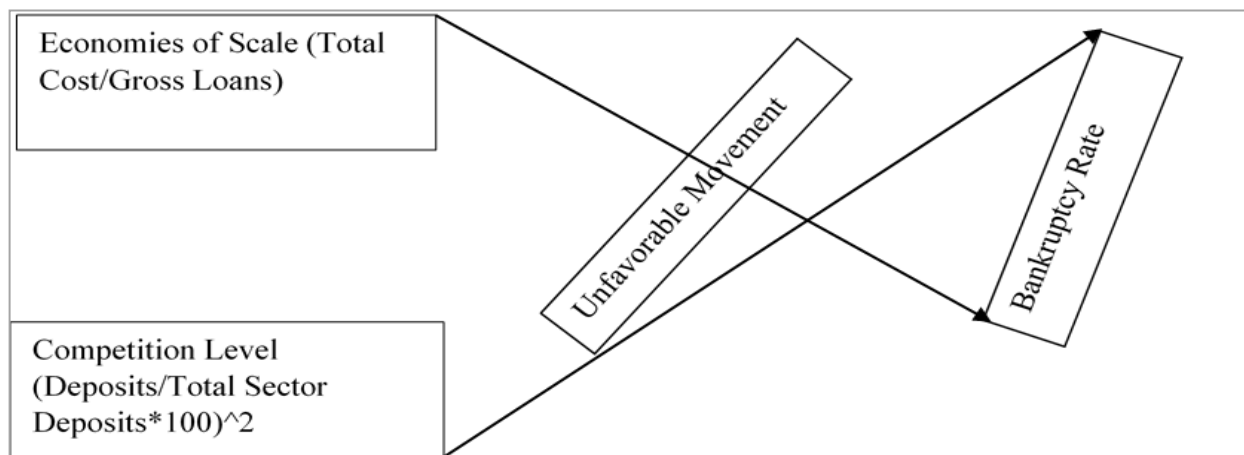
(Stefan, Troy, and George, 2020). Although the forces prompting consolidation are subject to debate, consolidation within the industry has been widely observed for the past three decades (Stefan, Troy, and George, 2020). In addition, it was stated that these banking businesses were sometimes described as the engine of economic growth in the United States, so a decline in credit availability to such businesses could affect the real economy (Stefan, Troy, and George, 2020). However, they further indicated that the disruption of the banking sector and credit relationships was an important channel through which bank failures affect economic performance (Stefan, Troy, and George, 2020).

In the study conducted by Cepi Pahlevi and Andi Ruslan (2019), with research title "Effect of Market Structure and Financial Characteristics on Bank Performance in Indonesia," explained how structure (competition level) influences the performance of banks. The purpose of the study was to obtain empirical evidence of the influence of market structure as measured by the Herfindahl-Hirschman Index (HHI) and Lerner Index, financial characteristics measured by capital, and bank size on bank performance. The research sample was a conventional commercial bank with a minimum core capital of Rp. 5,000,000,000,000 that published full financial statements from 2011 to 2018, which were then analysed using panel data regression. The results indicated that the Herfindahl-Hirschman Index proved to have a negative and significant influence on bank performance. The higher the Herfindahl Hirschman Index, the higher the competition level will be, which may lead to a decrease in the bank's performance and thus escalates bankruptcy rate. They further suggested that when there is low competition, the market structure will normally be dominated by a few big banks (monopoly structure), which leads to an increase in the bankruptcy rate for small banks (Pahlevi & Ruslan, 2019). Further, the study of Martins (2019) examined the effect of bank characteristics, the industrial structure measured by the Lerner Index, and macroeconomic factors on the profitability of 108 real estate banks from the US, UK, and Germany during the period 2000–2014. The results of his research indicated that credit risk, liquidity, operational efficiency, the Lerner Index, and GDP interest rates had a significant impact on bank profitability and thus increase going concern if moves favorably. The Lerner Index measures a bank's monopoly power in the industry, with a higher value or a value close to one indicating a bank's monopoly power. In addition, from the report of the Organization for Economic Cooperation and Development (OECD) published by the Directorate for Financial and Enterprise Affairs Competition Committee in April 2018. The report stated that in recent years, there has been growing concern that a trend has emerged in which markets around the world are becoming more concentrated and less competitive (OECD, 2018). The report further detailed that this is sometimes attributed to the increasingly digital and global nature of many markets and the firms that operate within them. Furthermore, he explained that looking at the evidence on other indicators of competitive intensity, it can be seen that markups and profits in the US have significantly increased. However, the report evidences that it remains unclear precisely what is driving the increase in market power in terms of competitive advantage among banks in the financial system. The report has also added that network effects, anticompetitive regulation, and better price discrimination may each also play a role in ensuring rivals compete profitably or not profitably. The report concluded that given the controversy, agencies might also be well advised to consider the practicality of monitoring concentration (competitive level), profitability, mark-ups, entry, and other indicators of competitive intensity at a market level to enable them to quickly respond and either debunk unwarranted concerns that may arise or investigate as appropriate. In same manner,

also Shewangu Dzomira (2014) in his study titled “Analysis of Bank Failures During Financial Tumult in Africa-Zimbabwe: A Historical Review” described analysis of the bank failures phenomenon in Africa with major consideration in Zimbabwe banking sector, based on historical research design. From the study, Dzomira (2014) discovered that the failing of banks was attributed, among others, to non-performing loans resulted from high level of competition in the market and thus due to low level of economies of scale, this causes problems in terms of liquidity and capital position of banks. Also, the study conducted by Ephias Munangi (2020) with research title “An Empirical Analysis of the Impact of Credit Risk on the Financial Performance of South African Banks” concluded that credit risk, resulted from failure of a bank to compete with other banks to obtain quality loan portfolio, was negatively related to financial performance or survival of financial institutions. In addition, Ugoani, Amu, Emenike (2014) in the study titled “Poor Management and Failed Banks: A Study of Banks with State Governments Participation in Nigeria” explained that banks fail when they become unable to meet demands from depositors and shareholders’ funds being eroded due to poor management characterized by creation of bad loans, insider abuses, and bad corporate governance culture among others. He added that all these problems are also created when the respective bank is unable to compete with rival firms in the market.

The designed conceptual framework aims at providing structure understanding on concepts and relationships of the identified explanatory and the dependent variables as centered on the interpretation of research findings against research hypotheses (Kingu, Macha, 2018; Jeremiah, 2016 and Buthiena, 2019). The framework is based on classical positivist where the researcher collects data, conduct analysis and test results against the formulated hypotheses. The framework has used competition level and economies of scale as explanatory variables and the bankruptcy rate as dependent variable, which has been computed using the Altman’s Z-score. These variables’ concepts are being linked with key theories, namely, theory of market structure, contagion theory and financial intermediation theory of banking in order to come up with meaningful framework. In that regard, this framework indicates how the mentioned explanatory variables impact level of bankruptcy rates of community banks under the case of worse scenario (unfavorable movement).

Figure 1.0. Conceptual Framework



Source: Authors, 2023

According to the research objectives (ROs) and the conceptual framework, the following two

hypotheses have been framed and tested: - Ho1: There is no effect of competition level on the bankruptcy rate (Altman's Z-score) of community banks in Tanzania's banking sector (RO1); and Ho2: There is no effect of economies of scale on the bankruptcy rate (Altman's Z-score) of community banks in Tanzania's banking sector (RO2).

This paper is organized in five parts as follows: Section 1 explains an introductory part specifically on the background of the study, objectives, research gaps, conceptual framework and study hypotheses. Accordingly, section 2 provides a brief description of the study methodology in terms of all procedures and strategy employed by in this study, which includes sample size, data collection, different regression diagnostic tests and type of model employed in this study. Further, section 3 displays regression results and their correlation coefficients while section 4 provides explanation and discussion of regression results against the empirical evidence. Lastly, section 5 provides conclusion and study implications.

2.METHODOLOGY

The sample size employed is eleven (11) community banks with total number of 176 observations, which is spanned for 16-years from 2006 to 2021. The data used have been collected from secondary source, namely, published financial statements and reports of Bank of Tanzania. The representation of the primer model that was estimated using panel techniques is as identified as follows: -

$$Y_{it} = f(X_{it}) + \delta_i + \gamma_t + i_t$$

With assumption of a linear conditional mean specification, we can write the specification as shown here under.

$$Y_{it} = \alpha + X_{it} + \delta_i + \gamma_t + i_t$$

Where Y_{it} is the dependent variable and X_{it} is a k -vector of regressors, and "it" is the error terms for $i = 1, 2 \dots M$ cross-sectional units observed for dated periods; $t = 1, 2 \dots T$. The parameter represents the overall constant in the model, while the δ_i and γ_t represent cross-section or period specific effects (random or fixed).

The study employed Random Effect Model compared to Fixed Effect Model due to naturalist of the employed panel data, based on the abilities and limitations of each model. According to Baum (2006), the RE panel data regression model expressed as:

$$y_{it} = x_{it}\beta + z_i\delta + (ui + \epsilon_{it})$$

Where: $y_{i,t}$ is the dependent variable which is the asset quality of bank i 's asset at time t , x_{it} are variables that vary over individual unit and time, β are coefficients of explanatory variables, z_i are time-invariant variables that vary for individual banks, δ is the coefficient of variables for time-invariant variables, ui is the individual effect; and $(ui + \epsilon_{it})$ is the composite error term. For the RE model to yield consistent results, a critical assumption of this model is that ui is uncorrelated with the regressors x_{it} and z_i (Baum, 2006). The data variables used in this study are the individual bank factors shown in Tables 2.1 and 2.2.

Table 2.1: Description of Variables

Variable	Types of Variable	Authors
Bankruptcy Rate	Dependent	Altman’s Model (Altman, 1995)
Economies of Scale	Independent	(Onditi, 2016 : BOU, 2008: BOT, 2021)
Competition Level	Independent	(BOT, 2021)

Source: Literature review, 2023

Table 2.2: Expected Sign of Explanatory Variables

Variables	Symbol	Descriptions	Expected Sign
Economies of Scale	Lnes	Total Cost/Gross Loans	–
Competition Level	Lncl	(Deposits/Total Sector Deposits*100)^2	–

Source: Authors, 2023

Various specifications and diagnostic tests allow researchers to determine whether the regressions are appropriate to serve as information regarding the explanatory variables of the dependent variable, namely, the bankruptcy rate, for the purpose of this study. Therefore, this section provides a discussion of diagnostic tests, results, and findings. The study has included a constant term in the regression equation, thus the errors zero mean ($E(e) = 0$) assumption is not violated (Brooks 2008).

The Stationary Test assumption has been tested using the Levin-Lin-Chu unit-root test, and the summary of the results is as indicated in Table 2.3. The null hypothesis (H_0) is that all the panels contain a unit root, while the alternative hypothesis is that the panels are stationary. The p-values for all independent variables are less than 0.05, with an average lag of 8.000. Therefore, H_0 is rejected, indicating the stationarity of panel data. Further, the p-values for dependent and independent variables are less than 0.05, also indicating that the stationarity assumption holds for both variables.

Table 2.3: Stationary Test Based on Levin-Lin-Chu Unit-Root Test

Variables	Brt	lncl	lnes
Unadjusted t	-7.0144	-8.7672	-7.6370
Adjusted t*	-3.1674	-5.9766	-3.6103
P-value	0.0008	0.0000	0.0002
Average Lags	8.0000	8.0000	8.0000

Source: STATA, 2023

The test of normality, which tests the normal distribution for Residuals, has been conducted using Skewness and Kurtosis. The values should be within the range of ± 2 for Skewness and ± 7 for Kurtosis values. Normality means that the distribution of the test is normally distributed (or bell-shaped) with zero (0) mean, one (1) standard deviation and a symmetric bell shaped curve. The values of Skewness and Kurtosis are shown in table 2.4; indicating normality assumption holds (Brooks, 2008).

Table 2.4: Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	Adj chi2(2)	Prob>chi2
Brt	176	0.0000	0.0000	.	0.0000
Lncl	176	0.1266	0.9525	.	0.0000
Lnes	176	0.0233	0.0000	.	0.0000

Source: STATA, 2023

Test for heteroscedasticity assumption. The null hypothesis (Ho) is constant variance (homoscedasticity), while the alternative hypothesis (Ha) is no constant variance (heteroscedasticity). Reject the null hypothesis when the p-value is less than 0.05 and otherwise accept it. The study used Breusch-Pagan to test for heteroscedasticity, and the results summary is shown in Table 2.5, which indicates that the p-value stood at 0.6319, which is greater than 0.05. Thus, the null hypothesis is accepted, implying low heteroscedasticity across entities.

Table 2.5: Breusch-Pagan / Cook-Weisberg Test for Heteroskedasticity

Ho: Constant variance	Variables: fitted values of brt
chi2(1) = 0.23 Prob > chi2 = 0.6319	

Source: STATA, 2023

Test for autocorrelation assumption. The null hypothesis (Ho) is serial correlation up to order p, while the alternative hypothesis is the presence of no serial correlation up to order p. Reject Ho when Prob>F is less than 0.05; otherwise, accept it. The summary of results in table 2.6 indicates a P-value of 0.0229, which is less than 0.05, so the null hypothesis is rejected, and thus there is no serial correlation up to order p.

Table 2.6: Test for Autocorrelation

brt	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lncl	-32.32606	15.33435	-2.11	0.035	-62.38084	-2.271285
lnes	-89.94842	33.0652	-2.72	0.007	-154.755	-25.14181
cons	70.53758	51.40263	1.37	0.170	-30.20971	171.2849

Source: STATA, 2023

Test for multicollinearity assumption. The assumption means that the variables of interest are highly correlated, and high correlations should not be present among variables of interest. The study used Variance Inflation Factor (VIF) to test the multicollinearity of the explanatory variables. If, VIF is greater than 10, it indicates that there is a multicollinearity problem (Gujarati, 2007). The summary results in Table 2.7 show that VIF is less than 10, indicating that a multicollinearity problem does not exist.

Table 2.7: Multicollinearity (VIF) Results

Variable	VIF	1/VIF
Lncl	9.10	0.109855
Lnes	9.10	0.109855
Mean VIF	9.10	

Source: STATA, 2023

Hausman specification test (Baltagi, 2005) was conducted to determine the appropriate model to employ for unbalanced panel data between Random Effect Model and Fixed Effect Model (Brooks, 2008). The null hypothesis (Ho) is that differences in coefficients are not systematic. Table 2.8 shows the results, which show a probability chi2 or P-value of 0.0173, which is less than 0.05, indicating that a random effect model is recommended.

Table 2.8: Hausman Test

	Coefficients			
	(b) Fixed	(B) Random	(b)-(B) Difference	sqrt(diag(v_b-v_B)) S.E
Lncl	-27.88712	-32.32606	4.438949	3.915934
Lnes	-50.26611	-89.94842	39.68231	11.03018

Source: STATA, 2023

Chi2 (1) < 0.05, reject Ho. Therefore, prob>chi2 = 0.0012 and chi2 (1) = 13.40, indicating that, the coefficients of independent variables are different and therefore significant to the study.

3.REGRESSION RESULTS

The regression model employed was the random effect model, as it seemed to be superior to the fixed effect model and yields better results as tested using Hausman specification test. The test indicated results of p-value being lower for random effect model compared to fixed effect, thus selected. Table 3.1 indicates descriptions of the regression results with correlational coefficients of the explanatory variables against the dependent variable

Table 3.1 Descriptive statistics Using Random Effect Model

brt	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lncl	-32.32606	15.46674	-2.09	0.037	-62.64031	-2.011814
lnes	-89.94842	33.35066	-2.70	0.007	-155.3145	-24.58232
cons	70.53758	51.8464	1.36	0.174	-31.07949	172.1547

Source: STATA, 2023

The regression equation after the results is written as follows: -

$(brt)it = 70.53758 - 32.32606(lncl)it - 89.94842(lnes)it$. Where by brt = bankruptcy rate, lncl = natural logarithm of HHI index (Competition level) and lnes = natural logarithm of economies of scale.

4. EMPIRICAL ANALYSIS AND DISCUSSION OF RESULTS

This section provides explanations that links results obtained in this study against other empirical findings conducted in related fields using different sample, period, methodology and population.

The first objective was to analyse the effect of competition level on bankruptcy rates of community banks. The result indicated a negative coefficient of 32.32606, which means that when the HHI index (proxy for competition level) increases, the bankruptcy rate decreases and vice versa. Therefore, the increase in competition levels, also rises the probability of failure for community banks, as evidenced by regression results. In addition, the result implies that a unit increase in the HHI index (completion level), leads to a decrease in the variance of the bankruptcy rate of community banks (brt) by 32.32606 basis points. This conforms with the hypothesis, which stated that the competition level is inversely proportional to the bankruptcy rate (negative correlations). In same perspective, this result supports the findings explained by Pahlevi and Ruslan (2019) who explained how competition level affects banks performance and bankruptcy in Indonesia. Mathematically, they indicated that competition level is negatively correlated with bank's failure. They further added that when a bank fail to compete in the market, it become exposed to liquidity and capital problems. Further, this result conforms finding of Muriithi (2017) who explained that competitive advantage of banks has been deteriorated due to low efficient and effective management thus recommended effective and strong management in order to ensure that banks gains competitive advantage, which will eventually reduce bankruptcy rates of community banks. Mathematically, he portrayed that competition level is negatively correlated with bankruptcy rate of banks. In addition, these results are in line with that of Sutton (2006) and Ezenekwe (2019) that pointed out statistically significant negative relationships between competition level and failure of banks' operations (bankruptcy). Furthermore, Basharat (2020) also provided concepts that indicating negative correlations between competition level and bank failure. In addition, the same stance was observed by other studies such as Mohamed & Magdy (2020) and Peter (2018) who also explained negative connections between competition level and bankruptcy rate of banks, which conforms with the study finding of this paper.

The second objective was to analyse the effect of economies of scale on bankruptcy rates of community banks. The regression results indicated a negative coefficient of 89.94842, which means that when economies of scale increase by one unit, leads to decrease in ratio of the bankruptcy rate of community banks (brt) by 89.94842 basis points. Further, the result implies that the economies of scale of community banks are inversely proportional to the bankruptcy rate, which conforms to the initial hypothesis of negative correlations. This result supports the findings explained by Lucas (2019) who provided different concepts that indicating that economies of scale is negatively correlated with failure of any financial institutions. He further explained that bank problems and failures occurs mainly due to inability of the respective institution to compete in terms of economies of scale with rival firms in the same market, which then causes low deposits mobilization and thus deteriorate capital position. Further, this result provides same stance with that explained in the financial stability report published by the Bank of Tanzania in 2021, which explained that small banks normally have low economies of scale, which subsequently increases banks' bankruptcy rate due to their inability to compete with others in the market, specifically on deposits mobilization and quality loan portfolio. Mathematically, the report expresses economies of scale as negatively correlated with bankruptcy rate of community banks. Furthermore, these results with negative correlations are in line with the ideas provided in the IMF report (2019),

which indicated negative relationship between economies of scale and banks' failure. In same perspective, Stefan, Troy, and George (2020) also explained negative effect of economies of scale and banks' failure. This implies that the higher the incidence of economies of scale, the greater the survival and going concern of the respective institution. Mathematically, they justified that economies of scale is negatively correlated with bankruptcy rates of community banks. Lastly but not by importance, Pahlevi & Ruslan (2019) also explained concepts that implying negative relationship between economies of scale and bank failure, thus conforms with the findings of this paper. Therefore, the study findings in this paper regarding the effect of competition level and economies of scale on bankruptcy rates of community banks are in line with other referenced studies as discussed in this study.

5. CONCLUSION

This study took an importance following bankruptcy of many community banks in Tanzania's banking sector, which thus posed a threat to the stability of the financial system. The study examined the causes of the bankruptcy rate of community banks using a quantitative approach to determine the relationship between the dependent variable, which is the bankruptcy rate (computed using Altman's model), and the explanatory variables, namely, competition level and economies of scale. The study employed a random effect model approach versus a fixed effect model to test the identified research hypotheses. As referenced in research findings, the results indicated that both competition level and economies of scale have significant influence on trends in the bankruptcy rates of community banks in Tanzania. Therefore, in order to minimize and prevent the bankruptcy rates, community banks are required to increase economies of scale and strengthen their capacity to compete with other rival banks operating in the same market.

The most important areas of contribution, especially for academic research is theoretical contribution. In this perspective, one of the ways to contribute to a theory is to compare the prevailing assumptions against the current situations or environment to test whether the assumptions still hold accordingly (Eric, 2020, and Lucas, 2019). In addition, papers make a theoretical contribution if they create a systematic understanding of some phenomena at an abstract level and apply existing theories to business and society (Eric, 2020 and Peter, 2018). In that regard, this paper contributes to the contagion theory by arguing that not only bank runs (massive deposits withdrawal) due to public panic that causes bank failure, but also there are other factors such as competition level and low economies of scale as justified by the theory of market structure. This stance is also supported by the following references: Pahlevi & Ruslan (2019); Stefan, Troy, and George (2020), Basharat (2020), Ezenekwe (2019) and Mohamed & Magdy (2020) and Peter (2018), who justified the presence of significant impact of competition level and economies of scale on banks' performance and bankruptcy rates. Therefore, based on this perspective, and for the purpose of this study, it can be concluded that apart from bank runs, there are other factors that contributes to the bankruptcy or failure of community banks, which includes low competitive advantage and economies of scale as justified by theory of market structure.

Based on the referenced research findings of this study, the following policy implications can be drawn: - Community banks' management are required to implement an adequate strategic plan and policies aimed at increasing economies of scale in terms of loans and deposits, which will eventually increase their capacity to compete with rival banks in the market. Further, community

banks are required to put in place a strong corporate governance policy that will enhance their competitive advantage relative to other rival banks and other financial institutions. Further, the regulator of community banks needs to formulate a regulatory framework that will assist small and medium banks to gain a competitive advantage and increase economies of scale against big banks. This will reduce the trend of bankruptcy rates for community banks and other small banks.

Lastly, this study has certain limitation, which includes insufficient coverage in terms of periodic, geographical and population level. In fact, the study has covered only a period ranging from 2006 to 2021 using data from specific individual country (Tanzania), therefore it is recommended to conduct other studies by expanding coverage of periods and using different countries such as EAC and SADC member countries. In addition, this study has focused only on one category of banks, namely, community banks, thus it is further recommended to undertake other studies based on other left categories of banks such as commercial, microfinance, development and other specialized banks.

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