

EFFECT OF OPERATIONAL RISK ON THE FINANCIAL PERFORMANCE OF BANKS IN TANZANIA

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ABSTRACT

The purpose of this paper is to examine the relationship between operations risk and the performance of Tanzanian commercial banks. The study used a panel data methodology constructed from the financial statements of all 41 commercial banks licensed and operated in Tanzania from 2006 to 2019. The data were obtained from the Bank of Tanzania and the National Bureau of Statistics. The study was based on the longitudinal explanatory design in which the quantitative approach was used to collect and analyze financial panel data of all 41 commercial banks. Data were analyzed using STATA14. The variables of operational risks that were investigated in this paper include; portfolio concentration ratio (PCR), cost to income ratio (CIR), bank leverage ratio (BLR), and Operating Expense Ratio (OER). From the results, the study indicated PCR and BLR had a negative and insignificant relationship with Return on Equity (ROE); but observed a negative and significant effect of OER and CIR on ROE. Also, regarding their impact on Return on assets (ROA), PCR and CIR were found to have a negative significant effect while BLR had a positive but insignificant impact while OER had a negative insignificant. The negative relationship implies that as PCR and CIR rise; they reduce the performance of Tanzanian commercial banks. The paper amongst others recommends that banks' management should improve their management practices and use modern portfolio theory together with information asymmetry theory to choose less risky portfolios but also borrowers to reduce cost and risks associated with bank' operations.

Keyword: portfolio concentration, leverage, the cost to income, bank performance

1. INTRODUCTION

Background Information

The financial sector of an economy plays an important role in its economic development and fosters the economic growth of any country through the financial services they provide to the community and nations (Oke et al., 2012). The financial sector is regarded as the backbone of a country's economy. Banks, therefore, serves as the financial hub and plays a pivotal role in the development of every country (Hundal& Singh, 2016). The banking sector is an important and unquestionable determinant of economic development as it directs the flow of the funds from surplus economic units of the economy towards deficit economic units. Their intermediation role

can be said to be a catalyst for a country's economic growth (Golin, 2001).

In administering this significant role, banks are exposed to credit risk due to borrowers' default and risk resulting from inadequate internal processes, systems, and external events 'the operational risk' (Gadzo et al., 2019). Operational risk includes legal risk arising from events such as internal and external fraud, employment practices and workplace safety, products and business practices, damage to physical assets, business disruptions, system failures, and process management. In the banking industry, operation risks are caused by moral hazards and an adverse selection due to asymmetry information plus modern portfolio theory (Li & Zou, 2014).

The banking sector of every economy is considered to be an important source of financing for most businesses, and without proper banking channels, the total business environment would be adversely affected (Kingu et al., 2018). Credit creation is the main income-generating activity of commercial banks (Kargi, 2011) and it remains to be the primary business of every commercial bank in the world (Dasah et al., 2012), which is the source of net interest income. These credit decisions have a pivotal role in firms' profitability. Banks are exposed to different types of risks, which affect the performance and activity of these banks (Goyal & Agrawal, 2010). According to Gadzo et al (2018), operational risks play a major role because they stem from credit management which accounts for almost three-quarters of the total bank's assets.

Equally, Shahzad (2019) posited that ineffective operational risk management is the primary cause of many commercial banks' failures and can lead to large financial losses and even bankruptcy. Besides, the credit quality is considered a proxy of the operational performance and financial health of banks. The health of the financial system has an important role in the country and depends mostly on a sound banking system (Das & Ghosh, 2007) as its failure can disrupt the economic development of the country (Abhiman & Saibal, 2007). Therefore, banks should recognize the operational risks as key threats to their performance; thus, they should be managed efficiently and effectively at the highest level of accuracy.

An increase in losses borne by banks as a result of inadequate operational risk management practices and the adverse impact on banks' financial performance has been a major concern to bank management and regulators (Fadun and Oye, 2020). This gave rise to more concerns about the stability and efficiency of the banking and financial system and the need for more frequent banking examination (Saiful and Ayu, 2019; Kajirwa and Katherine, 2019). Therefore, managing operational risk are the most important elements of a bank's operations. This phenomenon is equally applicable to banks across the globe, including banks in Tanzania

2. STATEMENT OF THE PROBLEM

Banks worldwide suffered sharp credit losses in their loan portfolios leading to forceful merger and acquisition and revoking the licenses of some banks due to ineffective operation risk management practices (Gadzo et al., 2019; Hasan et al., 2014). The financial sector in Tanzania has seen some turbulence in 2018 with BOT revoking the licenses of Covenant Bank, Efatha Bank, Njombe, Community Bank, Kagera Farmers' Cooperative Bank, and Meru Community Bank due to undercapitalization. On August 2, 2018, BOT take over the administration of the Bank M Tanzania Limited due to critical liquidity problems and unable to meets its maturity obligation. In the year 2020, BOT merged TIB Commercial limited into TPB and later merged NIC Bank Tanzania Limited (NIC) and the Commercial Bank of Africa (Tanzania) Limited

(CBA) due to inadequate capital requirements and taking control of some banks due to liquidity and undercapitalization. The well-managed risk will have a positive impact on the survival of a bank, but if the risk isn't managed properly, it will have a negative impact on the survival of the bank (Nanab et al., 2012).

Despite many researches on risks affecting commercial banks, it is quite clear from the previous studies that very little research studies have been done on operational risk to assess the magnitude of their effect on the financial performance of commercial banks in Tanzania. Besides, past studies have used very little sample on commercial banks. To bridge this knowledge gap, this study has examined the effect of operational risk on a bank's performance using the regression model and PLS-SEM. Moreover, this study included all 41 commercial banks operating in Tanzania regardless of their size, ownership, and country of origin. The study used BL, PCR, OER, and CIR as proxies for operational risk. Also, this study included the macroeconomic variables (GDP and inflation rate) as mediating variables to mediate the effect of operations risks and then justified the relationship between operational risk and financial performance.

Research Objectives

This study is guided by one major objective and four specific objectives.

General objectives

To assess the effect of operational risk on the financial performance of commercial banks in Tanzania

Specific objectives

- i. To evaluate the influence of PCR on the financial performance of commercial banks in Tanzania
- ii. To find out the impact of BLR on the financial performance of commercial banks in Tanzania
- iii. To determine the effect of CTIR on the financial performance of commercial banks in Tanzania
- iv. To evaluate the effect of OER on the financial performance of commercial banks in Tanzania

3. LITERATURE REVIEW

Under this section, we will show the importance of operational risks and financial performance in the banking sector, and then we will study the influence of operational risks on financial performance. Indeed, the capital of the bank has always been a central issue in the context of the health and financial security of the bank.

Meaning of important terms

Operational Risk

The Basel Committee of Banking Supervision defines operational risk as to the risk of loss resulting from inadequate or failed internal processes, people, and systems or external events (BIS, 2006). According to BBCS (2017), Operational risks result from failed procedures, systems, or policies such as employee errors, systems failures, fraud, or other criminal activity and any event that disrupts business processes. This definition includes legal risk but excludes strategic and reputational risk. The explanation focused on four operational risk event causes, which are external events, systems, processes, and people. This definition includes legal risk which is the loss that arises from events such as internal and external fraud, employment practices and workplace safety of clients, products and business practices, damage to physical assets, business disruption and system failures, and execution, delivery, and process management (Muriithi&Gitau 2017).

These events may cause operational losses that are associated with weaknesses of internal controls or failure to comply with existing internal procedures. Hence operational losses are the cost to the bank that is generated by operational risk. If the operational risk is not addressed systematically it can result in inconsistent performance and earnings for the stakeholders (BCBS, 2014). Thus, operational risk exposures threaten the financial stability and performance of the banking sector. Operational risk is, nonetheless, manageable as to keep losses within some level of risk tolerance (i.e. the amount of risk one is prepared to accept in pursuit of his objectives), determined by balancing the costs of improvement against the expected benefits. Proxies for operational risk in this study are CIR, BL, and PCR.

Operational Risk Management

Operational risk management is the process of identifying, assessing, monitoring, and controlling/mitigating operational risk (Leonard, 2016). The term operational risk management (ORM) is defined as a continual cyclic process that includes risk assessment, risk decision making, and implementation of risk controls, which results in acceptance, mitigation, or avoidance of risk. ORM is the oversight of operational risk, including the risk of loss resulting from inadequate or failed internal processes and systems; human factors, or external events. Unlike other types of risks (market risk, credit risk, etc.) operational risk had rarely been considered strategically significant by senior management.

All of these risks need to be managed and the more sophisticated the approach to risk management, the more chance the business has to thrive and grow. Operational risk events can trigger huge losses. Banks can use operational risk management to anticipate and fix problems. Effective management of operational risks will also assist in reducing operational losses, reduce compliance and audit costs, prompt identification of illegal activities, and reduce exposure to future risks.

Operational risk management is the responsibility of everyone in the organization including the board of directors and as such banks are aligning their strategies and objectives to operational risk management. Operational risk management through better analysis of business opportunities or diversified portfolio allows financial firms to the sake of opportunities that other firms cannot. Through operational risk management, the bank wants to reduce the errors and improper

activities that have a strong impact on the clients, financial losses, or give a bad reputation to the Company

Bank Performance

Bank performance refers to how efficiently and effectively a company utilizes its resources through its basic investments to realize profits (Magnifique, 2011). Some of the reasons why we evaluate the performance of banks are to determine their operational results and their overall financial condition of bank services (Kamandea, 2016). Financial performance is a company's ability to generate new resources, from the day- to- day operations, over a given period; performance is gauged by net income and cash from operations. Financial performance is an analysis conducted to see how far a company has performed using financial implementation regulations appropriately and correctly (Fahmi, 2013). For example, for a manager, the performance may be profitability or competitiveness for the company or the employee, the work environment, or the quality of services rendered for the customer.

Turyahebya (2013) describes the financial performance as the capacity to work proficiently and produce profits and in this way can survive, develop, and respond to the surrounding prospects and challenges. The best way to measure the financial performance of a bank is through Return on Equity ROE and or Return on Asset (ROA). Many researchers suggest that ROA and ROE are the most widely used indicator of bank performance in research. (Islam et al., 2019; Saiful&Ayu, 2019; Ekinici&Poyraz, 2019; Abdallah et al., 2014)

Theoretical review

This study is discussed on the premises of Information asymmetry theory, which is one of the tenants of the lemon theory propounded by Akerlof in 1970. Also, another theoretical perspective that informed this research and the development of the hypotheses used to analyze the relationship between operational risk and bank performance was credit theory.

Information asymmetry theory

Information asymmetry occurs when one party to an economic transaction possesses greater material knowledge than the other party (Mishkin, 1992). Asymmetric information is a problem in the financial market and this, the borrower has much better information about his financial state than the lender does (Edwards & Turnbull, 1994; Eppy, 2005; Farhan et al., 2012; Ahmad, 2013; Bhattarai, 2017). The two most important results of asymmetric information relevant to financial services are known as moral hazard and adverse selection.

The Information asymmetry theory argues that lack of equal information causes economic imbalances that result in adverse selection making, which is errors in lending decisions due to inadequate borrowers' referencing; and moral hazards, which is disclosing of vital information regarding one-self; the duo exposes commercial banks in operational and credit risks. In Tanzania, inadequate borrowers' profiling due to moral hazards had led to adverse selection, which might have eventually exposed commercial banks in Tanzania to high operational risk as well as credit risk (Bofundi and Gobbi, 2003).

Credit risk theory

This study adopted credit risk theory by Merton (1974); this theory was adopted by the researchers because it holds an important role in credit management (manage credit risk and manage operating costs). The application of this theory is that banks should consider the ability of repayment by a borrower before issuing the loan. Merton (1974) opined that there is a relationship between credit risk and the capital structure of the firm. The Merton model provides a structural relationship between the default risk and the assets of a company. A company is considered to default if its asset value is less than its outstanding debt. In such circumstances, the lenders are paid an amount equivalent to the asset, and the shareholders get nil.

Therefore, according to this theory, credit risk has an adverse effect on the profitability of a firm. In another study, it was postulated that a financial asset is prone to credit risk not only at maturity but throughout its lifetime (Longstaff& Schwartz, 1995). The second area of focus on credit risk theory is credit portfolio management. Likewise, credit risk theory links the role of bank management to manage operational risk and the capital structure of the firm and the assets of a company. This study used operating expenses ratio (OER), portfolio concentration ratio (PCR), bank leverage ratio (BLR), and cost to income ratio (CTIR) as measures of operation efficiency (Gadzo et al., 2019; Kingu, 2018).

Empirical Review

Influence of operational risks on the financial performance of commercial banks

In discussing the effect of operational risk on bank performance, Gadzo, Kportorgbi&Gatsi (2019) studied the effect of credit risk and operational risk on the financial performance of universal banks in Ghana of 24 universal banks in Ghana using the PLS-SEM. The results showed that credit risk influences financial performance negatively contrary to the empirical study but in line with the information asymmetry tenant of the lemon theory. It was also found that operational risk influences the financial performance of the universal banks in Ghana negatively. Furthermore, the study indicated that bank-specific variables measured by (asset quality, bank leverage, the cost to income ratio, and liquidity) significantly influence credit risk, operational risk as well as the financial performance of the universal banks positively.

Imamora&Oswari (2019) investigated the effects of credit risk, operational risk, and liquidity risk on the financial performance of banks listed on the Indonesian stock exchange from 2009-2017. The predictors used were credit risk (measured by non-performing loan ratio), liquidity risk (measured by loan to deposit ratio), and operational risk (measured by the operational cost to operational income). Financial performance was the dependent variable which was measured by ROA. The data were analyzed using the multiple linear regression model and showed that operational risk and liquidity risk had a significant negative effect on financial performance. Credit risk was however found to have no effect on financial performance

Olalere et al. (2018) studied the impact of operational risks on the bank performance of (16) commercial banks in Nigeria from 2009 to 2015. Based on the random effect analysis in the model, the bank efficiency ratio (ER) has a negative significant effect on firm performance, suggesting that the lower cost to income ratio, is the better the bank performance in terms of Net Interest Margin. The operating expenses ratio has a positive significant effect on firm performance. The firm size is not an important determinant of the firm performance of the

commercial banking sector in Nigeria, as compared to operational risk. GDP plays an important role in the performance of commercial banks during the period of study.

According to Magese (2017) who assessed the operating expenses of the commercial banks, the management efficiency in a bank underpins the financial performance of the bank. The management has oversight responsibility of managing the bank's operations; manage the quality loans they give and soundness of their investment portfolios to ensure that the bank remains profitable. Management, therefore, remains the single most important element for the successful operation of a bank (Jeong & Phillips, 2001; Ally, 2013; Hayes, 2019). Management quality is the capability of the board of directors and management, to identify, measure, and control the risks of an institution's activities and to ensure the safe, sound, and efficient operation in compliance with applicable laws and regulations (Magese, 2017).

Harelimana (2017) has evaluated that the determinants of risk management in Unguka Bank Ltd are credit risk, operational risk, and interest rate and liquidity risk are the determinants of risk management. The researcher found out that there is a very strong relationship between risk management and financial performance. The findings of the study were relevant due to, use of risk management, which are critical factors for financial performance as measured by ROA, ROE, and Net income marginal. It concluded that the interactions use of risk management of the factors create an impetus for financial performance as measured by ROA, ROE, and Net income marginal

Kerongo & Rose (2016) examined the effect of operational risk management practices on financial performance in commercial banks in Tanzania. The study found that the three independent variables in the study credit risk, Insolvency risk, and Operational efficiency influenced the financial performance for the period under study. Credit risk Insolvency risk and Operational efficiency influenced commercial bank's financial performance for the period of study. Besides, Wood & Mc-Conney (2018), determine the impact of risk factors on the financial performance of the commercial banking sector in Barbados using quarterly data for the period 2000 to 2015. The empirical results indicate that Capital Risk, Credit Risk, Liquidity Risk, Interest Rate Risk, and Operational Risk have statistically significant impacts on financial performance.

Mary (2015) investigated the effect of operational risk management practices on financial performance in 36 commercial banks in Tanzania from 2009-2013. Regression analysis was conducted to establish the effect of Operational risk management on the financial performance of commercial banks in Tanzania. The findings revealed that Operations risk management positively influenced the returns of commercial banks in Tanzania. This study also established that Operations efficiency was positively correlated with the financial performance of the commercial banks in Tanzania while the Credit risk and Insolvency risk rate negatively influenced the financial performance of commercial banks in Tanzania.

Fatuma (2015) assessed the effectiveness of operational risk management among the financial institutions in Tanzania whereby five banks in Dar es Salaam were selected as a sample. The results revealed that most of the respondents proved that operational risk management in

Tanzanian financial institutions was found not well implemented. In the literature on bank performance, operational expense efficiency is usually used to assess managerial efficiency in banks. With the increase in non-performing loans resulting from adverse selection, bank management tends to inject more resources into managing and monitoring bad loans, which in the long run results in an increase in the operating expenses over the increase in interest income, resulting in a higher cost-to-income ratio.

Mathuva (2009) observed that the Cost Income Ratio (CIR) of local banks in Kenya is high when compared to other countries and thus there is a need for local banks to reduce their operational costs to be competitive globally. Moreover, Al-Tamimi et al. (2015) examined the relationship between banking risks and the performance of Islamic banks in the Gulf countries. The sample covers 47 banks over the period 2000-2012. Four types of financial risk were used, namely credit risk, liquidity risk, operational risk, and capital risk. Their results support a negative and significant relationship between the performance of Islamic banks and operational risk. According to Louzis et al. (2010), Vardar & Özgüler, (2015), and Muratbek (2017), a higher cost to income ratio is a sign of weak bank management while a low cost-to-income ratio indicates management's strength in managing assets, in underwriting, monitoring, and control of the loan portfolio.

According to Sangmi&Nazir (2010), management competence is one of the key internal factors that play an important role in determining bank performance. They further articulated that management acts as a safeguard to operate the bank smoothly and decently and is called excellence management or skillful management, whenever it controls its cost and increases productivity, ultimately achieving higher profits. It is a pre-condition for the growth and success of any banking institution.

Zimmerman (1996) found that management decisions, especially regarding loan portfolio concentration, were an important contributing factor in bank performance. Researchers frequently attribute good bank performance to quality management. Management quality is assessed in terms of senior officers' awareness and control of the bank's policies and performance (Jeong& Phillips, 2001). The management quality of a bank in the current study was measured by examining bank operation efficiency, which is made up of the cost of management and the output (productivity) of employees. Management quality reflects all the qualitative aspects of a bank such as quality of staff, the organizational culture, and management system, compliance with the internal and external norms and policies, and the risk inclination level, and so on (Sangmi&Nazir, 2010).

Influence of macro-economical variables on banks' performance

According to Vong et al. (2009), the real GDP growth rate is used as a measure for the economic growth of a country and has a positive impact on the profitability of a bank. According to Daferighe&Aje (2009), the real GDP is the sum of the value-added in the economy during a given period or the sum of incomes in the economy during a given period adjusted for the effect of increasing prices. The real gross domestic product indicates the annual change of the GDP and as many studies have found till now (Athanasoglou et al, 2008; Kosmidou, 2006;

Demirgüç-Kunt & Huizinga, 1998), is expected to have a positive relationship with banks' profitability.

In theory, real GDP growth affects positively banking performance through three main channels: net interest income, loan losses improving, and operating costs (Jiménez et al., 2009; Bolt et al., 2012; Calza et al., 2006). Firm's profitability increases during an economic expansion, and declines in a recession's period (Gadzo et al., 2019). Thus, higher GDP growth causes firms loans and deposits to increase and make the bank's net interest income and loan losses to improve. Also, higher GDP growth implies a higher disposable income and lower unemployment and reduces defaults on consumer loans number (Kingu, 2018).

A study conducted on Philippian banks revealed a positive relationship between banks' profitability and GDP (Sufian et al., 2008). These authors stressed that, when there is favorable economic growth, the probability of borrowers defaulting is very low and vice versa. This is because it is used to estimate the whole economic activities of a country. The positive impact of GDP supports the argument of the positive association between growth and financial sector performance (Kosmidou et al., 2006). Based on the results of the study conducted by Bikker (2002), a positive relationship is expected.

The effect of inflation is also another important determinant of banking performance, but its impact is not clear (Dietrich and Wanzenried, 2014). However, the high rate of inflation worsens the efficiency of the financial sector through financial market frictions and slows down economic performance. Many authors such as Dietrich and Wanzenried (2011; 2014), Pasiouoras and Kosmidou (2007 and Athanasoglou et al. (2006, 2008), we're interested in the effect of inflation on banking performance and have found a positive and significant impact. Banking performance is highly influenced by inflation. However, the studies of Afanasieff et al. (2002) and Ben Naceur and Kandil (2009) have yielded an opposed result revealing that inflation has a negative effect on interest margins. The effect of inflation on banking performance is an important and complex issue. It is important because it has been the primary concern of the investors, shareholders, and lenders as well as the managers in planning their programs for greater efficiency (Athanasoglou et al., 2006, 2008; Kingu, 2018; Gadzo et al., 2019).

Further, according to Ravi (2013), high inflation rates are generally associated with a high loan interest rate. Thus, a high-interest rate increases the cost of borrowing, which leads to an increase in the obligation of borrowers increasing the credit risk. Besides, Boyd et al., 2000 (2000) have also shown a positive relationship between inflation rate and profitability. Additionally, the study of Abreu and Mendes (2000) reports a negative coefficient for the inflation variable in European countries.

Hypotheses of the study

To attain the objectives of the study, the null hypotheses were developed based on a review of the relevant and related empirical literature on the impact of credit risk on the financial performance of banks. According to the research question, the following hypothesis is formulated based on the independent variables, and controlling variables are taken into

consideration in this study. The hypothesis of the study stands on the theories related to credit risk (asymmetry information theory and credit risk theory) and related to the previous empirical studies done by different researchers. Thus, based on the objective, the study seeks to test the following eight hypotheses as follow:

HO_{1A}: PCR has a significant and negative effect on ROA

HO_{2A}: PCR has a significant and negative effect on ROE

HO_{1B}: BL has a significant and negative effect on ROA

HO_{2B}: BL has a significant and negative effect on ROE

HO_{1C}: CIR has a significant and negative effect on ROA

HO_{2C}: CIR has a significant and negative effect on ROE

HO_{1D}: OER has a significant and negative effect on ROA

HO_{2D}: OER has a significant and negative effect on ROE

4. RESEARCH METHODOLOGY

The overall objective of this paper was to evaluate the effect of operational risks on the financial performance of commercial banks in Tanzania. To achieve this objective the study used the quantitative approach. Also, the study was designed as longitudinal explanatory research, which used panel data of 41 licensed and registered commercial banks in Tanzania that have been in existence and operation from 2006 to 2019. Moreover, data of macroeconomic (GDP and inflation) variables for 2006 to 2019 from the BOT and National Bureau of Statistics of Tanzania were also analyzed. The selected banks represent 100 percent of all banks' assets size, loan size, liabilities positions, and capital and earnings because all commercial banks were included in this study.

According to Saunders et al. (2009) and Denscombe (2010), explanatory research emphasizes to study of the relationship between variables. In explanatory studies, the researcher is faced with a “causal-effect” situation, and the major task for the researcher being the separation of such causes (Ghauri&Gronhaug, 2005; Denscombe, 2010). Thus, the causality research design was applied no only because the study attempted to test and analyze the relationship among hypothesized variables, but also the design is good for analyzing the empirical association between the independent variables and a dependent variable. As a result, this research used descriptive analysis, multiple regression analysis models, and PLS-SEM to analyze the collected panel data of commercial banks. The multiple regression and SEM analysis assumptions such as normality, linearity, multicollinearity, and heteroscedasticity were tested, and the data did not violate any of them.

Measurement of Variables

Dependent Variable

Return on asset (ROA); is a financial ratio used to measure the relationship of earnings to total

assets. The return on assets represents efficiency in asset utilization and shows how much net income or profit is generated out of assets (Kennon, 2011). Return on assets reflects the ability of banks' management to generate profits from its assets. It is the ratio of net income and total asset of the company and is regarded as the best and widely used indicator of earnings and profitability of the firms together with return on equity (Jahan, 2012).

Return on Equity (ROE) is the maximum return expected by shareholders on their equity after minimized all possible portfolio risks. Return on equity represents the rate of return received from equity investments in banks. It is a ratio of net income and total equity. Harvey (2011) explained ROE as an Indicator of profitability determined by dividing net income for the past 12 months by common stockholder equity. It represents the rate of returns generated by the owner's equity (Ahmed & Bashir, 2013). It shows the effectiveness of management in the utilization of the funds contributed by shareholders of a bank. ROE is a reliable tool for measuring performance and it has been used in many studies all over the world (Gadzo et al., 2019; Islam et al., 2019; Ambrose, 2017)

Independent Variable

Cost to income ratio; the ratio which measures operating expense as a percentage of operating income, is used to gauge efficiency and productivity for banks operations (Chalise, 2019). it is determined by dividing non-interest operating expenses and operating income. As a rule of thumb, the lower a bank's cost-to-income ratio, the more efficiently a bank and higher ratios indicate lower efficiency of the bank. The "cost-income ratio (CIR)" or "cost-to-income ratio" shows the relationship between income and the cost of acquiring that income (Li & Zou, 2014). This study defined CTIR as the ratio of operating costs (minus bad and doubtful debt) to the net interest income (including non-interest income of the bank).

Bank leverage ratio; Leverage had been conceptualized as the extent to which a business funds its assets with borrowings rather than equity (Tafri, Hamid, Meera, & Omar, 2009; Gadzo&Asiamah, 2018). The bank leverage ratio is determined by dividing total debt with shareholders' equity or total assets. Leverage ratios effectively place a cap on borrowings as a multiple of a bank's equity. The shareholder equity ratio indicates how much of a company's assets have been generated by issuing equity shares rather than by taking on debt (Gatsi, Gadzo&Oduro (2016). This financial metric is frequently used by analysts to determine a company's general financial health. The lower the ratio result, the more debt a company has used to pay for its assets. It also shows how much shareholders might receive if the company is forced into liquidation.

Operating expense ratio, (OER), is considered a measurement of management efficiency. It is a pre-condition for the growth and success of any banking institution. The operating expense ratio allows investors and analysts to understand how efficiently a business can produce goods or supply services. It is calculated by dividing total operating costs and operating income. The lower ratio, the better for the bank since it shows that management has a good ability to handle the bank operations (Baral, 2005).

Portfolio concentration ratio; Deutsche Bundesbank (2006) states that concentration risk in credit portfolios arises because of an uneven distribution among separate borrowers (concentration of a single borrower) or sectors of industry, facilities, and geographical regions (sectoral concentration). It is calculated by dividing the investment of K_i with total investment (where K_i =bond, common stock, preferred stock, real estate, mortgage loan). Portfolio concentration is concerned with possessing certain relatively large positions in the loan portfolio of a bank (Adams et al., 2006). According to modern portfolio theory, due to portfolio concentration risk, making effective portfolio management is a key factor in bank safety and soundness (Markowitz, 1952; 1959).

Control Variables

Gross Domestic Product (GDP) is the sum of the value-added in the economy during a given period or the sum of incomes in the economy during a given period adjusted for the effect of increasing prices. It is used to proxy the cyclical behavior of the economic activity. GDP is one of the measures of economic growth for a country's economy which is measured in terms of the monetary value of all goods and services produced within the borders of a country during a year. Sufian et al. (2008) and Bikker and Hu (2002) posited that there is a relationship between annual GDP rate and bank profitability

The annual Inflation rate (INFLR) is the persistent rise in the general price level in the economy. The effect of inflation is also another important cause of banking performance, but its impact is not clear. Swings in the inflation rate impact banks as individual firms and also impact the banking industry in broad. Higher inflation can make debt servicing easier by reducing the real value of outstanding loans. However, it can also weaken borrowers' ability to service debt by reducing their real income. Therefore, the relationship between inflation and credit risk can be positive or negative.

Data Analysis Techniques and Procedures

This study adopted both descriptive and multiple regression models and this was solved by using a statistical tool (STATA 14).

Descriptive analysis

The descriptive analysis summarizes and describes the basic characteristics of the dataset in a study by breaking down the data into measures of central tendency and measures of variability. A measure of central tendency includes the mean, median, and mode. A measure of variability includes standard deviation, skewness, and kurtosis. The purpose of descriptive statistics was to understand the extent of operating costs, bank leverage, and portfolio concentration in the banking industry of Tanzania.

Inferential analysis

Multiple regression model

According to Kingu (2018), panel data is analyzed using different estimation methods depending on the research questions and objectives. Nevertheless, the two most popular regression

estimation models applied in similar studies were; Pooled regression (OLS) model, the Fixed Effects (FE) regression model, and Random Effects (RE) regression model. However, OLS property, violate the assumption of the classical linear regression model (there is no correlation between the error term and the independent variables) and thus can lead to biases and inconsistent results. Therefore, for the reason that OLS fails to control for the heterogeneity effect in panel data, the current study used Fixed Effects (FE) model and Random Effects (RE) model to analyze the effects of independent variables on dependent variables.

However, the regression models were limited to mere predictions which involve direct measurement of variables (dependent and independents) to estimate the relationship of the independent variables (predictors) only with the outcome or dependent variable (Bollen& Pearl, 2013). Besides, in regression analysis, the estimation of mediator effects involves the creation of a product variable, which has low reliability and reduced prediction power. As a result, it is difficult to find mediation effects. A solution is to switch to structural equation modeling (Frazier, Barron &Tix, 2004; Echambadi& Hess, 2007; Steinmetz, Davidov& Schmidt, 2011)

In contrast, the SEM is usually used for mediator variables to find out their relationships in an integrated approach based on a validated theory (Baron & Kenny, 1986; Frazier, Barron &Tix, 2004). The mediator variables are not directly measurable. SEM is a good one to show the inter-relationships of mediator variables and with its outcome. The SEM provides both direct and indirect effects of mediator variables on the outcome (Shrout& Bolger, 2002). Mediating with the direct and indirect effect is almost impossible in the case of regression analysis. The major benefit of SEM models is the potential to add and investigate measurement models, in which mediating variables (factors) are proposed and evaluated, and that paths among these mediating variables may be estimated and considered. Consequently, in this study, SEM was used to model and estimate the effects of mediating variables namely macroeconomic variables (annual inflation rate, GDP rate, interest rate, and exchange rate) on banks profitability (ROE and ROA)

The Hausmann tests were conducted to decide between the fixed effects model and random effects model estimating effects of PCR, CTIR, OER, BLR, and macroeconomic variables on ROA and ROE respectively. The results and judgments are indicated in Table 2. The null and alternative hypotheses underlying this test were;

Ho: The random effect model is appropriate

H1: The fixed effect model is appropriate

Table 2: Hausmann test results

| Analysis | p-value | Judgment (Null hypothesis) | Chosen model |
|------------------------------|---------|----------------------------|---------------|
| Operational risks versus ROA | 0.0745 | Reject | Fixed effects |

| | | | | |
|--|---------------|-------|-------------|---------|
| | Oper | 0 | Fail to | R |
| | ational risks | .0353 | be rejected | andom |
| | versus ROE | | | effects |

Source: Field Data 2020

Specification of the regression models:

Based on Haussmann's test results, the impacts of operational risk variables (PCR, CIR, BLR, and OER) on ROA were estimated by the fixed effect regression model whilst for ROE the random effect model was estimated. The models were specified as:

$$ROA_{it} = \alpha + \beta_1 CTIR + \beta_2 PCR + \beta_3 BL + \beta_4 OER + \beta_5 GDP + \beta_6 INF + \epsilon_{it}$$

$$ROE_{it} = \alpha + \beta_1 CIR + \beta_2 PCR + \beta_3 BL + \beta_4 OER + \beta_5 GDP + \beta_6 INF + \epsilon_{it}$$

Where:

't' represents the years

A is a constant term

ϵ_{it} is an error term or unexplained residuals

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are coefficients of independent variables

ROA= Annual net income divide by total assets

ROE= Annual net income divide by common stockholders' equity

CTIR= Operating expenses/Operating income

BLR= Tier 1 capital divide by average total consolidated assets

CPR= Non-Interest Expenses to Gross Income

OER= Total Operating Revenue to Total Profit

The GDP=Year-on-year GDP growth rate

INFLR=Annual Inflation rate, in percentage,

Structural Equation Model Set up

The SEM specification for this research is represented in figure 1;

Based on the model developed in Figure 1, the following research hypothesis is developed:

Ho: Bank's operational risk has a direct effect on its performance.

H1: Bank's operational risk has no direct effect on its performance.

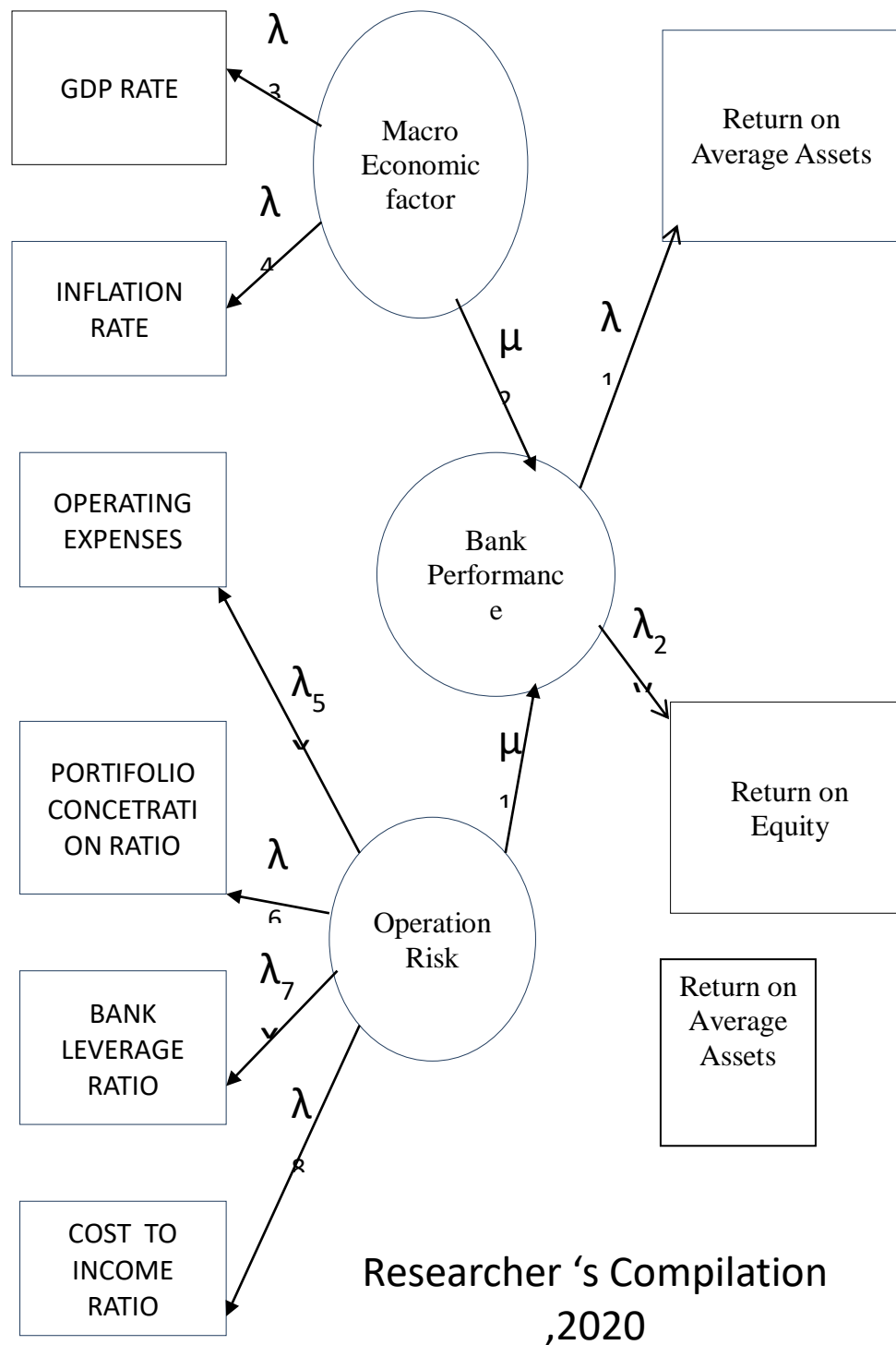


Figure 1: Structural Equation Model Set up

In this study, the model contains two latent variables namely operational risk and bank performance. In this case, operational risk is the endogenous variable while bank performance is the exogenous variable. SEM involves two main parts; structural model testing and model validation.

Structural Model Testing

$$\mu_1 = \lambda_1 \xi_1 + \xi_1 \dots\dots\dots (1)$$

Whereby; μ_1 is an endogenous latent variable (operational risk of the bank)

ξ_1 is an exogenous (predictor) latent variable (bank performance)

λ_1 is the regression coefficient

The observed variables are related to latent variables by measurement equations for exogenous and endogenous variables. The equations are as follows;

$$\text{Return on Equity} = \lambda_1 \mu_1 + \epsilon_1 \dots\dots\dots (2)$$

$$\text{Return on Average Assets} = \lambda_2 \mu_1 + \epsilon_2 \dots\dots\dots (3)$$

The exogenous variables are defined as follows;

$$\text{Operational risk} = \lambda_i x_i + \mu_1 \dots\dots\dots (4)$$

5. RESEARCH FINDINGS AND DISCUSSION

Findings in Table 3 indicate that the mean return on average assets was 0.022 with a standard deviation of 0.061 which is relatively low for an average figure. This implies that on average banks earn a 2.2% return on their assets. The skewness value was 5.116 which indicates a tremendous variation across the mean showing that some banks enjoy very large ROAA while others performing poorly while kurtosis value stood at 50.178 which shows a leptokurtic distribution. When it comes to return on equity (ROE), on average the mean value was 0.026 with a standard deviation of which indicates little spread from the mean 0.073. This implies that on every 100 TZS of owners' equity invested its return was 2.6 TZS. The values were skewed towards the positive side which shows that they were higher than the mean value and kurtosis of 50.234 reveals the fact that normal distribution was fatter around the tails which makes it leptokurtic.

Table 3: Results of descriptive statistics for study variables

| Variable | N | Mean | Std. Dev. | Minimum | Maximum | Kurtosis |
|----------|----|------|-----------|---------|---------|----------|
| OA | 64 | .022 | .061 | .004 | .116 | 50.178 |
| OE | 64 | .026 | .073 | .005 | .122 | 50.234 |
| IR | 64 | .383 | .551 | .304 | .981 | 4.046 |
| LR | 64 | .445 | .100 | .010 | .038 | .759 |
| CR | 64 | .798 | .291 | .084 | 0.304 | .929 |
| ER | 64 | .634 | .237 | .056 | 0.326 | .960 |
| NFLR | 64 | .501 | .554 | 9 | .655 | 2.398 |
| DP | 64 | .653 | .163 | .353 | -0.136 | .846 |

Source: Field data (2020)

Cost to income ratio, its mean value of 0.383 was within acceptable levels and a standard deviation of 0.551 shows significant dispersion of values around the mean. Values were skewed to the left as shown by the value of 3.981 indicating that the values were higher than the mean with a normal distribution being leptokurtic as shown by the value of 34.046. Also, the portfolio concentration ratio (PCR) on average had a mean value of 0.798 and a standard deviation of 0.291. The values were skewed towards the negative side with a skewness value of -0.304 and kurtosis value of 1.929 showing that normal distribution was leptokurtic.

Also, the average bank leverage ratio (BLR) was 0.445 which is considered safe with a standard deviation of 0.10 indicating slight dispersion from the mean. The values among banks were aligned to the positive side indicating that they were higher than the mean with kurtosis of 1.759 revealing a smooth fat-tailed normal distribution curve. Also, the average bank growth rate (BGR) was 0.295 with a staggering standard deviation of 0.424. The majority of values were skewed towards the positive side with the value of 3.981 while kurtosis stood at 34.054 indicating a smooth normal distribution.

Furthermore, in the case of the operating expense ratio (OER), on average had a mean value of 0.634 and a standard deviation of 0.237 which is within the acceptable level for a healthy bank. The standard deviation was 0.056 which shows only slight dispersion around the mean. The values were skewed to the negative side as shown by the value of -0.326 which indicates that most of the values were below the mean with a flatter normal distribution as shown by the value of 1.960 within the acceptable level of normality which makes the data appropriate for further analysis.

Besides, the real GDP growth rate on average had a value of 6.6% with a standard deviation of 1.163 which makes Tanzania among the countries enjoying high economic growth in the sub-Saharan region. The skewness value was -0.13 which indicates that most values were below the mean with a kurtosis value of 1.846 indicating a leptokurtic distribution. Moreover, the results presented in Table 2 indicate that the average inflation rate (INFR) during the study period was 8.5% which is a single digit and within the acceptable level but caution must be exercised. This inflation rate indicates macroeconomic stability but the general price level if not controlled can result in too much demand that suppliers can't keep up. The standard deviation was 3.5 which shows that in some years, inflation rates were much lower or higher compared to the mean figure. Skewness measure indicates the value of 0.655 which shows that values were inclined to the positive side and most of them were higher than the mean value and finally kurtosis of 2.398 shows that the normal distribution was smooth and flatter around the tails making it leptokurtic.

Regression results for model 1

The results from Table 4 show that the portfolio concentration ratio and cost-to-income ratio had a negative and significant relationship with ROA. The results imply that as PCR and CIR increase the ROA falls. Needless to say, when CIR rises by 1 TZS, ROA decreases by 0.0192746 TZS, whilst an increase in PCR reduces ROA by 0.0654191. The remaining variables (BLR and OER) had an insignificant impact on ROA. However, BLR had a positive while OER had a negative relationship with ROA.

Further, the annual GDP rate was significant and negatively related to the financial performance of commercial banks in Tanzania. This implies that as the annual GDP rate increases the profitability of banks falls. The results depict that, as the GDP rate raises by 1000% bank profitability decrease by approximately 10 TZS only. Besides, the annual inflation rate was found to have a positive and significant relationship with ROA signifying that an increase in inflation increases the bank's profitability. In general, the multiple regression model was significant with Prob> F = 0.0221 at a 0.05 confidence interval.

Table 4: Results of regression for correlation between operational risk and ROA

| V variable | Co ef. | St d. Err. | | >t |
|---------------|----------------|---------------|-----------|-------|
| C IR | - 0.0192746 | | - 2.45 | 0.015 |
| B LR | 0.0075377 | 0.0367342 | 0.21 | 0.838 |
| PCR | - 0.0654191 | 0.0273827 | - 2.39 | 0.018 |
| OER | -0.05911 | 0.034582 | - 1.71 | 0.089 |
| INFLR | 0.0023058 | 0.0010505 | 2.19 | 0.029 |
| GDP | - 0.0097257 | 0.0030964 | - 3.14 | 0.002 |
| Constant | 0.1232638 | 0.0338013 | 3.65 | 0 |

Prob> chi-squared= 0.0221

Source: Field Data 2020

Regression results for model 2

The results from Table 5 show that cost to income ratio and operating expenses ratio variable had a negative but significant relationship with ROE as shown by its p-value which is less than 0.05. Moreover, PCR and BLR possessed a negative and insignificant relationship with ROE. The annual GDP rate was found to have negative and significant effects on the financial performance of commercial banks in Tanzania. This implies that as the annual GDP rate increases the income of bank owners decreases. The results depict that, as the GDP rate raises by 1000% bank profitability (ROE) decreases by approximately 11 TZS only. However, the annual inflation rate was found to have a positive but insignificant relationship with ROA. The overall random-effects regression model was significant with Prob> F = 0.0009 at a 0.05 confidence interval.

Table 5: Results from Random effects regression analysis for the relationship between operational risk and ROE

| Variable | Coef. | Std. Err. | z | P>t |
|----------|------------|-----------|-------|-------|
| CIR | -0.0271448 | 0.0085532 | -3.17 | 0.002 |
| BLR | -0.0052819 | 0.0435979 | -0.12 | 0.904 |
| PCR | -0.0259244 | 0.017447 | -1.49 | 0.137 |
| OER | -0.0267706 | 0.0220322 | -1.22 | 0.024 |
| INFLR | 0.00214 | 0.0012465 | 1.72 | 0.086 |
| GDP | -0.0109024 | 0.0037601 | -2.9 | 0.004 |
| Constant | 0.1140806 | 0.0352029 | 3.24 | 0.001 |

Prob> chi2 = 0.0009

Source: Field Data 2020

Structural equation modeling results

The study went further to assess how operational risk impact bank performance when mediated by the macroeconomic variables of inflation and real GDP growth rate. In this case, the latent variables were operational risk and macroeconomic variables. For the case of operational risk, the observed variables were bank leverage ratio, portfolio concentration ratio, the cost to income ratio, and operating expense ratio. The observed variables for macroeconomic factors were represented by inflation and GDP growth rate. Confirmatory factor analysis and Path analysis were incorporated to examine this relationship between the latent variables in question.

Table 6: Results from confirmatory factor analysis and path analysis

| | Original sample | Mean | Sample mean | T-statistics | P-Values |
|---------------------------------|-----------------|--------|-------------|--------------|----------|
| Macroeconomic →Operational risk | 0.454 | 0.448 | 0.084 | 3.458 | 0.025 |
| Macroeconomic →performance | 0.125 | 0.114 | 0.091 | 1.214 | 0.084 |
| Operational risk→performance | -0.781 | -0.725 | 0.245 | 2.879 | 0.045 |

Source: Field Data 2020

The results from Table 6 indicate that operational risk has a significant negative impact on bank performance as indicated by its p-value of 0.045 which is less than the 0.05 confidence interval. Moving to observed variables representing operational risk, bank leverage, and cost to income ratios both had a significant relationship with bank performance.

Hypothesis tests the results of the study variables

Hypotheses tests of this study are based on the results provided by model 1 & 2. Hypotheses tests of between independent variables with ROA were provided with model 1 whilst hypotheses testing of independent variables with ROE were provided by model 2. The results are summarized in Table 6. Acceptance of hypothesis is based on the level of statistical significance (p-value) of up to 5 percent, while p-value higher than 5 percent were rejected

Table 7: Hypotheses Tests of Impact of OR Variables on ROA

| Variab le | Hypoth esis | Expect ed sign | Actu al sign | Statistical significance | Judgment |
|-----------|------------------|----------------|--------------|--------------------------|---------------|
| CIR | H0 _{1A} | - | - | Significa nt | Supported |
| BLR | H0 _{1B} | - | + | Not Significa nt | Not Supported |
| PCR | H0 _{1C} | - | - | Significa nt | Supported |
| OER | H0 _{1D} | - | - | Not Significa nt | Not Supported |

Table 7:1 Hypotheses Tests of Impact of OR Variables on ROE

| Variabl e | Hypothes is | Expected sign | Actual sign | Statistical significance | Judgme nt |
|-----------|------------------|---------------|-------------|--------------------------|----------------|
| CIR | H0 _{1A} | - | - | Significant | Suppo rted |
| BLR | H0 _{1B} | - | - | Not Significant | Not Suppo rted |
| PCR | H0 _{1C} | - | - | Not Significant | Not Suppo |

| | | | | | |
|-----|------|---|---|-------------|---------------|
| | | | | | rted |
| OER | H01D | - | - | Significant | Suppo rted |

Source: Field Data 2020

Hypothesis H01A: The study hypothesized a negative relationship between cost to income ratio and bank performance, in terms of ROA. The results show a negative and significant relationship between cost to income ratio and ROA. This result is in line with the hypothesis that lower costs to income ratio are related to higher ROA. Therefore, the study supported hypothesis H01A.

Hypothesis H02A: The study hypothesized a negative relationship between cost to income ratio and ROE. Accordingly, the results show a negative and significant relationship between cost to income ratio ROE. This result is in line with the hypothesis that lower costs to income ratio are related to higher ROE. Therefore, the study supported hypothesis H02A.

Hypothesis H01B: The study hypothesized a negative relationship between bank leverage and ROA. The results show the positive and insignificant relationship between bank leverage and both ROA. This result is not in line with the hypothesis, and therefore, the study failed to support hypothesis H01B.

Hypothesis H02B: The study hypothesized a negative relationship between bank leverage and ROE. The result is an insignificant negative relationship between bank leverage and ROE. This result is not in line with the hypothesis, and therefore, the study failed to support hypothesis H02B.

Hypothesis H01C: In this study, hypothesis H10 stated a negative relationship between portfolio concentration ratio and the bank profitability in terms of ROA. The result shows the portfolio concentration ratio was negatively and significantly associated with ROA. This result is in line with the hypothesis that lower PCR is related to higher ROA. Therefore, this study supported hypothesis H01C.

Hypothesis H02C: In this study, hypothesis H10B stated a negative relationship between portfolio concentration ratio and the bank profitability in ROE. The result shows the portfolio concentration ratio was negatively and insignificantly related to ROE. Since the result is not significant, it contradicts the hypothesis that lower PCR is related to higher ROE. Therefore, this study failed to support hypothesis H02C.

Hypothesis H01D: The results show a negative but insignificant relationship between operating expenses and ROA. Since the result was insignificant, this result does not justify the hypothesis that higher operating expenses are related to lower ROE. Therefore, the study failed to support hypothesis H01D.

Hypothesis H02D: The results show a negative and significant relationship between operating

expenses and ROE. This result is in line with the hypothesis that higher operating expenses are related to lower ROE. Therefore, the study supported hypothesis H02D.

6. DISCUSSION

Portfolio concentration ratio

Banks face various risks while managing their activities. Providing loans, banks are exposed to many risks: credit risk, liquidity risk, market risk, operational risk, and others (Chen, Chen, Chen, and Liao, 2009; Skridulytė and Freitakas, 2012). Portfolio concentration is another risk factor that determines the level of bank performance. Portfolio concentration refers to possessing certain relatively large positions in the loan portfolio of a bank (Adams et al., 2006). According to York (2007), loan portfolio concentration is one of the main reasons for banks to undergo loss. Skridulytė and Freitakas (2012) posit that a lot of bank crises appeared because of inappropriate control of concentration risk during the last 25 years. According to the modern portfolio theory, higher level of portfolio concentration risk is negatively related with bank profitability in both ROE and ROA.

Further, the most common financial ratio that reflects the concentration risk is portfolio concentration ratio (PCR). The PCR measures the level of risk in a bank's portfolio arising from concentration to a single counterparty, sector, or country (Grippa and Gornicka, 2016). The risk arises from the observation that more concentrated portfolios are less diverse and therefore the returns on the underlying assets are more correlated. Concentration risk is relevant to the stability of both individual institutions and whole financial systems (Chen et al., 2009; Nair and Fissah, 2010). Bankers use limits on the size of individual credits as a device to control the risk of the loan portfolio. A natural extension of this approach is to set limits on the overall concentration of the loan portfolio. The concentration ratio provides a measure of portfolio concentration and can serve as a useful tool for managing the risk of the loan portfolio.

The findings of this study indicated that PCR in the Tanzanian commercial banking industry for the last 13 years from 2006-2019 was high 0.798 (79.8%) on average with low variability among large and small Tanzanian commercial banks. According to BOT (2019), five large banks by asset size were major lenders implying credit concentration risk to a few banks. Thus, it could be stated that the loan portfolio provided by Tanzanian banks in between 2006-2019 was much more concentrated, although improvement of diversification of the loan portfolio was also observed during those years. The result of the PCR coefficient shows that the loan portfolio was distributed unevenly by sectors and banks. During the period concerned, the PCR coefficient has always been above 30%, which is the threshold (Ivkovic et al., 2008).

Considering inferential statistics, the results of the current study revealed that PCR has a negative and significant impact on the profit of commercial banks measured by ROA. Therefore, there is enough evidence to imply that increase in PCR eroded commercial banks' profitability in Tanzania. Also, it means that portfolio management is not optimal, and therefore it is important for banks to pave a way for stricter risk management measures. According to the theory of information asymmetry, portfolio concentration inefficiencies in the processes of bank operations can result in the adverse selection of investment portfolios. Besides, if at all a

distortion in communication exists involving banks' management and shareholders, the resultant effect is an adverse selection of leverage policies. Re-occurrences of this phenomena leads to a highly leveraged bank and eventually results in erosion of net interest income of the banks (Gadzo and Asiamah, 2018).

Considering the impact of PCR on ROE, the finding showed a negative non-significant association between the two variables. Thus, the findings have no reliable evidence to describe if the effect of PCR increases banks' ROE. So, inferences cannot be made for certain based on this finding. It is difficult to provide possible explanations. However, the negative impact of PCR on banks' ROA was also corroborated by Skridulytė and Freitakas (2012), and Ivkovic et al., (2008). Similarly, Chen et al., (2009) used SEM to examine the effect of operational risk on profitability using portfolio concentration as a proxy for operational risk, found that operational risk exerts a negative and significant effect on the profitability of the life insurance industry. This finding was also consistent with the studies by Nair and Fissaha (2010), Gadzo and Asiamah (2018); and Kingu (2018) whose study indicated a negative relationship between operational risk and financial performance.

5.4.2 Bank leverage

Leverage results from using borrowed capital as a funding source when investing to expand the firm's asset base and generate returns on risk capital (Brei&Gambacorta, 2014). Leverage is an investment strategy of using borrowed money specifically, the use of various financial instruments or borrowed capital to increase the potential return of an investment. Leverage can also refer to the amount of debt a firm uses to finance assets (Adrian and Shin, 2013; Brealey, Myers & Allen, 2017). The leverage ratio aims to act as a compliment and a backstop to risk-based capital requirements (Altunbas, Gambacorta, and Marques-Ibanez, 2014). It should counterbalance the build-up of systemic risk by limiting the effects of risk weight compression during booms (Borio and Zhu, 2012; Vallascas and Hagedorff, 2013). The leverage ratio indicates the maximum loss that can be absorbed by equity (Brei&Gambacorta, 2014).

In this study, the BLR in commercial Tanzanian banks was found to be high (44.5%) compared to the proposed Basel III accord requirement of 15%. Due to the 2007-2009 financial crises, there was a growing concern about regulating the financial and banking system. However, regulatory complexity has not eliminated crises in the financial system. Most banks in recent times have operated with at least twice the regulatory minimum. Begenau and Landvoigt (2017) found that a leverage ratio of at least 15 percent may maximize welfare. Similarly, Karmakar (2016) finds that equity capital requirements of 16 percent can maximize welfare. A 15 percent minimum also has recently been proposed in US financial policy arenas. Further, Egan et al. (2017) established that significant financial instability and loss of welfare can arise when the capital requirement falls below the 15–18 percent range.

According to Vazquez and Federico (2015), companies with high financial leverage were hit harder with the financial crisis of 2007 to 2009 than companies with low financial leverage before the crisis. However, bank leverage or debt can increase the business possibilities for a company by improving its positive cash flows, which can be used to finance both the company's

operating business and investments (Brealey et al., 2017). In general, Edim, Atseye, and Eke (2014) posited that financial leverage is used by banks because of the need for capital to run the business. Many authors have supported this claim that the capital is not only important but lifeblood for a company to grow (Brei&Gambacorta, 2014; Brealey et al., 2017). Accordingly, Brealey et al., (2017) established that financial leverage could lead to better financial performance.

This study found a negative and non-statistically significant association between the BLR and ROE. Thus, there is no enough evidence to support possible explanations to make any inferences of the findings. A possible explanation might be that the commercial banks in Tanzania depend much on deposits and owner's equity than loans to build up their assets and run their operations such as the provision of credits. Needled to say, most studies had found a negative but statistically significant relationship between BLR and ROE (Sidra &Attiya, 2013; Puwanenthiren, 2012; Iqbal, Farook, Sandhu& Abbas, 2018). Concerning the profitability measured by ROA, which indicated how far the bank earned from their assets, BLR showed an insignificant positive effect with the commercial bank's ROA. Though, there is no enough evidence to support possible explanations to make any inferences of the findings. A potential explanation could be that commercial banks were using leverages to build their assets and hence bank profits improved.

There have been researches conducted in the field before, but with mixed results. Ebaid (2009), showed a negative relationship between a company's financial performance and financial leverage in Egyptian companies. These findings corroborate with Sidra &Attiya (2013) who found that long and short term debt had a negative significant relationship with financial profitability measures ROA and ROE, Onaolapo&Kajola (2010) reported that financial leverage has a negative impact on ROA and ROE in Nigerian SMEs, as well as Abdul (2012) in Pakstan, found short term debt and total debt possess negative relationship. On the contrary, Harelimana (2017) in Rwanda found a positive association between debt level and profitability which was measured in terms of ROA and ROE. These studies including the current study contradicted by research conducted in Japan by Tsuruta (2015), found a significant positive relationship between a company's financial performance measured as ROE and financial leverage.

Mohammadzadeh (2011) investigated firms listed on the Tehran Stock Exchange in Iran and found that firms' performance in terms of ROA had a significant negative relationship with capital structure. Ngoc-Phi-Anh& Jeremy (2011) examined the relationship between firm characteristics, capital structure, and operational performance among a sample of 427 companies listed on the Vietnamese stock exchange. The results indicated that both long term debt and short term debt were negatively associated with firms' profitability measured by ROA. Another study by Puwanenthiren (2012) analyzed the impact of capital performance on Sri Lanka business firms. The results show that financial performance measured as ROE and ROA have a negative relationship with capital structure at -0.104, and -0.196 correspondingly. The F and t values were 0.366, and -0.605 in that order and the correlation was insignificant.

A study conducted by Abdul (2012) researched the relationship of capital structure decisions

with the firm performance of the engineering sector of Pakistan, the results showed that financial leverage measured by short term debt to total assets and total debt to total assets had a significantly negative relationship with the firm performance measured in terms of ROA and ROE. The total debt had a negative relationship with ROA and a positive association with ROE. A similar study was conducted by Puwanenthiren (2012; Iqbal, Farook, Sandhu & Abbas (2018). Also, Kingu (2018) reported a positive association of bank leverage with a bank's profits.

5.4.3 Cost to income

Understanding productivity is essential for banks when considering the fierce international competition. A popular measure of productivity and efficiency in banking is the Cost Income Ratio (Burger & Moormann, 2008). The cost-to-income ratio (CIR) is calculated by dividing non-interest expenses by gross income. This ratio reflects management efficiency in managing assets. The cost to income ratio (or efficiency ratio) measures operating costs as a percentage of operating income. Literature provides evidence that a high cost-to-income ratio reflects serious weaknesses in a management capacity, while a low cost-to-income ratio indicates management's strength in managing assets (Gadzo et al., 2019). The CIR is a key financial measure, particularly important in valuing banks (Mathuva, 2009). It is an efficiency measure, and lower CIR is better. Cost efficiency has a strong impact on the profitability and value creation in financial institutions (Hussain, 2014).

The ratio varies across the bank, should be as low as possible, but not so low that it compromises customer service. Due to economies of scale, banks reduce their cost-income ratio as the business grows. The CIR puts expenses (administrative costs) and earnings (operating income) of a bank with each other. The commonly held notion claims that a high CIR is equivalent to low productivity and low efficiency and vice versa (Gadzo et al., 2019). However, Li and Zou (2014) posited that CIR may have a mixed effect on financial performance. That means firms with a higher operating cost ratio might use relatively higher revenue, which suggests a positive relationship between firm cost to income and financial performance. On the other hand, firms with more operating cost ratio may not be aligned to high retained earnings which imply a negative impact on its financial performance (Li and Zou, 2014).

In this study the findings indicated that the operating expenses ratio was 38.3% on average which means for every 100.00 TZS of income earned from banks' operations, operating costs comprise 38.30 TZS. Li and Zou (2014) said that if CIR is lower, it will be an indicator that there is greater efficiency. The result indicates an increase in CIR from 12% in 2009 to 38.3% in 2019. According to Ernst & Young (2010), this amount of CIR was considered lower on average for the period under study. This result implies that the banks' managements were efficient and hence the bank could realize profits. CIR is one of the key financial measures particularly important in the measurement of productivity, efficiency, and value in the company (Mathuva, 2009; Gadzo et al., 2019; Hayes, 2019). It shows the cost of the company to its revenue has decreased significantly. It provides investors with a clear picture of the banks' managements' efficiency.

Theoretically, the CIR was expected to have a negative association with banks' profitability. Management quality in this regard determines the level of operating costs and in turn affects

profitability (Li and Zou, 2014; Magese, 2017; Hayes, 2019). So, concerning the relationship between CIR and ROA; which measures the return from the investment of banks' assets, this study finding was consistent with the modern portfolio theory. The result shows a negative and statistically significant relationship at a 95 percent level of significance. This finding implies that there is enough evidence to claim that the increase in operating cost over operational income decreases the profits of the banks earned from banks' assets. Moreover, this result suggests that low CIR increases ROA. Many other studies (Ahmad, 2011; Trujillo-Ponce, 2013; Winarso&Salim, 2017; Yao, Kingu, 2018; Haris& Tariq, 2018; Hayes, 2019; Gadzo et al., 2019) had provided indisputable evidence that CIR and ROA relate negatively. However, Chen et al. (2009), Iskandar (2017), and Sporta, Ngugi, Ngumi&Nanjala (2017) found a positive and statistically significant association between CIR and ROA.

Besides, the relationship between management efficiency and ROE indicates was negative and statistically significant. The findings of this study thus showed holding all other independent variables constant a decrease in CIR increases banks' profit in terms of ROE. These findings confirm the argument by Sufian and Chong (2009) who posited that the main cause of poor profitability is poor expenditure management. High operating costs result in low profits and vice versa which may always not be the case, this is because high operational costs can be connected to high banking activities resulting in large amounts of revenue. The finding of this very study corroborates the research results of Kingu (2018) and Vardar and Özgüler (2015) which explain that CIR and ROE negatively relate to each other. Moreover, the findings of this study agree with Muratbek (2017), which had found a negative relationship between operating costs and bank profit.

On the contrary, the findings of the current study contradict the research results of Kuspita (2011) and Anisma (2012) which explain that CIR and ROE directly relate to each other. Moreover, the findings of this study disagree with (Tan & Floros 2012; Lee et al. 2015; SiewPeng&Mansor 2017), which have found a positive relationship between operating cost and ROE. Besides, the findings were also against the efficiency wage theory since CIR has an indirect relationship with both ROA and ROE.

Impact of ME on the Financial Performance of Banks in Tanzania

Management Efficiency is one of the crucial internal factors that determine bank profitability. By improved handling of operating expenses, the less efficient banks can successfully endorse resource utilization efficiency and become efficient ones (Ally, 2013). Operating expenses is such kind of expenses of a company that incurred in carrying out an organization's day to day activities, but not directly associated with investing decisions. Operating expenses is a non-interest expense. Thus, the lesser commercial banks' operating expenses are, the higher profitable they are. Often, the performance of management is measured qualitatively through subjective rather than an objective evaluation of the quality of staff, management systems, organizational discipline, control systems, and others. Some financial ratios act as a representation of management efficiency. It is represented by different financial ratios like operating expenses ratio, total asset growth ratio, loan growth rate, and earnings growth rate. The capability of the management to deploy its resources effectively and efficiently, income

maximization, and reduction of operating expenses/costs can be measured by financial ratios.

However, it is one of the complexes subject to capture with financial ratios. Moreover, operational efficiency in managing the operating expenses is the closest dimension for management quality. Therefore, the ratio used to measure management quality is the operating expenses ratio (Sangmi&Nazir, 2010). Fewer operating expenses mean lower operating expenses ratio (OER) and thus can support the quantity of loan and other banks' outputs positively. Operating expenses rise because of the difficulty and risks in dealing with loans. Operating expense ratio as a measure of managerial flexibility and competency makes companies easier to compare. However, it is imperative to bear in mind that some industries have higher OERs than others. This is why comparing operating expense ratios is generally most meaningful among companies within the same industry.

In the commercial banking industry, a critical decision lies in the trade-off between short-term operating expenses and future loan performance problems. Lesser expenses in the short run can lead to forthcoming loan problems and possible costs of dealing with these problems. In this study the findings indicated that the operating expenses ratio was 63.4 percent on average which means for every 100.00 TZS of revenue earned from banks' assets, cost comprise of approximately 63.00 TZS. The finding is consistent with Kingu (2018) who found that the mean value of operating costs to income ratio for commercial banks in Tanzania was 63 percent from 2008 to 2015, which ranged from as low as 22 percent to as high as 185 percent. Jeong& Phillips (2001) postulated that if OER is lower, it will be an indicator that there is greater efficiency. Thus, this amount of OER was considered lower on average for the period under study. This result implies that the banks' managements were efficient and hence the bank could realize profits.

Since operating expenses ratio is one of the key financial measures particularly important in the measurement of productivity, efficiency, and value in the company (Hayes, 2019). It shows the cost of the company to its revenue has remained the same since 2015 regardless of the variation of other bank-specific variables such as loan growth and loans' portfolios. It gives investors a clear picture/view of how efficiently the banks were being run. However, a contradictory finding was reported by Ernst & Young (2010) that in 2009 OER was 12 percent. This variation could not be explained succinctly. However, a possible explanation might be data errors or missing values.

Over time, changes in the OER shows how banks could raise sales without dramatically swell their operating expenses. Usually, if revenues expand year-over-year and the average OER goes down; this indicates that management was able to scale production efficiently because revenues expanded more quickly than the expenses. This is a positive result from a profitability standpoint. According to Magese (2017), the higher the operating expenses ratio the less efficient management is in terms of controlling operational expenses.

Theoretically, the ratio of operating expenses to total revenue was expected to be negatively associated with banks' profitability. Management quality in this regard determines the level of

operating expenses and in turn affects profitability (Athanasoglou et al., 2005; Magese, 2017). So, with respect to the relationship between management efficiency and ROA; which measures the return from the investment of banks' assets, this study found that the association between OER and profitability measured in terms of return on the asset was negative and statistically not significant at 95 percent level of significance. This finding implies that there is no enough evidence to claim that the increase in operating expenses over income decreases the profits of the banks. Moreover, this result suggests that low OER performance not necessarily increases ROA or vice versa. In other words, OER not necessarily shows a negative effect on the increase or decrease of ROA since the research result showed OER has no significant effect on asset return.

Though this study failed to produce enough evidence on the relationship between OER and ROA, many other studies (Dietrich & Wanzenried, 2011; Ahmad, 2011; Trujillo-Ponce, 2013; Tiisekwa, 2013; Moualh, et al., 2016; Winarso&Salim, 2017; Banya&Biekpe, 2018; Yao, Haris& Tariq, 2018) had provided indisputable evidence that OER and ROA relate negatively. However, Iskandar (2017) and Sporta, Ngugi, Ngumi&Nanjala (2017) found a positive and statistically significant association between OER and ROA in Kenyan commercial banks. This result difference shows that variation in research results can result from a different sampling taken from different years and different countries. Therefore, this deep investigation of literature led this study to affirm the argument that an observed difference is due to differences in periods data were drawn from, several banks involved, and variability among the banks themselves (Sporta, Ngugi, Ngumi&Nanjala, 2017).

Besides, the relationship between management efficiency and ROE indicates that the relationship between OER and ROE was negative and statistically significant. This is in line with the argument of Hassan (1999) and Ross et al., (2005) that ROE usually overshadows ROA. The findings are consistent with the theoretical underpinning of the study. This measure of performance had shed light on the superiority of the management of commercial banks in Tanzania. The management must safeguard that the banks' operation runs smoothly and decently. Goddard et al. (2004), Ally (2013), Ndungile (2015), and Winarso&Salim (2017) commented that, very often, the banks' power in terms of management is decided by the unquestionable skills and abilities of the management to control the expenses and increase productivity, eventually realizing higher profits. The findings of this study thus showed holding all other independent variables constant an increase in management efficiency increases earnings (ROE).

These findings confirm the argument by (Sufian and Chong, 2009) stating the main cause of poor profitability is poor expenditure management. High expenses result in low profits and vice versa which may always not be the case, this is because high expenses can be connected to high banking activities resulting in large amounts of revenue. The finding of the current study did not corroborate with the research results of Kuspita (2011) and Anisma (2012) which explain that OER and ROE directly relate to each other. Moreover, the findings of this study agree with (Tan & Floros 2012; Lee et al. 2015; SiewPeng&Mansor 2017), which have found a positive relationship between operating expenses and ROE.

The findings of the current study so as those past studies did not support the efficiency wage

theory, which suggests that higher labor productivity is due to higher wages and salaries, which leads to increased operating expenses, but profitability is increased more than operating expenses. On the contrary, the current study found a negative association between OER and profitability in both ROE and ROE. Therefore, the findings imply that the management should focus and monitor the operational expenses of commercial banks in Tanzania and ensure lower operational expenses results in higher operational efficiency. Researchers had advocated for the importance of operational efficiency (Sufian& Chong, 2009; Lee et al, 2015; Sporta, Ngugi, Ngumi&Nanjala, 2017). According to Safiullah (2010) is a significant determinant of ROA and ROE.

7.CONCLUSION AND IMPLICATION

Conclusion

The findings of this study indicated that PCR in the Tanzanian commercial banking industry was much more concentrated. Considering inferential statistics, the results of the current study revealed that PCR has a negative and significant impact on ROA. It means that the portfolio management was not optimal, and therefore it was important for banks to pave a way for stricter risk management measures. However, the impact of PCR on ROE, the inferences were not easily made for certain. Equally, this study found a negative and non-statistically significant association between the BLR and ROE as well as ROA. Thus, there is no enough evidence to support possible explanations to make any inferences of the findings. In the case of CTIR, it was considered lower on average for the period under study. This result implies that the banks' managements were efficient and hence the bank could realize profits. The study also found out that CTIR had a negative and significant relationship with ROA as well as ROE. Indicating a lower cost to income ratio increases a bank's profit.

The findings of the current study showed that the mean value of real GDP growth rate was lower which meant that the economy was not growing fast enough. Also, the current study found that the association between GDP growth and banks' ROA and ROE were negative and statistically significant. Thus, as GDP growth becomes low and the correlation coefficient between GDP growth and bank profitability becomes negative. This implies that commercial banks in Tanzania would not realize profits even if GDP growth was to increase. Thus, the current study concludes that, as expected the lower GDP growth has a negative influence on bank profitability. On the contrary, it was not possible to explain the impact of the inflation rate on both ROA and ROE.

Implications

This study was conducted to widen the framework of theories on the effect of credit risk and operational risk on the bank performance (ROA and ROE) in Tanzania. To the researcher's knowledge, this study may be among the first to combine information asymmetry theory (ex-ante credit risk) and credit risk theory (ex-post credit risk) to explain the effect of the bank performance. The motivation for combining information asymmetry theory and credit risk theory is drawn from the view that variables drawn from the information asymmetry theory alone cannot explain the important role of credit management (manage credit risk and manage operating costs). Proper credit management of resource will enhance reasonable returns on shareholders' investment (Abiola and Olausi, 2014; Poudel, 2012).). The combination of the two

phenomena have contributed to new knowledge

Needless to say, this thesis may be among the first in Tanzania to test empirically the effect of credit risk and operational risk on bank financial performance in Tanzania. The findings of the current study methodology have introduced a new approach to assessing the effect of credit risk (CA, AQ, MGTE, and LIQ) and operational risk (CIR, BL, and PC) on banks financial performance (ROA and ROE) by combining both credit risk and operational risk to assess the magnitude of their effect on the financial performance of financial institutions in Tanzania. Many studies have been conducted in Tanzania assessing the impact of credit risk (Catherine, (2020), Ambrose (2017) or operation risk (Okeke at el, 2018, Kerongo and Rose 2016) on bank performance separately but neither of these studies combined credit risk and operational risk to assess the effect of bank performance

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APPENDIX

Operationalization of the Study Variables

| Variables | Measurement of definitions | Ratio/Symbol | Impact (Expected sign) |
|------------------------------------|---|-------------------------------------|-------------------------------|
| Return on assets | Annual net income divide by total assets | Return on assets ROA | |
| Return on equity | Annual net income divide by common stockholders' equity | Return on equity ROE | |
| Cost to Income | Non-interest operating expenses/Operating income | Cost to Income Ratio CIR | - |
| Bank Leverage | Total debt/ Total assets | Bank Leverage Ratio BLR | - |
| Concentration Portfolio | Investment of Ki/ Total investment | Portfolio Concentration Ratio (PCR) | - |
| Management Efficiency | Total Operating expenses/ Operating ratio | Operating expense ratio | - |
| Annual gross domestic product rate | The annual growth rate of real gross domestic product | Annual growth domestic product rate | + |
| Annual Inflation rate | Annual general inflation rate | Annual Inflation rate | + / - |