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Effect of Probability of Default and Financial Performance of Commercial Banks in Kenya

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ABSTRACT

Purpose: Specific objectives are to establish the effect of effect of probability of default and financial performance of Commercial Banks in Kenya. The theoretical framework was based on asymmetric information.

Methodology/Approach: The adopted mixed research comprising of causal and longitudinal research designs. The study used all commercial banks which are 42 it total. Positivism research philosophy was adopted. The study used secondary data from financial statements of banks. Data was analyzed by both descriptive and inferential statistics. Data was presented using tables.

Findings: From the findings Probability of default negatively affects the Performance of Commercial Banks in Kenya as indicated by a p value of 0.00 in the fixed effect model. This can be explained as a result of the following possible factors: Loans with higher Probability of default are more likely to become non-performing assets or be classified as doubtful debts.

Implications: Implementing a credit risk stress testing plan can effectively mitigate the likelihood of a bank encountering a financial crisis. In order to mitigate liquidity risk, it is advisable for banks to augment their liquid holdings.

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Introduction

Probability of default refers to the realized value of what the bank may lose if one of its borrowers is unable to satisfy their debt obligation. This is operationalized through non-

performing loans to operating income as well as loan loss provision to operating income. Gurny and Gurny (2015) did research on the probability of default for Bayesian regularized artificial neural networks. The findings of the study indicate that the Bayesian approach exhibits superior performance in neural networks when compared to the classical regularization approach. The research was initially conducted using data from East Europe; in contrast, the present study will utilize data from Kenya to bridge the geographical divide. In addition, the present investigation will focus on the effect of the Probability of Default on performance rather than the function of networks in determining the aforementioned factor.

Financial performance encompasses a range of methodologies aimed at evaluating the effectiveness with which a business utilizes its assets to create revenue (Omondi, 2016). The initial step in evaluating the financial performance of banks is assessing their ability to achieve predetermined objectives as determined by stakeholders. The financial performance of banks indicate whether micro finance is making success in achieving its set goals during a specific phase. Typically, the financial performance of a corporation is assessed using four fundamental ratios. According to Muhindi and Ngaba (2018), the aforementioned ratios encompass liquidity ratios, profitability ratios, efficiency ratios, and solvency ratios. Solvency ratios assess the financial robustness of a company by comparing its debt to its assets and equity.

Performance of banks and the stability of the banking industry depends on an interaction between the bank's characteristics -Such as Bank's style (Sbeiti & Alqatan, 2021); Bank's ownership structure (Maswadeh, 2021); bank's Corporate governance and credit risk (Dibra & Bezo, 2021) addition to bank's size, banks ratios for deposit, loan, profitability and leverage, affect Capital Adequacy adjustment (Dibra & Bezo, 2021) and economic variables such as regulatory pressure, GDP growth rate and banking system restructuring (Dibra &Bezo, 2021) as well as the role of the regulatory authorities (Helmy & Wagdi, 2019). Finally; the stability of banks depends on a purposeful balance of market sector interests under elite control and market crises in the banking industry (Yue et al., 2013).

Prior studies have primarily examined indirect indicators, such as abnormal stock returns and credit default swaps spreads, to assess the informational value of credit risk stress testing results. These studies have focused on the period surrounding the disclosure date and have been conducted by researchers (Fernandes et al, 2020). The interpretations of market participants with varying positions and interests in the data presented by credit risk stress testing may vary. The examination of the general market response may conceal divergent responses and does not enable an accurate assessment of whether such disclosure leads to increased transparency (Abad et al., 2020).

Regionally, research looks at what factors affect the likelihood of default for both audited and unaudited private banks in Zimbabwe when times are tough. It is crucial to examine the factors that influence the likelihood of commercial banks defaulting in a financially underdeveloped economy like Zimbabwe. Commercial banks play a crucial role in the foundation of numerous economies. According to Karas & Reznakova (2021), they serve as a catalyst for consistent job opportunities, enduring economic expansion, and groundbreaking advancements. Also, commercial banks are the most important businesses in both emerging and developed economies (Mashingaidze et al. 2021).

The Central Bank of Kenya devises and executes policies, overseeing and enforcing the soundness of the banking industry. The banking industry is regulated by the banking legislation. By the conclusion of 2019, there existed a total of 42 officially registered commercial banks. In 2015, Dubai was placed under receivership and subsequently underwent liquidation. Chase bank also went into a bank run in 2016.Following the acquisition of Giro Bank by DTB Bank, I&M

Bank took over Habib Bank. In 2019, the merging of NIC and CBA resulted in the formation of NCBA. According to CBK (2019), KCB acquired a 100% stake in National Bank in 2019.

The Kenyan banking sector has been experiencing a concerning rate of inability to repay their debt. According to the CBK's latest report in June 2022, the total amount of loan defaults has exceeded Ksh514.4 billion, marking the first instance in history where this figure has surpassed half a trillion shillings (CBK, 2022). Moreover, there was a gradual increase in the amount of non-performing loans within the banking system, rising from Kshs. 436 billion in 2020 to around Kshs. 460 billion in 2021. The loan loss provisions in 2021 amounted to Kshs. 58.97 billion, representing an increase from Kshs. 110.30 billion in 2020. The data indicates a consistent upward trend in default rates, with values of 8.923% in 2019, 10.617% in 2020, 11.61% in 2021, and 14.1% in 2022 (CBK, 2022). According to the annual report of Equity Bank for the year 2022, there was a notable rise in credit losses compared to the preceding data (Equity Bank, 2017). The liquidation of Dubai Bank, Prudential Bank, Trust Bank, Euro Bank, and Charter House Bank may be attributed to the utilization of credit risk stress testing indicators. This discovery emphasizes the significance of implementing effective probability of default methods in the banking industry, thus requiring a research study to evaluate the effect of probability of default and financial performance of Commercial Banks in Kenya.

Statement of the Problem

The International Monetary Fund estimates that major U.S. and European banks lost over $1 trillion due to toxic assets and bad loans following the financial crisis (IMF, 2017). The decline of Crane Bank Ltd in Uganda can be attributed to a significant increase in the prevalence of non-performing loans, as reported by the Central Bank of Uganda in 2020. Kenyan banks have experienced a fall in profitability, as evidenced by the National Bank of Kenya (NBK) declaring a profit of KES 177 million for the financial year ending on December 31, 2020. This figure signifies a decline of 26.2% compared to the KES 675 million recorded in 2019.

Financial difficulties are indicated by the liquidation of Dubai Bank, Prudential Bank, Trust Bank, Euro Bank, and Charterhouse Bank and the merger and acquisition deals which was accelerated by the Basel III requirement in which the merger of Kenya Commercial Bank and the Nation Bank of Kenya was orchestrated signaled financial distress in the banking sector. Moreover, as of June 2022, the total amount of bank loans stands at Ksh514.4 billion, with loan defaults exceeding the milestone of half a trillion shillings, marking a significant milestone in history (CBK, 2022). Trends in default rate shows continuous rise in defaults in 2019 at 8.923%, 2020 at 10.617%, 2021 at 11.61%, 2022 at 14.1% (CBK, 2022). Past studies revolved on credit risks and not probability of defaults. Kanno (2015) conducted a study on loan loss provision as Wachira (2017) established the effects of credits risk management practice on loan performance of commercial banks in Kenya using Nyeri County as case study. This study examined the effect of effect of probability of default and financial performance of Commercial Banks in Kenya

Objectives of the Study

To establish the effect of effect of probability of default and financial performance of Commercial Banks in Kenya

Research Hypothesis

Probability of default does not significantly affect financial performance of Commercial Banks in Kenya

Literature Review

Theoretical Framework

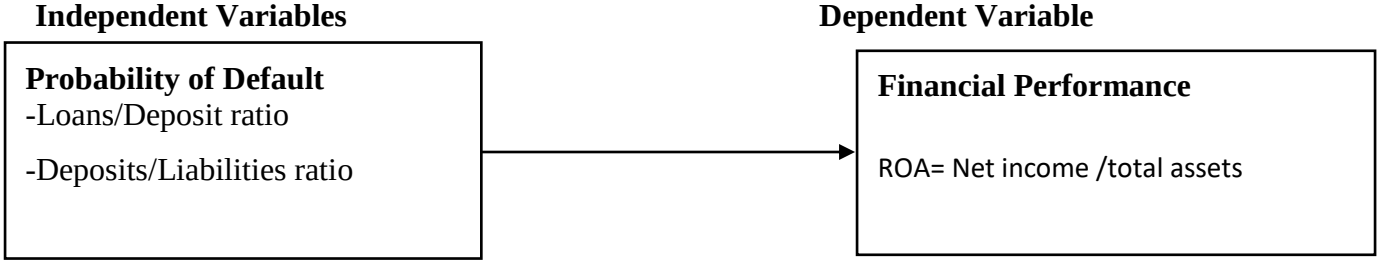
The theory of asymmetric information was initially elucidated by Akerlof in the 1970s. The idea

posits that the presence of information asymmetry is evident during the evaluation of banking credit applications. This theory elucidates the scenario in which crucial information remains undisclosed to all parties involved in a transaction, hence necessitating the implementation of a suitable credit risk testing methodology.

The establishment of clientele power in loan management is facilitated through the implementation of assessment procedures (Keitany, 2013). Zik and Ilu (2018) elucidate the phenomenon in which the involved parties in a transaction lack comprehensive knowledge of crucial information. This analysis effectively determine the likelihood of loan default and provide insights into the projected loan loss. The theory posits that when financial institutions perceive information asymmetry, they face two primary challenges: moral hazard, which involves monitoring the behavior of entrepreneurs, and adverse selection, which occurs when the firm makes errors by lending to the wrong individuals.

This theory addresses the credit risk testing approach on probability of default as a study variable. When information is given in the right manner default cases will be avoided and loan loss won't arise.
The theory has faced criticism on multiple grounds. Cowgill and Tucker (2019) highlight that there are individuals that possess knowledge and understanding in credit markets, and are not uninformed. Banks actively seek out consumers to provide loans to, leveraging their expertise to understand and fulfill their customers' specific financial requirements. Tchamyou (2019) argues that models that rely on the ignorance of one party are faulty due to the presence of information provided by third parties, such as customer reports.

Conceptual Review



Author, Compilation (2024)
Figure 1

Conceptual Framework

Probability of default was measured by loans to deposit ratio and deposit loss provision to operating income ratio. Exposure at default was measured by the NPL to operating income ratio. The financial performance is measured using the ROA ratio, which was calculated by dividing total income by total assets.

Expected loan loss refers to the total value of the loan at the time a borrower defaults. It is a calculation used by the lending institutions to help them understand losses they may incur as a result of lending to a borrower that mat default. This is operational through loan loss provision to total risk weighted assets as well as loan loss provision to total capital. Expected loan loss provision is the most significant accrual for the banking sector (Muya, 2017). Usually, the median ratio of LLP (Loan Loss Provision) to earnings range between 15% and 20% and the median ratio of LLP to stockholders' equity is around 10%. Under some estimation, LLP reflects changes in expected future loan losses (Non-Performing Loans), a process that allows for discretion in LLP estimation (Omondi, 2016). The CBK report (2022) Measures expected loan loss by Loan loss provision to TRWA and Loan loss provision to total capital which will be the

measure under the study.

Empirical Review

Globally, Sariev and Germano (2020) conducted a study on estimation of Probability of Default with regard to the Bayesian regularized neural networks. The results showed that Bayesian approach performs better when a comparison is done with the classical regularization approach for neural networks. The study used East European data to conduct the study while the current study will use data from Kenya to fill the geographical gap. Furthermore, the current study will concentrate on impact of the Probability of Default on performance and not the role of networks in the estimation of Probability of Default.

Similarly, Gurny and Gurný (2013) in their study on Probability of Default as a vital parameter in the risk management and comparison of credit scoring in the United States banks and concluded that estimation of Probability of Default is imperative in its usage for estimation of creditworthiness of borrowers, estimation of bank's capital adequacy, risk management and valuation of credit derivatives. The present study is conducted in Kenya to fill the geographical knowledge gap since the two countries have different regulations and level of advancement in financial systems.

Katherine and Kajirwa (2019) examined the correlation between financial performance and credit risk in the context of Kenyan banks listed on the Nairobi Securities Exchange. This study investigated the Capital Asset Pricing Model, Portfolio Theory, theory on risk and leverage, and credit risk theory, among other theories and models. Positivism was the research philosophy that guided this investigation. In this investigation, a longitudinal research design was utilized. The research was centered on a cohort of eleven commercial banks that were publicly traded on the Nairobi Securities Exchange. The analysis of the data was conducted using Statistical Package for Social Studies, Version 20. The data were analyzed utilizing an inferential statistical technique known as Karl Pearson correlation and regression. The results of the study revealed a strong and statistically significant correlation ($r = -0.601^{**}$, $p = .003$) between FP (as measured by Return on Equity (ROE)) and credit risk, specifically Loan Loss. The examination unveiled a significant influence of credit risk on return on equity ($\beta = -0.601$, $p = 007$, α). The adjusted r-squared value for the model was calculated to be 0.323, suggesting that credit risk accounts for around 32.3% of the total variability observed in the FP of commercial banks.

Many research have been conducted to forecast defaults in practice. However, the majority of default prediction research focus on publicly-owned corporations in industrialized nations because to the abundance of available data. Research on the prediction of default likelihood is typically constrained (Karas & Reznakova, 2021). Moreover, the availability of such studies specifically focused on predicting default in commercial banks in underdeveloped nations is even more scarce. Matenda et al. (2021) argued that financial institutions in poor nations often struggle to establish and operate formal credit evaluation procedures, which are commonly seen in industrialized countries. This can be linked to insufficient technical capabilities, limited and imperfect financial markets, and a lack of widespread involvement by foreign and local rating agencies (Ozili, 2019).

While commercial banks are not yet fully developed, recent study by professionals and scholars has focused on the likelihood of default. The focus on loan loss in commercial banks was revived with the introduction of the Basel II Capital Accord in 2004. The Basel II Capital Accord incentivizes banks to determine their capital needs based on the ratings assigned to their borrowers, such as commercial banks, using their internal rating systems (Ciampi et al., 2021). Therefore, financial institutions worldwide have now established dedicated desks and divisions just for business banking. Furthermore, considering that commercial banks' loan balances make

up a substantial part of total bank loans, the prediction of defaults by commercial banks is currently being studied as a distinct and separate research field within the banking industry.

Karminsky and Kostrov (2014) also conducted a study on the probability of default in the Russian banking sector. The results showed that there existed a quadratic U-shaped relationship between capital adequacy ratio of a bank and it's Probability of Default. This study was also conducted in a different context in the developed country of Russia. The present study will be conducted in Kenya which is a developing country with different challenges regarding credit risks. The present study will fill the noted knowledge gaps.

In respect to the regional perspective a case study was conducted in the Zimbabwe Stock Exchange listed counters by Matanda and Mhizha (2021) on the corporate Probability of Default modeling for banks in emerging economies. The results showed that the Probability of Default model adjusted for transaction costs was appropriate, more realistic and healthier for adoption and application in emerging economies like Zimbabwe, where most transactions are done manually, leading to huge transaction costs that had a substantial impact on the value of the firm. The study was conducted in Zimbabwe with different regulators and financial challenges that are unique to them. The present study was conducted in Kenya to fill the contextual knowledge gap.
Setargie (2013) in a study in Ethiopia found out that credit diversion and loan size significantly increased the chances of loan default. The study did not however go further to investigate the effect of the default on the FP of the banks. Furthermore, the study was conducted in the micro-finance industry, unlike the current study which targeted commercial banks.

In Kenya, Adem, Gichuhi and Otieno (2012) in their study researching on a parametric model on the Probability of Default of bank loans in Kenya found out that the Probability of Default was affected by risk factors such as age, gender, marital status, terms of loan and occupation. The study did not however delve into the impact of the default on the performance of the banks a knowledge gap that the present study was sought to fill.

Kimutai and Ambrose (2013) in a study conducted in Kenya indicated that credit rationing was crucial in minimizing the probability of loan default. The study employed a descriptive research design while the present study will employ an explanatory research design to fill the methodological gap. In addition, the present study had FP as the dependent variable, unlike their study which had credit rationing as the dependent variable.

Financial performance further refers to the metric of a company's ability to effectively utilize its assets in order to earn income. According to Ali (2015), the return on assets is considered a key statistic for assessing profitability, in addition to income on equity and operational profit margin. The achievement of performance is a crucial objective for banks worldwide, as it serves as an indicator of the banks' ability to effectively manage and distribute resources (Ofori et al., 2016). Academics have historically employed financial measures as a means of evaluating the FP of banks. Financial institutions employ CAMELS ratings to assess their fiscal well-being and operational effectiveness (Ali & Dhiman, 2019). The operational analysis of the study will be conducted using the ratios of total income to total assets and total income to total equity.

Methodology

Research Design: The present study employed a mixed research design. The first research strategy employed in this study was a causal association, aiming to establish a cause-and-effect relationship between expected loan loss and performance of commercial banks. Furthermore, the study employed a longitudinal research approach, focusing on the period from 2013 to 2022, and examining the performance of commercial banks.

Target population: Kenya has a total of 42 commercial banks, as reported by the Central Bank

of Kenya in 2012 that forms target population. Entire population thus this thesis encompasses all 42 commercial banks that have made their financial statements publicly available between the years 2013 and 2022.

Data Collection: The present study utilized secondary data obtained from the official website of the CBK. The data source comprised the annual audited financial statements spanning the years 2013 to 2022, pertaining to the commercial banks being examined. The data collection schedule was utilized for the purpose of gathering secondary data.

Data Analysis: Data analysis refers to obtaining information from raw data (Creswell, 2003). The study adopted both descriptive statistics and inferential statistics.

Regression Analysis: A fixed random effect regression analysis model was used to establish the relationship between expected loan loss and financial performance. This relationship was determined using the following equation:

Equation : $Y_{it} = \beta_0 + \beta_1 X_{1it} + e$

Y is performance which his Return on Assets (ROA)

B Slope or the contribution of stress testing to the performance of the banks.

X_1 is Probability of Default

E is the error terms.

Results & Discussion

Introduction

It was necessary to carry out descriptive analysis so that the nature of the data can be known to detect the outliers. Mean, standard deviation, minima and maxima figures were used to describe the nature of the data.

Table 1 Descriptive statistics- Probability of Default

Stats	Loans/Deposit	Deposits/Liabilities
N	420	420
Min	0	-377
Max	40.96	327.20
Mean	1.94	.59
Sd	3.48	1.25
Cv	1.79	2.098

Source: Field data (2024)

Table 1 explains probability of default which is as a measure of likelihood that a borrower will fail to pay back a certain debt had a mean value of 1.94, a minimum value of 0, a maximum value of 40.96 and a standard deviation of 3.48. With standard deviation above 1.0 it means probability of default had a significant effect on performance of commercial banks in Kenya.

Table 2 Pearson Correlation

The study conducted pair wise correlation analysis to ascertain the type and direction of the relationship between variables. The findings are presented in table 2.

Table 2: Correlation Analysis

Variables	(1)
(1) Probability of default	1.000
(2) Performance	-0.029*
	(0.036)

Source: Field data (2024)

According to the correlation research in Table 2, the performance of commercial banks in Kenya is inversely associated to the likelihood of default, with a p-value of (0.036) < 0.05, indicating a statistically significant correlation (-0.029*). The probability of default has a significant and

adverse impact on the performance of commercial banks.

H_{o1}: Exposure of Default does not significantly influence on Performance of Commercial Banks

Table 3 Regression Fixed Effect of Exposure of Default on Performance of Commercial Banks (ROA)

Fixed-effects (within) regression				Number of obs = 420		
Group variable: BankID				Number of groups = 42		
R-sq:				Obs per group:		
within = 0.2796				min = 10		
between =0.2973				avg = 10.0		
overall = 0.2000				max = 10		
				F(1,377) = 32.59		
				Prob > F = 0.000		
LnROE	**Coef.**	**Std. Err.**	**t**	**P>t**	**[95% Conf.**	**Interval]**
LnED1	-.557	-.098	-5.71	0.000	-.749	-.365
LnED2	-.199	-.184	-2.05	0.000	-.169	.555
_cons	-.177	.145	-1.22	0.000	-.461	.108

Source: Field data (2024)

Results from the fixed model indicated that default exposure accounted for 20% (Overall R sq=0.2000) of the variance in Commercial Banks' performance. A p-value of 0.000 was found in the results. As a percentage, an increase in exposure of default causes performance to increase by -0.557 percent, and -0.199 percent, respectively, according to the values for exposure of default. A p-value of 0.000, which was lower than the established significance level of 0.05, further confirmed the statistical importance of this link. The regression model is as shown below

ROA=-0.177-0.557NPL/Operating Inc

ROA=-0.177-0.199 Loan LP/Op Income

According to the model shown in Table 4.14, the coefficient of exposure to default has an increasing effect on the performance of Kenyan commercial banks. While holding all other variables constant, the model's inflation index coefficient implies that. As a result, we can say that the null hypothesis, which states that commercial banks in Kenya's performance is unrelated to their exposure at default, is not true.

The aforementioned results were expected since commercial banks could be at risk from default exposure. The potential for loan defaults, which would cause the bank to lose money due to unpaid interest and principle, is what this risk is all about. If the bank experiences too many loan losses, its profitability and net income could take a hit.

If this indication is negative, it could mean that the bank's assets aren't as good as they once were, which would hurt their return on equity and their profitability. Past studies by Gibilaro and Mattarocci (2018) show that default exposure has a negative effect on profitability. According to their research, banks' bottom lines would take a hit if they set aside more money to protect themselves against potential loan defaults. To reduce the reserve ratio and increase profitability, prudent credit management is essential for mitigating expected loan loss.

Conclusions & Recommendations

Conclusions

The study's goal was to ascertain the effect of probability of default on Performance of Commercial Banks in Kenya. From the findings Probability of default negatively affects the Performance of Commercial Banks in Kenya as indicated by a p value of 0.00 in the fixed effect model. This can be explained as a result of the following possible factors: Loans with higher

Probability of default are more likely to become non-performing assets (NPAs) or be classified as doubtful debts. The accumulation of NPAs and doubtful debts deteriorates the bank's asset quality, weakening its balance sheet and potentially affecting its ability to attract deposits and raise funds at favorable rates. Also, a persistent high Probability of default and elevated loan losses can damage the bank's reputation among customers, investors, and regulators. A perception of poor risk management or underwriting standards may lead to a loss of trust and confidence, resulting in customer attrition, investor skepticism, and increased regulatory scrutiny. The study rejected the null hypothesis as the variable was significant.

Recommendations

The study additionally suggests that banks should broaden the range of loans offered to customers in order to mitigate the likelihood of default. This measure is expected to have a substantial impact on the reduction of loan defaults. Regarding the capacity to generate earnings, the study suggests that banks should allocate a significant portion of their profits into internal investments, potentially at the detriment of shareholders, in order to ensure effective and sustainable business operations. Implementing a credit risk stress testing plan can effectively mitigate the likelihood of a bank encountering a financial crisis. The study suggests that it would be advantageous for banks to persist in providing loans to prospective clients as a means to enhance their profitability by means of interest rates. In order to mitigate liquidity risk, it is advisable for banks to augment their liquid holdings.

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