MODERATING EFFECT OF BANK SIZE ON THE RELATIONSHIP BETWEEN NON-INTEREST INCOME AND INSOLVENCY RISK OF COMMERCIAL BANKS IN KENYA

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DECLARATION

This thesis is my original work and has not been presented for examination in any other University or for any other award.

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DEDICATION

This thesis is dedicated to my parents Professor Vallantino Emongor and Dr. Rosemary Emongor, my sister Gloria Emongor, brothers Samuel Emongor and Isaiah Emongor, my husband Leonard Opollo and my children Shammah, Fadhili, Eliana and Zawadi.

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OPERATIONAL DEFINITION OF TERMS

Bank Insolvency Risk:	The probability that a bank's equity capital declines below sustainable levels due to losses triggering the inability to meet liabilities as they fall due or even disburse loans.
Commercial Banks:	These are financial institutions act as an intermediary; they accept deposits and give required loans. They perform resource allocation functions, are a conduit for monetary policy transmission and they provide a platform to participate in capital market activities at reduced costs.
Dividend Income:	Income received from equity holdings in other firms or subsidiaries in which the bank has invested in as part of its portfolio.
Fees and commissions on loans	Bank income that is earned by imposing charges on loan applications, processing and servicing.
Foreign exchange trading Income:	Bank earnings from translation gains during selling or buying of currency and percentages charged on remittances.
Medium Peer Group:	A bank with a weighted composite index ranging between 1% and 5%.

Non-Interest Income: Bank income that is not derived from interest earned on loans advanced but from other sources such as fees charged on transactions, fees charged during the disbursement of loans, foreign exchange trading and dividend income from equity holdings in other firms.

Small Peer Group: A bank with a weighted composite index of less than 1%.

Stability z-score: This is a measure of bank insolvency risk that captures variability of returns and equity capital.

Transaction fee Income: Fees charged on routine banking services such as cheque processing, automatic teller machine transactions, account management, payment and deposit services.

Weighted Composite

ABBREVIATION AND ACRONYMS

CBK	Central Bank of Kenya
CBR	Central Bank Rate
CMA	Capital Markets Authority
EQ	Equity Capital
NNII	Non-interest income
NPLs	Non-performing loans
ROA	Return on Assets
ROE	Return on Equity

ABSTRACT

Ensuring commercial banks remain resilient is critical to the success and growth of any economy as they allocate resources toward productive activities. Hence, the general objective of the study was to examine the moderating effect of bank size on the relationship between non-interest income and insolvency risk of commercial banks in Kenya. The specific objectives were to determine the effect of fees and commissions on loan income, dividend income, foreign exchange trading income, and transaction fees income on insolvency risk. Bank size was used as a moderating variable. The study was anchored on agency theory, modern portfolio theory, financial intermediation theory, stakeholder theory and economies of scale theory. The study period was between 2012 and 2019. The study conducted a census in which all 40 banks were included in the study. Secondary data from audited financial statements, published annual reports and supervisory reports published by CBK for the period between 2012 and 2019 was used in the study. The analysis performed included descriptive statistics (mean, standard deviation, minimum and maximum) and inferential statistics (correlation and panel multiple regression analysis). The correlation results showed that fees and commissions on loans income, dividend income, foreign exchange trading income, and transaction fee income are positively and significantly associated with the Z-score. The regression results showed that fees and commission income from loans was positively and significantly related to the Z-score of commercial banks in Kenya. Additionally, dividend income was found to be positively and significantly related to the Z-score of commercial banks in Kenya. Furthermore, foreign exchange trading income was found to be positively and significantly related to the Z-score of commercial banks in Kenya. Lastly, transaction fee income was found to be positively and significantly related to the Z-score of commercial banks in Kenya. Lastly, there is a significant effect of the interaction term between fees and commissions on loans income and bank size (log assets), dividend income and bank size (log assets), foreign exchange trading income and bank size (log assets), transaction income and bank size (log assets). The coefficient of determination (R-squared) increased when bank size interacted with non-interest income (fees and commissions on loans income, dividend income, foreign exchange trading income, and transaction income). The study concluded that fees and commissions on loans income, dividend income, foreign exchange trading income, and transaction fee income are positively and significantly related to the Z-score. Bank size moderates the relationship between non-interest income and the insolvency risk of commercial banks in Kenya. The study recommended that commercial banks need to review transaction rates from time to time to ensure that they derive maximum income from loans. Further, banks need to participate in the securities market by trading in shares and other investment vehicles to expand their revenue base. Banks can diversify their investment options and focus on foreign exchange trading income since it increases solvency. The research recommended that future studies be conducted to examine the effect of interest rates, technology, capital adequacy, and income diversification on the insolvency risk of commercial banks in Kenya. Furthermore, studies can be conducted on other financial institutions, such as microfinance institutions. This will unearth more research gaps for future studies.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Problem

Globally, the banking sector plays an important role in financial intermediation; where the efficient distribution of scarce resources is enabled, money creation is achieved, monetary policy is transmitted, and a system of payments is established (Phillipon, 2015). These unique functions of commercial banks make it imperative to direct efforts to ensure they are not insolvent (Lepetit & Strobel, 2015). Bank insolvency risk describes a scenario where a bank's capital is unable to adequately cushion against possible losses grounding operations (Dragoi & Preda, 2016). Alamandis and Sickles (2016) paint a picture of an insolvent bank as one whose capital reserves are depleted below statutory requirements resulting in its inability to service financial commitments as they fall due.

Reducing the risk of insolvency can prevent contagion in the entire financial sector and enhance the strength of individual banks (Alamandis & Sickles, 2016). In 2007, global economic distress was witnessed because of collapsed banks in the USA and Europe that produced a dominoes effect where markets were integrated (Fior Delisi & Marques-Ibanez, 2013). Senyo, Olivia, Musah and Nuhu (2015) have implored that regular checking of individual bank insolvency risk is important for commercial banks relative to other corporates owing to the systemic nature of the industry.

The primary source of income for commercial banks is from loans and other services' interests. Nonetheless, banks have become more innovative to expand their revenue base by working on securities and foreign exchange trading, among others (Suriya,

Guriasekarage & Dempsey, 2015). European banks have also recorded increased non-interest income activity. Sanya and Wolfe (2011) depicted that the Philippines have registered an upward trend. In East Africa, non-interest income to total income from 2009 to 2013 averaged about 30% of total revenue (Ernst &Young, 2013).

The growing development of bank products has unearthed discussions of prospective advantages towards protecting against bank failures. It is said that benefits accumulate if the numerous non-interest earnings are miserably associated with interest revenue (Meslier, Tacneng & Tarazi, 2014). Other benefits may be recognized if non-interest payments are much less intermittent than financing income. For that reason, non-interest revenue can offer support during difficult economic times (Stiroh, 2004).

Fees and commission income includes the income that is derived from charges on loan processing and servicing (Lepetit & Strobel, 2015). Fees and commission income contribute to total income and support banks by reducing the risk of insolvency. They also include mortgage fees among other charges the Bank may set during loan advancement (Nisar, et. al. 2018). Dividend income is realized by holding equity in other firms as a form of investment (Mutega, 2016). The dividend income includes the dividends received from subsidiaries. Banks participate in the securities market by trading in shares and other investment vehicles like derivatives to expand the sources of revenue.

Foreign exchange trading income is profit realized from foreign currency transactions. The higher foreign exchange trading income, the lower the insolvency risk. Increased income from foreign exchange trading increases available income (Senyo, Olivia, Musah & Nuhu, 2015). Transaction income is derived from charges on routine provision of financial

services such as mobile banking, account management/maintenance, and card replacement, among others (Hong Kong Institute of Bankers, 2018). It also management fees which contributes to total income positively (Matey, 2019).

1.1.1 Insolvency Risk

Insolvency risk is the firm's inability to meet financial obligations, due to reduced/inadequate returns and capital (Roman & Sargu, 2013). Bank insolvency is crucial for commercial banks relative to other firms because of the devastating effects of losing public confidence in these institutions (Hupkes, 2005). The 2007/2008 worldwide monetary crisis that was ignited by the collapse of several banks in developed economies highlighted the constant need to measure bank insolvency risk and the prediction of financial distress (Todd, 2010). Predicting bank insolvency risk is of importance to management and regulators. Management is keen on maximizing firm value; hence constant monitoring of potential distress helps maintain shareholder confidence. CBK uses the CAMEL method to measure individual bank strength (CBK, 2018). CAMEL is a popular evaluation of bank soundness developed in the USA, it was then adopted by other countries, and was suggested that "S" be included to capture the sensitivity of banks to market changes (Roman & Sargu, 2013).

In banking literature, alternative measures have been developed that utilize accounting information, market information, or a combination of both, the most common being the stability Z-score (Lepetit & Strobel, 2015). The study used Z-score to measure the insolvency risk. The author of the Z-score was Edward Altman and it has been improved to include the aspect of multiplying the standard deviation with the return on assets to

enhance its effectiveness (Altman, Danovi & Falini, 2013). The Z-score is considered an alternative measure of risk and thus a good indicator of the financial soundness of financial institutions such as banks (Moreno, Parrado-Martínez & Trujillo-Ponce, 2021). The justification for using the Z-score as a measure of the insolvency risk is because it combines the information on performance, leverage, and risk and thus becomes the most common method of insolvency risk measurement for banks (Roman & Sargu, 2013).

The Z-score method is different from the Altman Z-score popular in corporate finance literature (Roman & Sargu, 2013). The Z-score captures crucial aspects of bank insolvency, which are; that bank assets are often illiquid and equity capital is insufficient to cushion bank assets that have declined in value (Hugoinner & Morellec, 2017). Therefore, the stability Z-score measures the probability that losses exceed equity (Karim *et al.*, 2018). The stability Z-score can also be easily applied as a dependent variable in a multivariate regression as it attempts to address the issue of endogeneity arising from the use of accounting ratios (Lepetit & Strobel, 2015). The Z-score trend line from 2012 to 2019 is presented in Figure 1.1

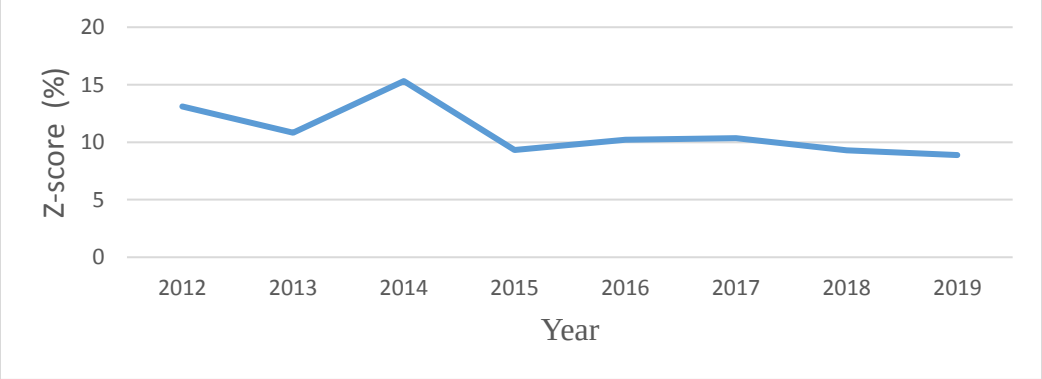

Figure 1.1: Z-score Trend line from 2012 to 2019
Source: Author (2022)

The study results presented in Figure 1.1 indicate that the Z-score was highest in 2014. This was supported by CBK (2015), which noted that Kenya's financial system remained stable, supported by resilient economic performance in 2014 driven by heavy investments in infrastructure development and a stable overall macroeconomic environment. However, after 2017, the Z-score declined persistently. The continued decline of the Z-score from 2017 may have been due to the working environment, notably the political environment in the country and the capping of interest rates in 2016. The Z-score values can be negative, zero, or positive (Musau, 2018).

A negative Z-score value implies banks have inadequate equity to settle unforeseen losses (return on assets is negative), while a zero value of the Z-score indicates banks have only enough capital to cover the losses incurred (Musau, 2018). A positive Z-score implies banks have enough capital to cover up any losses that might occur during operations. A Z-score towards a positive one indicates high stability, while below 0.5 indicates fair stability (Nthambi, 2015). Additionally, Matey (2019) revealed that a positive Z-score implies banks have a low risk of insolvency and can meet any unforeseen losses. A negative Z-score shows banks are at a higher risk of bankruptcy.

1.1.2 Non-interest Income

Banks' non-interest income includes revenue generated from other platforms away from interest on loans. It entails fees and commission income on loans, dividend income, foreign exchange trading income, and transaction fee income (Koch, 2015). It also includes administrative costs associated with loan application, vetting process, and approval (Hong Kong Institute of Bankers, 2018). The fluctuations of fees and commission income could

be attributed to management efficiency as indicated by Atellu (2012) who explained that technical efficiency is an important determinant of the expansion of non-interest income activities. Furthermore, it includes loan processing fees, and mortgage fees among other charges a Bank may set during the loan advancement (Nisar, et. al. 2018).

Dividend income is earned through shareholding in subsidiaries and other equity investments that a bank may have, whenever dividends are announced the bank will receive its share of the proceeds (Hong Kong Institute of Bankers, 2018). Dividend income is realized by holding equity in other firms as a form of investment (Mutega, 2016). Banks participate in the securities market by trading in shares and other investment vehicles like derivatives to expand their sources of revenue.

Foreign exchange income is earned through gains on currency transactions and charges on remittances (Koch, 2015). Foreign exchange trading income is the profit realized from foreign currency transactions. Increased income from foreign exchange trading increases the available income, thus enhancing their sustainability (Senyo, Olivia, Musah & Nuhu, 2015). This source of non-interest income is not tied to the issuance of loans or provision of routine services but is rather earned by participating in the forex market.

Transaction fee income is realized from routine transactions undertaken by bank clients, such as account fees, transaction fees, and deposit fees. Transaction fee income increases available funds (Matey, 2019). It also includes charges for the routine provision of financial services such as mobile banking, account management/maintenance, and card replacement, among others (Hong Kong Institute of Bankers, 2018). Transaction fee income includes investing in other companies and strengthening the mechanisms to increase the transaction

fee income, such as management fees (Githinji, 2016). Banks' diversification into other non-loan activities increases their revenue base and lowers the risks of collapse (Okello & Muturi, 2018).

Financial institution dimension, technical development, and macroeconomic variables were very important components of development into non-interest earnings activities. Federal government deregulation as revealed by Wang'ondu (2017) indicated a positive impact of non-interest income on performance. This pattern of adjustment of income sources during periods of regulatory changes by Commercial Banks is evident (see figure 1.2). In the period 2002-2011 non-interest income was at about 30-37% of total income. It grew from 33% in 2001 to 37%, reflecting a deliberate shift by banks from traditional interest income to fee and commission income as general interest rates remained low.

The period 2013 to 2015 saw an increase in total interest income as the business environment was favorable (CBK, 2015). In 2016, interest rate capping came into effect (Banking Act (Amendment) 2016). Total interest income decreased in this period owing to reduced lending attributed to challenging economic conditions and reduced private sector lending (CBK, 2017). Foreign exchange trading income increased by 15% (CBK, 2017). In 2018, bank earnings increased by 5.6% owing to increased trading in Government activities and fee and commission income that grew by 7.62% (CBK, 2018).

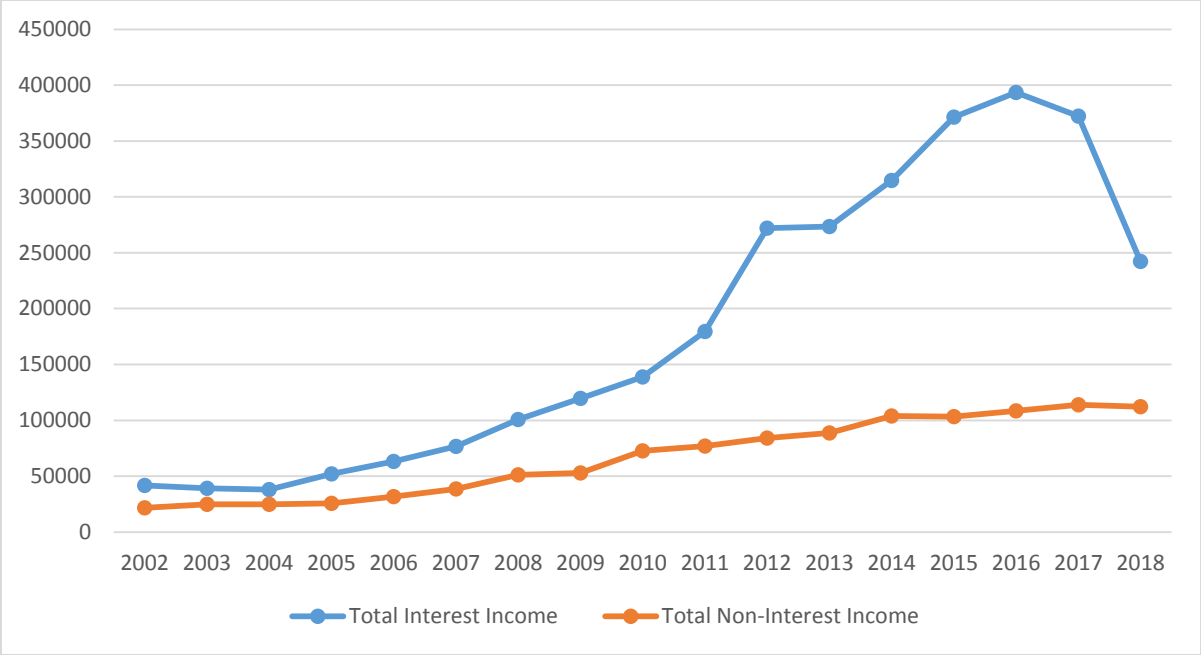

Figure 1.2: Line Graphs Showing Total Interest Income and Total Non-Interest Income of Commercial Banks in Kenya for the period 2002-2018.

Source: Central Bank of Kenya Supervision Data

1.1.3 Bank Size

The study used bank size as the moderating variable. A moderating variable measures the relationship between the independent and dependent variables (Lee, 2009; Leledakis, Davidson & Smith, 2018). In most cases, large firms are considered to have high performance compared to small firms due to the low cost of production and high innovations (Mutunga & Owino, 2017). Leledakis, Davidson, and Smith (2018) argued that the size of a firm could affect its financial performance. Therefore, bank size was ideal as a moderating variable as used in previous studies by other scholars. Some of these scholars include Dalci, Tanova, Ozyapici & Bein (2019); Santosa (2020); Mutunga &

Owino (2017); Mahmood, Han, Ali, Mubeen & Shahzad (2019); Kasman & Kasman (2016); Puah & Ali (2018) among others.

1.1.4 Commercial Banks in Kenya.

There are 40 commercial banks in Kenya, as shown in appendix I. The large peer group has 9, the medium peer group has 10, and the small peer group has 21. The market share of the financial institutions in the country is dominated by nine banks that are in a large peer group with a market share of 70.28%, while medium banks have a market share of 21.2% and small banks have a market share of 8.5% (CBK, 2019). The banking sub-sector assets comprised about 49.51% of nominal GDP in 2018, a decline over the last six years from a high of 59.3% in 2014. The banking sector's asset quality reflected by gross non-performing loans deteriorated in 2018 compared to 2017, which saw a rise of 19.69% (CBK, 2018).

Insolvency risk has led some banks, such as Imperial Bank, Chase Bank, and Dubai Bank to liquidate. Other struggling banks like National Bank and Equatorial Commercial Bank were taken over (CBK, 2019). In 2019, the profitability growth of banks declined by 10.4 percent (CBK, 2019). The KBA (2019) report asserts that while the level of NPLs has not reached a historically high level, the continual increase over the past five years is influencing commercial banks' risk-taking habits. Regardless of the general stability in the financial sector, the increase of non-performing loans is bound to affect the solvency of individual commercial banks, and therefore, there is a need to continually address the challenges banks may face in the traditional lending business.

1.2 Statement of the problem

The overall insolvency risk within the banking sector in Kenya has been on a rise. The study results presented in Figure 1.1 indicate that the Z score was highest in 2014. However, after 2017, the Z score declined persistently. The continued decline of the Z-score from 2017 may be due to the working environment, notably the political environment in the country and the capping of interest rates in 2016. Insolvency risk has led some banks such as Imperial Bank, Chase Bank, and Dubai Bank to liquidate. Furthermore, the sector has witnessed stressed banks like National Bank and Equatorial Bank taken over (CBK, 2019). In 2019, the profitability growth of the banks declined by 10.4 percent (CBK, 2019). Moreover, some banks have been reporting losses above their available capital, putting their sustainability in jeopardy.

The Consolidated Bank of Kenya Limited reported a net loss of Ksh. 516.91 million in 2019, Ksh. 351.57 million in 2018, 439 million in 2017, and Ksh. 277 million in 2016 (CBK, 2016,2017, 2018, 2019). Moreover, Mayfair CIB Bank Ltd reported a net loss of Ksh. 365.88 million in 2019, Ksh. 267.65 million in 2018 and Ksh. 297 million in 2017 (CBK,2017, 2018, 2019). In addition, DIB Bank Kenya Ltd reported a net loss of Ksh. 795.13 million in 2019, Ksh. 873.32 million in 2018 and Ksh. 839 million in 2017 (CBK,2017, 2018, 2019). Also, Spire Bank Limited reported a net loss of Ksh. 453.43 million in 2019, Ksh. 307.40 million in 2018, Ksh. 1576 million in 2017 and Ksh. 968 million in 2016 (CBK, 2016,2017, 2018, 2019). Consistent loss-making may force the companies into bankruptcy, due to increased insolvency risk. Hence, conducting the study

was considered relevant for policy formulation where financial distress prediction is concerned and its relevance to the non-interest income operations of banks.

The basis of conducting the study was the knowledge gaps in terms of contextual, conceptual, and methodological parameters. Nisar, Peng, Wang, and Ashraf (2018) examined the impact of fees and commissions earned on the insolvency risk of banks in select South Asian Countries. The study was done in Asian countries, thus a contextual gap. Moreover, Santosa (2020) examined the moderating effect of firm size on the relationship between financial characteristics and Islamic firm value in Indonesia, thus presenting a contextual gap because the study was conducted in Indonesia while the current was conducted in Kenya.

Besides, the studies by Puah and Ali (2018) and Ho, Zhong, Cui, and Bhaduri (2016) presented a contextual gap since they were also not conducted in Kenya. Further, the studies of Gichure (2015), Mokni and Rachdi (2016), Jaffar *et al*. (2014), and Bian, Wang, and Sun (2015 present a methodological gap. The scholars only illustrated the theoretical understanding of non-interest income, firm size, and insolvency risk. Hence, the study sought to examine the moderating effect of bank size on the relationship between non-interest income and insolvency risk of commercial banks in Kenya.

1.3 Objectives of the Study.

1.3.1 General Objective

The general objective of the study was to examine the moderating effect of bank size on the relationship between non-interest income and insolvency risk of commercial banks in Kenya.

1.3.2 Specific Objectives

The specific objectives of the study included;

i. To determine the effect of fees and commissions on loan income on the insolvency risk of commercial banks in Kenya.
ii. To establish the effect of the dividend income on the insolvency risk of commercial banks in Kenya.
iii. To evaluate the effect of foreign exchange trading income on the insolvency risk
iv. To assess the effect of transaction fees income on the insolvency risk
v. To explore the moderating effect of bank size on the relationship between non-interest income and insolvency risk

1.4 Hypotheses of the Study

The study tested the following hypotheses.

i. **H_{01}**: Fees and commissions on loan income has no significant effect on the insolvency risk of commercial banks in Kenya.
ii. **H_{02}**: Dividend income has no significant effect on the insolvency risk
iii. **H_{03}**: Foreign exchange trading income has no significant effect on the insolvency risk
iv. **H_{04}**: Transaction fee income has no significant effect on the insolvency risk
v. **H_{05}**: Bank size does not moderate the relationship between non-interest income and the insolvency risk of commercial banks in Kenya.

1.5 Significance of the Study

In practice, the outcomes inform the management of banking institutions on the best combination of non-interest income sources based on their corresponding impact on insolvency risk. The study is also useful to the CBK as the main regulator since they provide a point of reference during the formulation of policy, rules, and prudential guidelines for banks on the implementation of non-interest income activities. The results similarly, enable shareholders to ascertain the implications of bank income diversification strategies on their portfolio choices as they evaluate whether diversification helps to maximize returns received from individual bank shareholding. Furthermore, the results are now a reference point for future scholars.

The value of the study in terms of its contribution to theory is that it provides future researchers and academia with information regarding the relationship between non-interest income and insolvency risk. Hence, the study's recommendations are expected to build a foundation for expanding knowledge, notably in agency theory, portfolio theory, financial intermediation theory, stakeholder theory, and economies of scale theory. The agency theory indicates that managerial decisions are essential for the company's success, portfolio theory clarifies how adding arbitrary securities to a portfolio can enhance or reduce accumulated risks of an organization, and financial intermediation theory reports the development and succeeding trading of agreements that activate funds, share risks, and develop valuable details.

The stakeholder theory shows that stakeholders can be involved in developing strategies that will reduce the risks of an organization. Economies of scale theory show how large

firms can spread risk, thus producing a higher income. Therefore, big firms are expected to spread risks and invest in numerous ventures for profit maximization. The decisions that can influence fees and commissions on loan income, dividend income, foreign exchange trading income and transaction fees income can be impacted by management and stakeholders. Hence, the study is considered significant in increasing information on the theories.

1.6 Scope of the Study

The general objective scope was to examine the moderating effect of bank size on the relationship between non-interest income and insolvency risk of commercial banks in Kenya. The specific objectives scope was to determine the effect of fees and commissions, dividend income, foreign exchange trading income, and transaction fees income on loan income on the insolvency risk of commercial banks in Kenya. The study used bank size as a moderating variable. The time scope was between 2012 and 2019. This period was selected because it recorded 12 banks put under receivership since the 1990s. The banks included Charter House Bank, Dubai Bank, Imperial Bank, and Chase bank. The population scope was 40 commercial banks in Kenya.

1.7 Limitations of the Study

A hurdle experienced was the possibility of biasness from using secondary data. To minimize this problem, the study utilized audited reports. Also, data from published reports by the CBK was employed. In addition, the study conducted some diagnostic tests: normality, multicollinearity, heteroscedasticity, autocorrelation and the Hausman test to ensure the assumptions of the classical linear regression model are not violated.

1.8 Organization of the Study

The thesis was organized in chapters. Chapter one included the introduction. Under the introduction, the background of the problem, statement of the problem, objectives of the study, hypotheses of the study, significance of the study, the scope of the study, limitations of the study and organization of the study were discussed. Further, chapter two incorporated the literature review. The subsections under the literature review included theoretical review, empirical review, a summary of the literature and research gaps, and the conceptual framework. Chapter three entailed the research methodology. The subsections included research philosophy, research design, general model, target population, data collection instruments, operationalization and measurement of variables, data analysis method and ethical considerations. Chapter four included the research findings and discussion. The subsections of the chapter included the response rate, descriptive statistics, trend analysis, correlation analysis and inferential statistics. Lastly, chapter five entailed a summary, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter included an in-depth presentation of the literature review. The chapter included the theoretical review, empirical review, summary of the literature and research gaps, and the conceptual framework. Each section was exhaustively described to show its significance in the study.

2.2 Theoretical Review

2.2.1 The Agency Theory

This theory is a fundamental reference point for the managerial decisions of firms. It was first developed by (Jensen & Meckling, 1976; Eisendhardt, 1989). The theory explains that as managerial ownership falls, the incentive to engage in profit-making ventures decreases. It, therefore, proposes the use of contracts to provide the ultimate delicate balance between all the participants in the firm (Shapiro, 2005). As a result of the potential divergent nature of the owner and principal goals, there may be costs associated with attempting to align their interests (Shapiro, 2005).

The goal is to design the most reliable contract to govern the principal-agent partnership. Different propositions have been presented over the years, in an attempt to converge the interest that threatens this relationship, these can be summarized into two broad contracts: behavior-oriented (focus being on remuneration) and outcome-oriented (performance-based rewards) (Gayle, Chen & Miller, 2018). Shareholder-focused corporate governance

has been linked to increased insolvency risk (Anginer *et al*, 2014). It is assumed that corporate managers are more risk-averse than shareholders as insolvency affects their income and reputation (Anginer *et al*, 2014).

However, despite the agency theory being very pragmatic and popular, it still suffers from various criticisms from some scholars. The roles of directors are only limited to monitoring the managers and their further role is not clearly defined (Clarke, 2004). The theory was relevant to the study, despite having some weaknesses. The motive behind managerial decisions is critical for the success of the organization and hence the agency theory is invaluable to this study. The theory-informed variable foreign exchange trading income in the study.

Decisions undertaken by the management can have an impact on the expansion of the business by looking for new markets. Foreign exchange trading income is not tied to the issuance of loans or provision of routine services but is earned by participating in the forex market. The adoption and degree of engagement in non-interest income-generating activities such as the forex market can be based on the influence of management. Their decisions have the potential to maximize the value of a firm. Management whose interests are well lined will be concerned with the effects of insolvency risk as it affects their wealth. Hence, the theory is considered relevant to anchor the study's variable foreign exchange trading income.

2.2.2 Portfolio Theory

This theory was developed by Markowitz (1952), who quantified the riches appropriation trouble as one of purchase, alteration, and rebalancing profiles according to risk and return

preferences (Ghosh, 2010). The theory clarifies exactly how adding arbitrary securities to a portfolio can enhance or reduce accumulated threats (Dunlop, 2004). Integrating assets that are not entirely associated reason a decrease in profile volatility (Dunlop, 2004). In considering the danger of a profile, capitalists analyze the anticipated returns and private standard deviations of properties (Hoekstra, 2012). A capitalist will also explore the covariance framework of the chosen investments in a proposal to minimize the general profile threat (Hoekstra, 2012). The ramification is that safety and security in a portfolio are not selected by analyzing its characteristics. Instead, it is how it co-moves with all other protection in the profile (Rutterford & Sotiropoulos, 2016).

Nonetheless, the theory faces criticism from scholars. For instance, Fabozzi, Gupta, and Markowitz (2002) criticized the theory because it assumes the presence of a normal distribution of the return on an asset within an asset class. Also, according to Mangram (2013), past performance is never a guarantee for future performance. Lubatkin and Chatterjee (1994) argue that the assumption that securities of any size can be traded is wrong because some securities have the least order sizes that cannot be split any further.

The theory was relevant to the study, despite having some weaknesses. The theory was deemed relevant to inform variable dividend income in the current study. Dividend income belongs to the revenue portfolio choice that business banks must make. Dividend income is realized by holding equity in other firms as a form of investment (Mutega, 2016). The co-movement of non-interest revenue with interest revenue in a provided financial institution's portfolio and the succeeding addition/reduction of risk is a vital evaluation for management hence the foundation for this research study. Investors examine the extent of

income they can get from an investment, and this influences their decision-making. Insolvency risk can be factored in expected returns where; investors' portfolios are not well-diversified and if they cannot be diversified (Fior Delisi & Marques-Ibanez, 2013). Thus, the theory was regarded relevant to inform variable dividend income.

2.2.3 Financial Intermediation Theory

The theory was developed in 1977 by Sealey and Lindley. This theory forms the basis of the existence of commercial banks and posits that they perform vital functions of liquidity intermediation, risk intermediation, and information intermediation (Freimanis & Senfelde, 2019). The stability of the banks can be supported by ensuring they diversity their sources of revenue. The diversification of the avenues of the banks contribute to total income and support reducing the risk of insolvency. Financial intermediation is achieved through the development and subsequent trading of contracts that mobilize funds, share risks, and develop useful information (Philippon, 2015).

However, the theory faces criticism from scholars. For instance, Fase (2001) reported the approach did not establish mechanisms to deal with the information asymmetry where some of the information is only available within the organization and management is not willing to expose it. Bottazzi and Hellmann (2009) revealed another weakness of the theory that it is more concerned with transaction costs and does not consider how to deal with the adverse effects of over-investing in various assets.

The theory was relevant to the study, despite having some weaknesses. The theory informed the variable fees and commissions on loan income. Insolvency risk can be positively affected by diversifying sources of income. Income from fees and commissions

on loans can increase revenue, thus spurring solvency levels. This theory is invaluable to this study as it forms the basis of investigating the probability of default for commercial banks as they engage in non-interest income-generating activities, the aim is to ensure that individual banks are sound as they perform critical functions in the financial system.

2.2.4 Stakeholder Theory

As established by Freeman (1994), this theory explains that in the conduct of business, management must consider all stakeholders proactively in decision-making. Kaler (2006) indicates that diversification of the income generating activities increases the wealth of the stakeholders which in turn are motivated to continue operating in the business. The diversification of the avenues of the revenue increase solvency of a business enterprise. The importance of examining insolvency risk is that it scrutinizes how insolvency risk can affect the sustainability of the business (Hasnas, 2013). This concept matters as organization decisions affect various stakeholders either favorably or adversely. The stakeholder theory integrates values and connections in firms' production processes (Freeman & Parmar, 2004).

The limitations/ weakness of stakeholder theory according to Crane and Ruebottom (2011) is it lacks specificity and, thus, cannot be operationalized in a way that allows scientific inspection. Moreover, Bailur (2006) argues that the weakness of this theory is that the interests of the group are just too broad to be realistically managed. The needs of stakeholders vary from one to another. Despite the limitations, the theory was applicable to the study.

The theory was relevant in the current study to inform the variable transaction fee income. Banks' diversification into other non-loan activities increases their revenue base and lowers the risks of collapse (Okello & Muturi, 2018). The diversification of the avenues of the revenue such as charges for the routine provision of financial services such as mobile banking, account management/maintenance, and card replacement, among others can increase the solvency of banks. The importance of examining insolvency risk is that it scrutinizes how insolvency risk can affect the sustainability of the business (Hasnas, 2013). The solvency of commercial banks ultimately impacts many stakeholders and the consideration of this vital aspect in corporate decision-making can form part of the risk-return analysis.

2.2.3 Economies of Scale Theory

Alfred Marshall developed this theory in the 1890s. It reports that the availability of external economies to firms increases with the scale of industry output. Investors prefer companies with massive assets and are certain that their returns are guaranteed (Carlino, 2012). Economies of scale refer to enterprises' cost advantages due to size, output, or operations level. There is a positive effect between firm size and stock market returns (Peck, 2002; Vreeker, De Groot & Verhoef, 2004; Hansen, 2000). The stocks of larger companies often pay good dividends to investors to capture some of their investment returns. Larger firms are expected to have more reliable information concerning their performance, increasing investor confidence, and lowering moral hazard (Brusa, Liu & Schulman, 2005).

Further, the theory establishes that large firms can spread risk, thus producing higher income (Mauler, Duffner & Leker, 2021). Larger firms can venture into areas that are not attractive to smaller firms, thus expanding their revenue base and gaining monopoly status (Reinganum & Smith, 1983). Furthermore, larger firms have greater access to funding, consequently enhancing their performance by investing in modern technologies, hiring qualified staff, and investing further, which is advantageous to investor earnings (Cabral & Mata, 2003). Besides, firm size enables the company to conduct research and development efforts to remain competitive and attract more investors (Mauler, Duffner & Leker, 2021). However, the theory's limitation is that it did not establish mechanisms to deal with ineffective communication and control the negative impact of business expansion. This theory is relevant to this study since it informed the variable bank size. The theory shows how large firms can spread risk, thus producing a higher income and lower insolvency risk.

2.3 Empirical Review

2.3.1 Fees and Commissions on Loans and Insolvency Risk.

This income is earned during the disbursements of loans. It includes loan processing and mortgage fees; among other charges a bank may set during the loan advancement. This also includes administrative costs associated with the loan application, vetting process, and approval (Hong Kong Institute of Bankers, 2018). Fees and commission income on loans and advances contribute to total income and the risk of insolvency.

A study was conducted by Busch and Kick (2009) to examine the impact of non-interest income on insolvency risk. The study was done on German Banks and adopted a

descriptive research design. The study revealed that fee income from loans go together with higher risk because they are correlated with interest income activities associated with lending. The study concluded that non-interest income positively and significantly impacts insolvency risk. However, the study looked at the impact of fee income on loans only and examined the effects of fee income on interest margin. The current study examined the effect of fees and commissions on loans, dividend income, foreign exchange trading income, and transaction fees income on loan income on the insolvency risk of commercial banks in Kenya. The study used bank size as a moderating variable.

Nisar, Peng, Wang, and Ashraf (2018) examined the impact of fees and commissions earned on the insolvency risk of banks in select South Asian Countries. The study used a cross-sectional research design. The analysis was done using descriptive and inferential statistics. The results showed a positive impact on the insolvency risk. The study presented a contextual gap since it was conducted in South Asian Countries.

Kohler (2009), in his examination of the impact of non-interest income on the risk of German banks, revealed that potential benefits were dependent on the banking model adopted. The collection of the data was done using the secondary data collection template. Retail-oriented banks became significantly stable, while investment-oriented banks became less stable if they pursued fees and loan commissions. The study presented a contextual gap since it was conducted in Europe.

Mndeme (2015) examined the influence of non-interest income on the performance of commercial banks in Tanzania. The study adopted the descriptive research design. The collection of the data was done using the secondary data collection sheet. The descriptive

and inferential were used to do the analysis. The study findings showed a negative impact on bank performance if banks were to engage in non-interest income activities like fees and commissions on loans. However, the study adopted the descriptive research design while the current study used the explanatory research design.

2.3.2 Dividend Income and Insolvency Risk.

Dividend income is realized by holding equity in other firms as a form of investment (Mutega, 2016). Banks participate in the securities market by trading in shares and other investment vehicles like derivatives. Dividend income is also earned through shareholding in subsidiaries and other equity investments that a bank may have. Whenever dividends are announced, the bank will receive its share of the proceeds (Hong Kong Institute of Bankers, 2018). Dividend income contributes to the risk of insolvency. A higher proportion of trading income, particularly in assets such as shares, increases sustainability, thus reducing insolvency risk (Kiweu, 2012)

Chunhachinda (2014) examined the influence of non-interest income on banks' risk profiles in eight Asian countries. The study used a descriptive research design. The collection of the data was done using questionnaires. The results showed that a higher proportion of trading income, particularly in assets like shares, produced positive results regarding insolvency risk reduction. Nonetheless, the study focused on some Asian countries and examined stock exchange-listed banks only, thus a contextual gap.

Lepetit *et al.* (2007) investigated the relationship between bank risk and non-interest income in Europe. The study embraced the descriptive research design. The analysis of the results was based on descriptive and inferential statistics. The study used tables and graphs

to present the study results. The study's results indicated that a higher share of dividend income derived from engaging in trading activities resulted in lower risk for small banks. However, a contextual gap is found since it focused on select European countries.

In addition, Gichure (2015) looked at the influence of non-interest income activities on bank returns in Kenya. The study adopted the descriptive research design. Descriptive and inferential statistics were used to analyze the study results. The results showed support for bank diversification into activities as dividend income was positively related to ROE. The study presents a methodological gap. The study used a descriptive research design and focused on performance, while the current study utilized an explanatory research design and examined the impact on insolvency risk.

Okello and Muturi (2018) examined the impact of dividend income on the performance of banks in Kenya. The study used a descriptive research design. The collection of the data was done using the secondary data collection template. The presentation of the study results was done using descriptive and inferential statistics. The study results showed that transaction fees, dividend income, forex trading, and fees and commissions on loans positively and significantly impacted performance. However, the study focused on the performance rather than insolvency risk; thus, a conceptual is depicted.

2.3.3 Foreign Exchange Trading Income and Insolvency Risk.

Foreign exchange trading income is the net profit (loss) realized from foreign currency transactions, it consists of income from currency trading and commissions from remittances (Sharma & Sharma, 2017). Increased foreign exchange trading increases available income, thus boosting sustainability (Senyo, Olivia, Musah & Nuhu, 2015). This

non-interest income is not tied to the issuance of loans or provision of routine services but is earned by participating in the forex market.

Abugri, Osah, and Andoh (2016) analyzed the relationship between foreign exchange trading income and risk in Ghana and concluded that the relationship was positive; however, as asset size increased, the relationship became negative. The implication is that large banks could benefit from diversification activities compared to smaller banks that were exposed to higher risk. However, the study presented a contextual gap since it was done in Ghana, unlike the current research in Kenya.

Ferreira, Zanini, Fransisco, and Tiago (2019) sampled Brazilian Banks to examine the impact of non-interest income on bank insolvency risk. The study employed an explanatory research design. The collection of the data was done using the secondary data collection template. The study used descriptive and inferential statistics to analyze the data. The study's outcome indicated a negative relationship between non-interest income such as foreign exchange trading income and bank insolvency risk. However, the study presented a contextual gap since it was done in Brazil, unlike the current research in Kenya.

Edirisuriya, Gunasekarage, and Dempsey (2015) examined the relationship between foreign exchange trading income and bank risk in their non-interest income analysis and focused on Australian Banks. The study utilized the descriptive research design. They found no strong evidence to suggest unfavorable outcomes but concluded that Banks improved their insolvency risk-return profiles. The study focused on commercial banks in Australia, thus a contextual gap.

2.3.4 Transaction Fee Income and Insolvency Risk

This income is realized from routine transactions undertaken by bank clients, such as account fees, management fees, and deposit fees. The transaction fees income increases available funds (Matey, 2019). Kaiguo (2014) notes a significant relationship between transaction fees and bank insolvency risk. Banks' diversification into other non-loan activities, such as transaction fees, increases the revenue base and thus lowers the risks of collapse (Okello & Muturi, 2018).

A study was conducted by Ramasastri, Achama, and Ganagadarans (2004) to examine the ability of non-interest income, particularly transaction fee income, to stabilize banks' total income. The study used a descriptive research design. The collection of the data was done using the secondary data collection template. The analysis was done using descriptive and inferential statistics. The study showed that fee income could reduce total income volatility for Indian banks. However, the study looked at the correlation of non-interest income with total income, thus a conceptual gap. In the current study, the stability Z-score was used to determine insolvency risk.

Bian, Wang, and Sun (2015) investigated the effects of non-traditional banking activities on insolvency risk among Chinese Banks. The study employed a descriptive research design. Transaction fee income was seen to significantly increase risk due to the circumvention of deposit interest rates and the assumption of risk that should have been borne by customers. The study presented a methodological gap because the current study used an explanatory research design that examined the relationship between the variables.

Ngendo (2012) looked at the relationship between bank diversification and performance in Kenya. The study used a descriptive research design. A secondary data template was used to collect the data. Descriptive and inferential statistics were used to analyze the data. The study findings showed no significant increase in profit if a bank engages in transaction fees as it was seen to diminish ROE and increase earnings volatility. Nonetheless, the study did not focus on the insolvency risk as in the case of the current study and thus, a conceptual gap was depicted.

2.3.5 Bank Size and Insolvency Risk

Mahmood *et al*. (2019) examined the moderating effects of firm size on the relationship between leverage and performance in China. The proxies of firm size were total sales and total assets. The study concluded that most financing institutions were willing to provide loans to big firms. This enabled larger firms to acquire additional assets, thus increasing their stock market return. The study reported that big companies could invest in modern technology to improve the quality of products or services, which increases the demand, consequently, the growth rate of share prices. Nonetheless, the study was done in China, thus a contextual gap.

Kasman and Kasman (2016) sought to investigate bank size's effect on Turkish banks' insolvency risk. The study used a descriptive research design. The primary data was collected using questionnaires. Descriptive and inferential statistics were used to analyze the data. Results showed that insolvency risk was inversely related to bank size, implying that large banks were healthier. Nonetheless, the bank size was used as an explanatory variable rather than a moderating variable, thus presenting a conceptual gap.

Mokni and Rachdi (2016) compared the results of conventional banks based on insolvency risk and bank size. They utilized a descriptive research design. The study used a secondary data collection template to collect the data. Descriptive and inferential statistics were used to analyze the data. The study findings showed that bank size had an insignificant negative relationship with insolvency risk for all commercial banks. However, the study used the descriptive research design while the current used the explanatory research design, thus a methodological gap.

Puah and Ali (2018) analyzed the influence of bank size on insolvency risk for commercial banks in Pakistan. The study used secondary data from 49 commercial banks in the country. The study adopted the descriptive research design. The study's findings showed that bank size is negatively related to insolvency risk. The study concluded that large banks could reduce the insolvency risk significantly. Large banks are less likely to become insolvent than smaller ones in the long run. However, the study was done in Pakistan, thus a contextual gap.

Table 2.1: Summary of literature review and research gaps

Author	Context and Focus	Key Findings	Research Gaps	Addressing the Gap
Edirisuriya *et al*, 2015	The impact of income diversification on bank performance and risk in Australia.	There was no evidence to suggest negative outcomes from income diversification risk profiles of banks improved.	The study focused on commercial banks in Australia thus a contextual gap.	The study focused on all commercial banks in Kenya.
Kaiguo, 2014	NNII and bank risk in China	showed no significant relationship between transaction fees and bank insolvency risk	Focused on the level of total non-interest income, hence a conceptual gap.	The study investigated the impact of fees and commissions, dividend income, foreign exchange trading income and transaction fees income on loan income on the insolvency risk. The study used bank size as a moderating variable.
Gichure (2015)	The influence of non-interest income activities on bank returns in Kenya	Bank diversification into activities as dividend income was positively related to ROE	Methodological gap. The study used a descriptive research design.	The study utilized an explanatory research design. The study looked at the risk relationship.

Ramasastri *et al*, 2004	NNII and Bank Risk in India	NNII was seen to stabilize total income and hence improved bank insolvency risk.	Used the coefficient of variation to examine the variability of non-interest income. Looked at the correlation of non-interest income with interest income, thus a conceptual gap.	The stability Z-score was used to determine insolvency risk.
Chunhachinda, 2014	NNII and Risk of Commercial Banks in Asia	Low insolvency risk was reported. Fee and commission income was risk increasing.	Contextual gap. Focused on some Asian countries. examined stock exchange-listed banks only.	A census of the commercial banks was used in the study and the study focused on one country, Kenya.
Lepetit *et al*, 2007	Impact of NNII on the insolvency risk of European Banks.	Trading income was seen to reduce risk	Contextual gap. Grouped the sample into small and large banks. Focused on select European countries.	The moderating effect of bank size was examined.
Ferreira *et al*, 2019	The influence of NNII on bank risk in Brazil.	Trading income had a negative relationship with the z-score implying greater risk.	Contextual gap. Done in Brazil.	Done in Kenya.
Busch & Kick, 2009	NNII and bank risk in Germany	Fee income was associated with higher risk.	Looked at the impact of fee income on loans only and examined the effects of fee income on interest margin.	The study investigated the impact of fees and commissions, dividend income, foreign exchange

				trading income and transaction fees income on loan income on the insolvency risk. The study used bank size as a moderating variable
Ngendo, 2012	NNII and bank performance in Kenya.	Expanding into NNII diminished returns.	The study did not examine the influence on insolvency risk.	The study investigated the impact of fees and commissions, dividend income, foreign exchange trading income and transaction fees income on loan income on the insolvency risk. The study used bank size as a moderating variable
Okello and Muturi, 2018	NNII and bank performance in Kenya	Transaction fees, dividend income, Forex trading, and Fees on loans had a positive and significant impact on performance.	The study did not consider the impact on insolvency risk.	The study investigated the impact of fees and commissions, dividend income, foreign exchange trading income and transaction fees income on loan income on the insolvency risk. The study used bank size as a moderating variable

Nisar, Peng, Wang and Ashraf (2018)	Impact of fees and commissions earned on the stability of Banks in select South Asian Countries	The positive impact of fees and commissions earned on bank risk.	Contextual gap. The study was conducted in South Asian Countries	The study was conducted in Kenya.
Stiroh, (2004)	Impact of non-interest income on insolvency risk of banks in the USA.	The study findings showed that securities trading was quite volatile.	Methodological gap. The study used a descriptive research design.	The study utilized an explanatory research design.
Kasman and Kasman (2016)	Effect of bank size on insolvency risk of Turkish banks.	Insolvency risk was inversely related to bank size implying that large banks were healthier.	Conceptual gap.	Bank size was used as a moderating variable
Mokni and Rachdi (2016)	Compared the results of conventional banks based on insolvency risk and bank size	Bank size had a negative insignificant relationship with insolvency risk for all commercial banks	Methodological gap.	The study utilized an explanatory research design.
Puah and Ali (2018)	Influence of bank size on insolvency risk for commercial banks in Pakistan.	There was a negative influence of bank size on insolvency risk.	Contextual gap.	The current study was done in Kenya.

Bian, Wang, and Sun (2015)	Effects of non-traditional banking activities on insolvency risk among Chinese Banks	Transaction fee income was seen to significantly increase risk due to the circumvention of deposit interest rates and the assumption of risk that should have been borne by customers	Methodological gap.	The study utilized an explanatory research design
Abugri, Osah and Andoh (2016)	Relationship between foreign exchange trading income and risk in Ghana.	The relationship between foreign exchange trading income and risk is positive.	Contextual gap. The study was done in Ghana	The current study was done in Kenya
Murithi (2013)	Impact of non-interest income activities on bank performance in Kenya	A positive impact	Conceptual gap. The study only focused on foreign exchange	The study investigated the impact of fees and commissions, dividend income, foreign exchange trading income and transaction fees income on loan income on the insolvency risk. The study used bank size as a moderating variable

Source: Author (2022)

2.4 Conceptual Framework

A conceptual framework is a diagrammatical representation that shows the relationship between independent and dependent variables. Figure 2.1 presents a conceptual framework that will reveal the relationship between non-interest income, bank size and insolvency risk. The dependent variable was insolvency risk, captured by the bank stability Z-score. The stability Z-score measures bank capitalization and return on assets to the volatility of returns. The independent variables (non-interest income) are represented by; foreign exchange translation gains, dividends received from equity holdings, fees from loans disbursed and management fees charged on bank services. Bank size is used as a moderating variable.

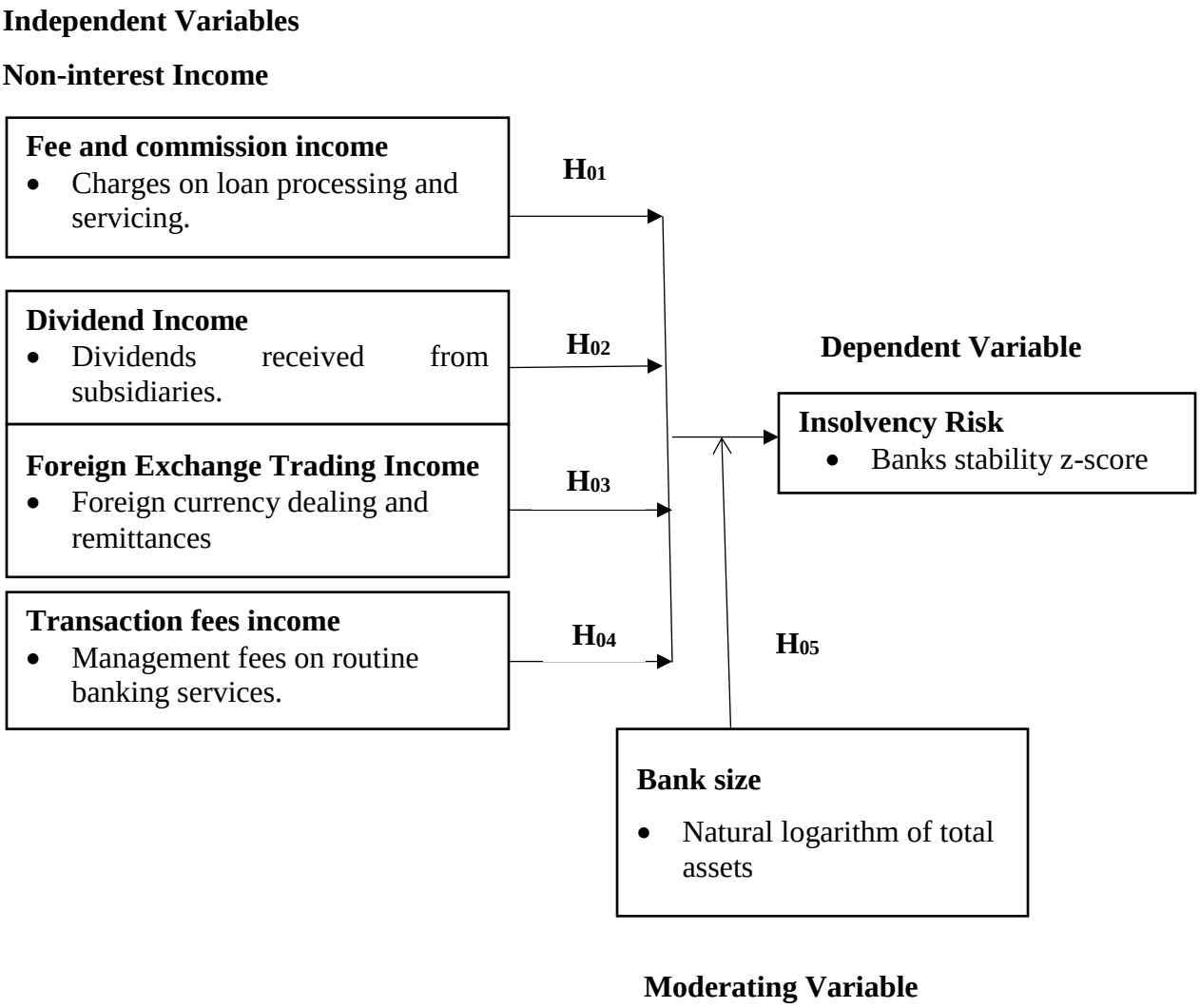

Figure 2.1: Conceptual Framework

Source: Author, 2022

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter described the methodology that was used. The methodology embraced was designed in sections. Each section was comprehensively discussed to show its significance for consideration for inclusion in the study.

3.2 Research Philosophy

This research study took on a positivist approach. A positivist paradigm presumes that phenomena exist externally to the researcher and, their qualities are determined through observation (Gray, 2019). This approach is deemed relevant when the researcher seeks to test a hypothesis. This approach highlights empirical screening, straight monitoring of sensations, and the scientist's self-reliance (Greener, 2006). Consequently, positivism was deemed reliable for the study.

3.3 Research Design

Research design is a framework employed to create answers to examiners' concerns. It can be illustrated as a blueprint for collecting, measuring, and analyzing data (Cooper & Schindler, 2011). The study adopted an explanatory research design. The design is used when the researcher is primarily interested in describing causal relationships among variables (Patten & Newhart, 2017). It investigates relationships between variables without controlling or manipulating them. In the current study, the relationship of the variables was

examined through hypothesis testing. Thus, explanatory research design was considered suitable for this study.

3.4 General Model

The general model was adapted from previous studies (Edirisuriya *et al.*, 2015; Hidayat, Kakinaka & Miyamoto, 2012; Chunhachinda, 2014; Lepetit *et al.*, 2007; Oninag'o, 2015). The study used a panel model. The justification for using a panel model was because panel data was used. The panel data include the collection of data from the 40 commercial banks for the period between 2012 and 2019. The advantage of using Panel data is that it appropriately clarifies a perceived problem at any given time (Beins & McCarthy, 2017). The general panel model was;

$$(Y)it = \alpha_i + \sum_{t=1}^{\infty} \beta iXit + \mu it \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

Where;

$(Y)_{it}$ = Insolvency risk

X_{it}=Value for independent variables

β_i = Beta coefficients to be determined,

α_i =the alpha coefficient of representing constant term,

μ= refers to the error term.

3.4.1 Empirical Model

Expanding the equation (3.1), by including the independent variables of this study we get the equation (3.2) which is the empirical model;

$I_{it} = \alpha + \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + €$…… (3.2)

Where:

I_t = insolvency risk

α = constant.

€ = error term

X_{1it} = Fees and commissions from loan income.

X_{2it} = Dividend income.

X_{3it} = Foreign exchange trading income.

X_{4it}= Transaction fee income.

The subscript i is the specific bank and t is the time period

β1 β2 β3 and β4

Where Betas 1 to 4 are the coefficients for the independent variables.

The Z-score is given as follows;

Z-score= $(ROA_{it} + EQ/A_{it})/\square ROA_{it}$

Where ROA is the return on assets, EQ equity, A total assets, and □ is the standard deviation of the return on assets (ROA). The justification for computation of the Z score as a measure of the insolvency risks is because it combines the information on performance, leverage, and risk and thus becomes the most common method of insolvency risk measurement for banks. The Z-score captures crucial aspects of bank insolvency, which are bank assets, leverage, and equity capital. The Z-score values can either be negative zero

or positive (Musau, 2018). A negative Z-score value implies banks have inadequate equity to settle the unforeseen losses (return on assets is negative) while a zero value of the Z-score indicates the banks have only enough capital to cover the losses incurred (Musau, 2018). A positive Z-score implies banks have enough capital to cover up any of the losses that might occur during the operations. A Z-score towards a positive one indicates a low probability of insolvency while below 0.5 indicates a higher probability of insolvency (Nthambi, 2015).

3.4.2 Moderating Effect Bank size

The study adopted a three-step procedure as specified by Baron and Kenny (1986) to test the moderation effect of bank size. The panel multiple regression model in step one was as indicated in equation (3.2)

$$Y= \beta_0+ \beta_1X_{1it} + \beta_2X_{2it} + \beta_3X_{3it} + \beta_4X_{4it}+€ \quad \text{.....(3.3)}$$

Where;

Y_{it} = Insolvency Risk (Z score)

X_{1it}=Fees and commission on loans

X_{2it}=Dividend income

X_{3it}=Foreign income

X_4it=Transaction income

The subscript i is the specific bank and t is the time period

In the second step, bank size which was determined by the logarithm of the total assets was introduced as a predictor variable. The panel multiple regression results were as indicated in equation 3.3

$Y= \beta_0+ \beta_1X_{1it} + \beta_2X_{2it} + \beta_3X_{3it} + \beta_4X_{4it}+ \beta_5X_{5it}+€$……(3.4)

Y_{it}= Insolvency Risk (Z score)

X_{1it}=Fees and commission on loans

X_{2it}=Dividend income

X_{3it}=Foreign income

X_{4it}=Transaction income

X_{5it}=Bank size (logarithm of the total assets)

In the third step, non-interest income interacted with bank size. The model is depicted in equation 3.4

$Y= \beta_0+ \beta_1X_{1it} + \beta_2X_{2\ it} + \beta_3X_{3\ it} + \beta_4X_{4\ it} + \beta_5X_{5\ it} + \beta_6X_{6\ it} + \beta_7X_{7\ it} + \beta_4X_{4\ it} + \beta_8X_{8\ it} + \beta_9X_{9\ it} + €$……(3.5)

Where;

$Y_{\ it}$ = Insolvency Risk (Z score)

$X_{1\ it}$ =Fees and commission on loans

$X_{2\ it}$ =Dividend income

$X_{3\ it}$ =Foreign income

$X_{4\ it}$ =Transaction income

$X_{5\,it}$ =Log of total assets

$X_{6\,it}$ =Fees and commissions on loans income * Log assets

$X_{7\,it}$ =Dividend income* Log assets

$X_{8\,it}$ =Foreign exchange trading income * Log assets

$X_{9\,it}$ =Transaction Income* Log assets

The moderation effect was determined in step 3 by examining the R-squared. When the R-squared in step 3 is more than in steps 1 and 2, the study concludes there is a moderating effect.

3.5 Target Population

The 40 banks that were operational and regulated by CBK between 2012 and 2019 were used as the target population (Appendix 1). The period was deemed relevant since significant changes took place in the financial sector, such as interest capping. Banks were categorized based on their size, as the CBK reports gave.

Table 3.1: Distribution of the target population

Peer Group	No. of banks	% of total
Large	9	22.5
Medium	10	25
Small	21	52.5
Total	40	100

Source: CBK, 2019

3.6 Data Collection Instruments

The study applied quantitative secondary data from commercial banks. This data was obtained from audited financial statements, published annual reports, and supervisory reports published by CBK, for the period between 2012 and 2019. The study had unbalanced panel data set since some banks were not observed every period. The data was extracted using the document review guides attached in appendices II and III.

3.7 Operationalization and Measurement of Variables

Table 3.2: Operationalization and measurement of variables

Variable	Definition of Variable	Measurement of Variable
Insolvency Risk (Dependent variable)	The probability that bank losses exceed equity.	Z-score = $\frac{[ROAit + EQ/Ait]}{\delta(ROA)}$
Foreign exchange income (Independent variable)	Revenue from the foreign dealings that include translation transactions and remittances.	Net foreign exchange income/Net operating income
Dividend income (Independent variable)	This is income from shareholding in other firms.	Dividend income/Net operating income
Fees and Commission income (Independent variable)	This income from fees charged and/or commission received from loans disbursed	Net fees and commissions from loans and advances/Net operating income
Transaction Income (Independent variable)	This is income from management fees on accounts held by the bank.	Management fees/Net operating income
Bank size (Moderating variable)	Bank size.	Natural logarithm of total assets

Source: Author 2020

3.7.1 Validity of the instruments.

Validity relates to what an instrument measures and how well it measures the variable(s) (Mohajan, 2017). The financial statements sourced from the annual reports are prepared according to IFRS and IAS. Furthermore, they comply with the Banking Act and CBK prudential guidelines. The data review guides in appendices II and III also captured all the variables as derived from literature.

3.7.2 Data Collection Procedure

The researcher required an authorization letter before data collection, which was obtained from the Kenyatta University Graduate School. The letter was then presented to (NACOSTI) to allow for data collection from the annual reports and bank supervision reports published by the CBK. Panel data was extracted and summarized using document review guides.

3.8 Data Analysis Method

Since the study adopted panel multiple regression analysis. The study did the analysis using descriptive (mean, standard deviation, minimum and maximum) and inferential statistics (correlation and regression analysis). The study ensured the assumptions of the classical linear regression model are not violated by conducting the normality, multicollinearity, heteroscedasticity, autocorrelation, and the Hausman test.

3.8.1 Normality

Statistical methods are founded on assumptions, a common one being that the observations follow Gaussian distributions (Das & Rahimtullah, 2016). Skewness and Kurtosis test was conducted for the normality test.

3.8.2 Multicollinearity

This is a state where two or more independent variables are correlated (Daoud, 2017). This scenario prevents the determination of the most influential predictors for inclusion in the model (Daoud, 2017). The VIF was used to test for multicollinearity. A VIF value that is less than 10 indicates no multicollinearity exists between the study variables (Katrutsa & Strijov, 2017).

3.8.3 Heteroscedasticity

Heteroscedasticity arises where error terms do not have constant variance (Gajewski, 2015). If the P-value is less than 0.05, the null hypothesis is rejected; otherwise not.

3.8.4 Autocorrelation

This arises from the violation of the assumption that random errors are identically and independently distributed (Wooldridge, 2012). To check for serial correlation, the Woodridge test for autocorrelation was employed. If the P-value is less than 0.05, the null hypothesis is rejected; otherwise not.

3.8.5 Test for Fixed/Random Effects.

The Hausman test determined the choice of either the fixed effects model or a random-effects model. If no correlation exists, the random-effects model was applied and where correlation exists, the fixed effects model is adopted. If the P-value is less than 0.05, the null hypothesis is rejected; otherwise not.

3.9 Ethical Considerations

Ethics in research relates to the suitability of the researcher's actions concerning the participants in the research (Gray, 2019). These are captured by elements of privacy, risk

assessment, confidentiality, informed consent, and data access (Gray, 2019). In line with these guidelines, the researcher obtained a research license from NACOSTI before obtaining any data and upon completion, the results were shared with NACOSTI.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the research findings and discussion. The discussion of results was presented based on the findings. The chapter notably included the response rate, descriptive statistics, trend analysis, correlation analysis, and inferential statistics.

4.2 Response rate

The response rate was 100% since all the banks in Kenya were included in the study. According to Kothari (2004) and Dattalo (2008), a response rate above 50% is adequate for analysis and inferences. The study's response rate was above 80%, hence excellent for analysis and inference. The purpose of the response rate was to show the number of banks included in the study.

4.3 Descriptive Statistics

This section presents the summary of the data set and the trend analysis

4.3.1 Summary of the Data Set

The discussion presented in Table 4.1 summarizes the data set.

Table 4.1: Summary of the data set

Variable	Observation	Mean	Std. Deviation	Minimum	Maximum
Z- score	320	8.6329% (0.086329)	5.4568% (0.054568)	1.0520% (0.010520)	15.8946% (0.158946)
Fees and Commission income	320	0.0787	0.0398	0.0200	0.1400
Dividend income	320	0.0081	0.0012	0.0006	0.0169
Foreign exchange income	320	0.1115	0.0413	0.0510	0.2000
Transaction income	320	0.1054	0.0496	0.0300	0.1990
Bank size (Log of assets)	320	10.4605	0.5623	9.4123	11.9536

Source: Study data (2022)

The average value of the Z-score for the 40 commercial banks was 8.6329% (0.086329) with a standard deviation of 5.4568% (0.054568). The minimum and maximum Z-scores between 2012 and 2019 were 1.0520% (0.010520) and 15.8946% (0.158946) respectively. This implies the Z-score of the commercial banks has been ranging between 0.010520 and 0.158946. The values were positive showing the banks were fairly stable at a maximum Z-score of 0.158946 (15.8946%). A Z-score towards one indicates a low probability of insolvency while below 0.5 intimates fairly secure as indicated by Nthambi (2015).

Besides, Musau (2018) explains that a positive Z-score implies banks have enough capital to cover up any of the losses that might occur during routine processes; a negative Z-score means banks have inadequate equity to settle losses and a zero value of the Z-score implies banks have just enough capital to cover the losses incurred. The mean of fees and commission income on loans from the 40 commercial banks was 0.0787 with a standard deviation of 0.0398. The minimum and maximum fees and commission income were 0.0200 and 0.1400 respectively. The fees and commission income in the study was

obtained by dividing the net fees and commissions from loans and advances by net operating income. The results implied the percentage contribution of the fees and commission income to the net operating income among the commercial banks between 2012 and 2019 was 7.87% (0.0787) but this varied from bank to bank as supported by the standard deviation of 0.0398. The minimum percentage contribution of the fees and commission income to net operating income was 2% (0.0200) with a maximum of 14% (0.1400). Thus, fees and commission income has been fundamental among commercial banks.

The mean dividend income for the 40 commercial banks was found to be 0.0081 with a standard deviation of 0.0012. The minimum dividend income and the maximum were 0.0006 and 0.0169 respectively. Dividend income was obtained by dividing the dividend income by net operating income. The results meant the percentage contribution of dividend income to net operating income among the commercial banks between 2012 and 2019 was 0.81% (0.0081) however, this varied from bank to bank as supported by the standard deviation of 0.0012. The minimum percentage contribution of dividend income to net operating income was 0.06% (0.0006) with a maximum of 1.69% (0.0169. Karani (2015) indicated dividend income is positively related to performance.

The mean of foreign exchange income for the 40 commercial banks was 0.1115 with a standard deviation of 0.0413. The minimum foreign exchange income and the maximum were 0.0510 and 0.2000 respectively. Foreign exchange income was obtained by dividing the foreign exchange income by net operating income. The results meant the percentage contribution of the foreign exchange income to the net operating income among the

commercial banks between 2012 and 2019 was 11.15% (0.1115). Nevertheless, this varied from bank to bank as supported by the standard deviation of 0.0413. The minimum percentage contribution of foreign exchange income to the net operating income was 5.10% (0.0510) with a maximum of 20% (0.2000). These results of foreign exchange income concur with Murithi (2013) who found there is a positive influence on returns as a result of engagement in foreign exchange activities. Otieno (2017) noted the performance of the banking industry is highly influenced by the currency exchange rates in the country.

The summary indicated the mean score of transaction income of commercial banks between 2012 and 2019 was 0.1054 with a standard deviation of 0.0496. The minimum and maximum transaction income were found to be 0.0300 and 0.1990 respectively. Transaction income was proxied by management fees divided by net operating income. The results implied the percentage contribution of transaction income to net operating income among commercial banks between 2012 and 2019 was 10.54% (0.1054). However, this varies from bank to bank as supported by the standard deviation of 0.0496. The minimum percentage contribution of transaction income to net operating income was 3% (0.0300) with a maximum of 19.90% (0.1990).

The mean total assets of commercial banks between 2012 and 2019 was Ksh. 28,873,537,792 (antilog of 10.4605). The minimum value of assets was Ksh. 2,584,044,569 (antilog of 9.4123) with a maximum of Ksh. 898,669,495,048 (antilog of 11.9536). This implied none of the commercial banks had a value of total assets less than Ksh. 2,584,044,569. Having a larger asset base as indicated by Dalci, Tanova, Ozyapici,

and Bein (2019) is significant since investors consider the assets of the company before venturing their investment into a particular organization.

4.3.2 Trend Analysis

Trend analysis was performed for bank size, fees and commission on loans income, dividend income, foreign exchange income, transaction income, and the Z-score.

4.3.2.1 Bank size Trend line from 2012 to 2019

Figure 4.1 shows the trend of bank size (total assets). The annual average bank size for all the firms under study was generated and data was used to extract the line graph as shown.

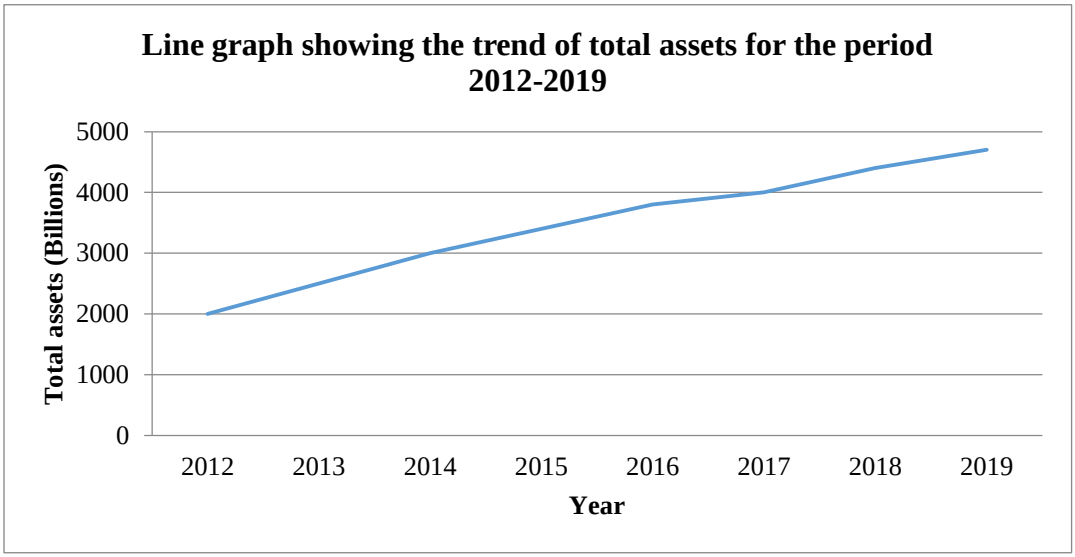

Figure 4.1: Total Assets Trend line from 2012 – 2019

Source: Study data (2022)

Based on the results presented in Figure 4.1, it is evident that the total assets of the commercial banks have been increasing from 2012 to 2019. However, there was slower growth in total assets between 2016 and 2017. This might have been attributed to the

elections that took place in the country in 2017 and the introduction of the interest rate cap in 2016. This claim is supported by Zainabu (2014) who indicated uncertainty makes many investors shy away from investments and even withdraw their shares for fear of losing. Besides, Kimenyi, Adibe, Djiré, and Jirgi (2014) found elections are significant and influence the morale of investors. Nevertheless, the trend of the total assets went upward significantly in 2018. Having a strong asset base is essential and signifies the sustainability of a commercial bank.

4.3.2.2 Fees and Commission income Trend line from 2012 to 2019

Figure 4.2 presents the trend line of fees and commission income of the commercial banks in Kenya from 2012 to 2019

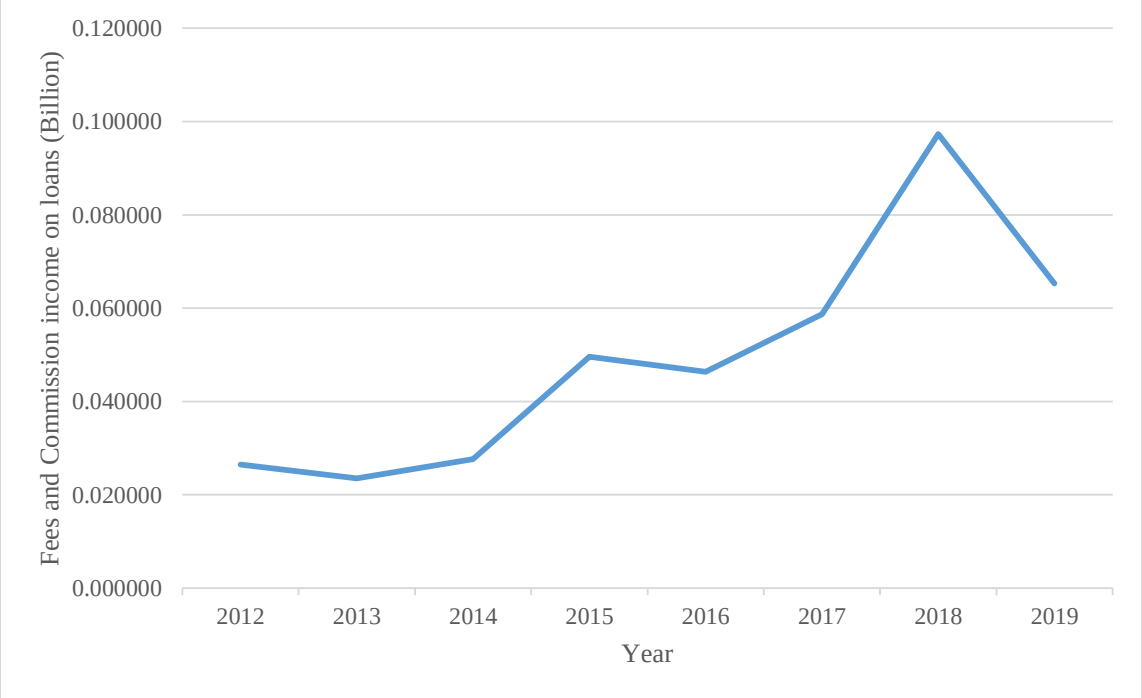

Figure 4.2: Fees and Commission trend line from 2012 to 2019

Source: Study data (2022)

Based on the results presented in Figure 4.2, fees and commission income has been fluctuating. The trend depicts that income has been increasing in most of the years apart from 2013, 2015, and 2018. Commercial banks had the highest fees and commission income in 2018. However, in 2019, income decreased significantly. This may have been attributed to reduced lending due to the interest cap that was later repealed in November 2019. Fluctuations of fees and commission income may have been a result of the management efficiency as indicated by Atellu (2012) who explained that technical efficiency is an important determinant of the expansion of non-interest income activities.

4.3.2.3 Dividend income Trend line from 2012 to 2019

The results presented in Figure 4.3 illustrate the dividend income trend line of the commercial banks in Kenya from 2012 to 2019.

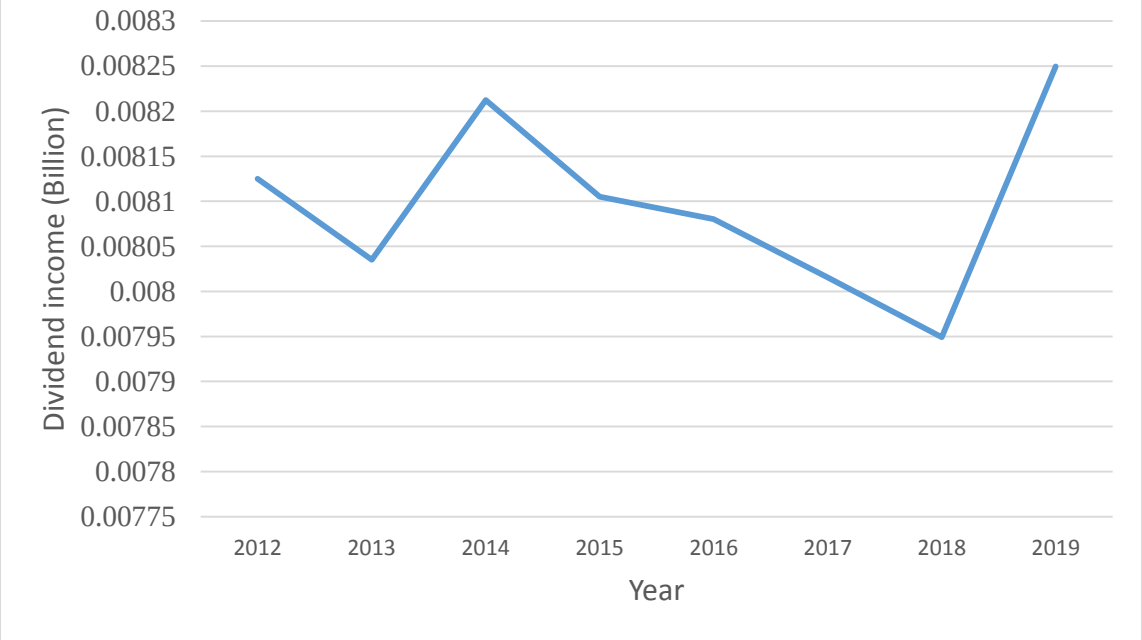

Figure 4.3: Dividend income Trend line from 2012 to 2019

Source: Study data (2022)

The results in figure 4.3 show that dividend income decreased in 2012 while increased in 2013. Between 2014 and 2017, the income has been decreasing. However, in 2018 and beyond it has been increasing significantly. The persistent increase in dividend income from 2018 and beyond could be a result of the political stability witnessed in the country. Kenya endured divisive politics rising from the 2017 general elections but after the consensus between the president, Uhuru Kenyatta, and opposition leader, Raila Odinga to work together, there has been political stability and a conducive working environment. Besides, Adidi and Martin (2010) revealed there is an inverse relationship between the general elections and the financial performance of businesses. The political stability from 2018 to date may be the reason why dividend income, generated by holding equity in other firms as a form of investment has been rising among commercial banks in Kenya.

4.3.2.4 Foreign exchange income Trend line from 2012 to 2019

Figure 4.4 presents the foreign exchange income trend line of the commercial banks in Kenya from 2012 to 2019.

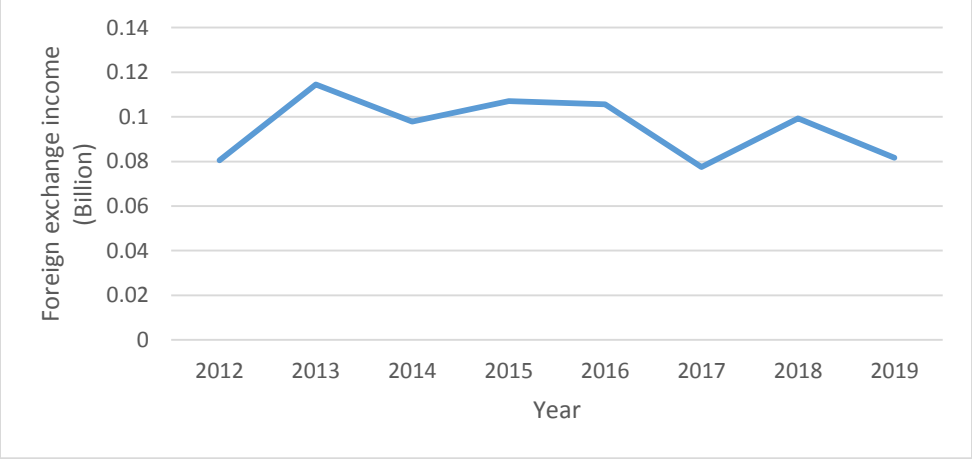

Figure 4.4: Foreign exchange income trend line from 2012 to 2019
Source: Study data (2022)

The results show foreign exchange income has been varying from year to year. It has been increasing in some years (2012; 2014; 2017) while decreasing in other years. The fluctuations of foreign exchange income could be a result of fluctuations in currency rates. Fluctuations of currency rates are induced by inflation rate, interest rates, government debt, terms of trade, and political stability among others (Lagat & Nyandema, 2016; Majok, 2015).

4.3.2.5 Transaction income Trend line from 2012 to 2019

The results presented in Figure 4.5 illustrates the transaction income trend line of commercial banks in Kenya from 2012 to 2019.

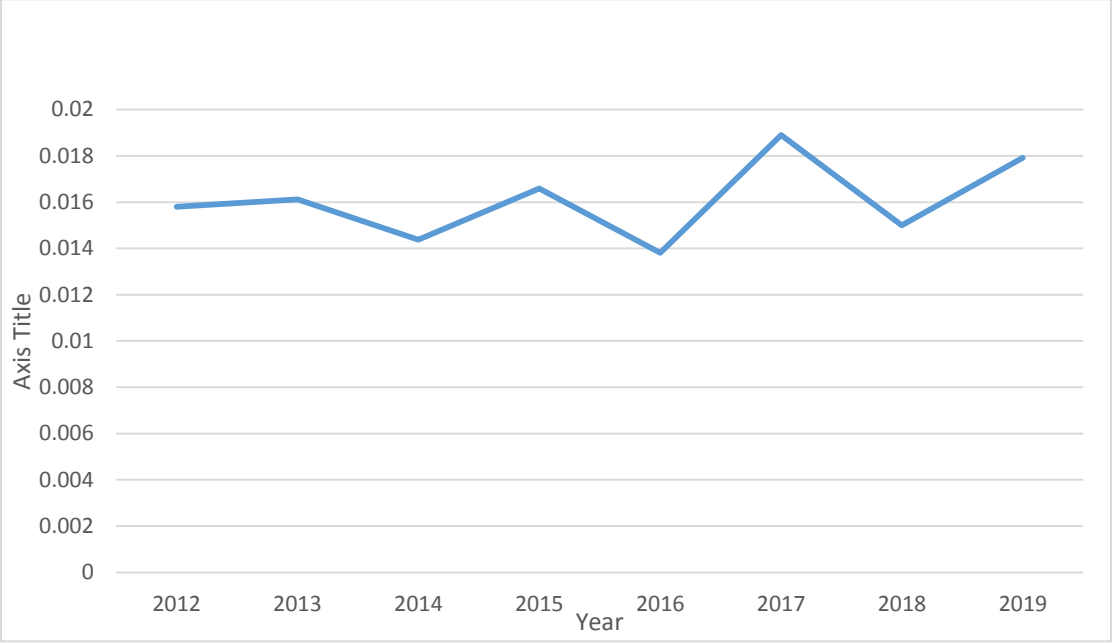

Figure 4.5: Transaction income trend line from 2012 to 2019

Source: Study data (2022)

As per the results presented in Figure 4.5, the transaction income of commercial banks has been fluctuating between 2012 and 2019. The fluctuations of transaction income from year to year can be a result of the management efficiency as supported by Ngendo (2012) who documented that commercial banks in Kenya increase transaction fees to augment their portfolio of total income. Further, Ahamed (2017) indicated that non-interest income notably transaction income varies from time to time depending on the working environment and technical efficiency of the organization.

4.3.2.6 Z-score Trend line from 2012 to 2019

The Z-score trend line from 2012 to 2019 is presented in Figure 4.6.

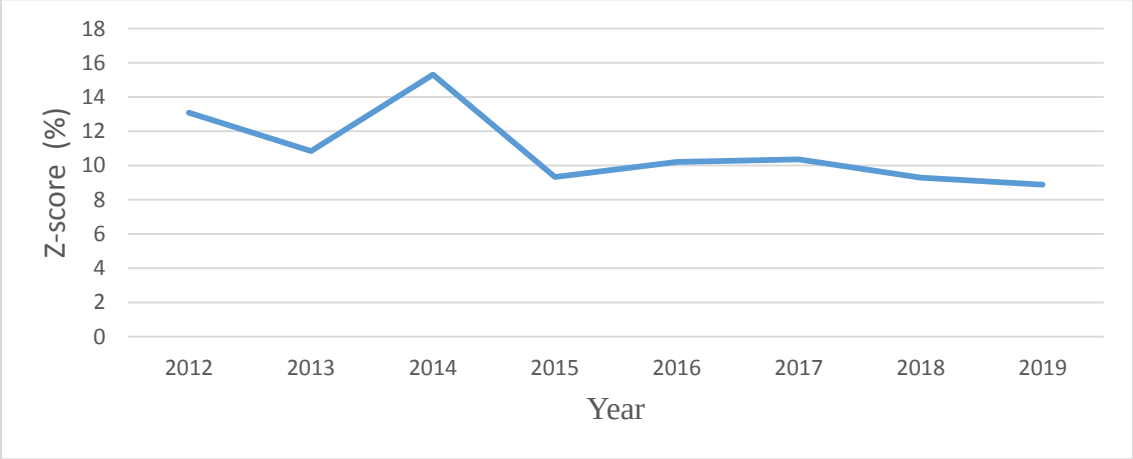

Figure 4.6: Z-score Trend line from 2012 to 2019

Source: Study data (2022)

The Z-score has been fluctuating, as shown in Figure 4.6 from year to year. The Z-score was highest in 2014 and this was supported by CBK (2015) which noted Kenya's financial system remained unwavering and supported by resilient economic performance in 2014. This was driven by heavy investments in infrastructure development and a stable overall

macroeconomic environment. However, after 2017, the Z-score declined persistently. The persistent decline of the Z-score from 2017 may be a result of the working environment, notably the political environment in the country and the capping of the interest rate in 2016. These claims are supported by Kabiru, Ochieng, and Kinyua (2015) who revealed the general election of 2007 in Kenya influenced stock returns negatively. CBK (2018) reported interest income dipped because of interest rate capping between 2016 and 2018.

4.4 Pearson Correlation Analysis

Values less than 0.3 indicate weak correlation, less than 0.5 moderate association, and between 0.5 and 1 show strong association (Bonett & Wright, 2000; Hemphill, 2003). The Pearson correlation analysis is presented in Table 4.2.

Table 4.2: Pearson correlation analysis

		Z-score	Fees and commissions	Dividend income	Foreign exchange trading income	Transaction fees income
Z-score	Pearson Correlation	1.0000				
	Sig. (2-tailed)					
Fees and commissions	Pearson Correlation	0.6137	1.0000			
	Sig. (2-tailed)	0.0000				
Dividend income	Pearson Correlation	0.6537	0.6301	1.0000		
	Sig. (2-tailed)	0.0000	0.0000			
Foreign exchange trading income	Pearson Correlation	0.5499	0.5743	0.6255	1.0000	
	Sig. (2-tailed)	0.0000	0.0000	0.0000		
Transaction fees income	Pearson Correlation	0.5364	0.5963	0.5985	0.4978	1.0000
	Sig. (2-tailed)	0.0000	0.0000	0.0000	0.0000	

Source: Study data (2022)

The study results of the correlation analysis in Table 4.2 indicate that a positive and significant association exists between fees and commissions income and the Z-score (r=0.6137, p=.0000). Also, a positive and significant association exists between dividend income and the Z-score (r=0.6537p=.0000). Further, foreign exchange trading income is positively and significantly associated with the Z-score (r=0.5499, p=0000). In addition, transaction fee income is positively and significantly associated with the Z-score (r=0.5364, p=.0000).

4.5 Inferential Statistics

Inferential statistics examine the relationship between variables. The components include model fitness, analysis of variance, and regression coefficients. Inferential statistics allow researchers to generalize about the populations from which the samples were drawn.

4.5.1 Diagnostics Tests

Diagnostics tests are assumptions that need to be undertaken to avoid spurious regressions (Bastien, Vinzi & Tenenhaus, 2005). The study performed several tests to ensure non-violation of the classical linear regression model and also to establish how well the data fit in the models as supported by White and MacDonald (2012) and Lesch and Corwin (2008). Thus, before running a regression model, the following diagnostics tests were undertaken. The rationale for conducting the diagnostics tests was to make sure the OLS regression assumptions are met, and the study results were not spurious.

4.5.1.1 Normality Test

To test the normality of the variables, the skewness, and Kurtosis test was used. Table 4.3 presents the normality test results.

Table 4.3 Normality test

Variable	Observation	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob> chi2
Insolvency risk	320	0.1149	0.2598	3.77	0.1516
Fees and commissions	320	0.6509	0.7518	3.61	0.1643
Dividend income	320	0.9511	0.7335	8.21	0.3165
Foreign exchange trading income	320	0.0549	0.8503	2.64	0.2671
Transaction fees income	320	0.7028	0.0533	7.99	0.1184
Log of total assets	320	0.0612	0.4848	5.67	0.4643

Source: Study data (2022)

The results from Table 4.3 show the P-value for insolvency risk was 0.1516. This implied that data for insolvency risk was normal. Besides, the p-value for fees and commissions income was 0.1643 indicating the data for fees and commissions was normal. The p-value for dividend income was 0.3165, thus the data was normal. The p-value for foreign exchange trading income was 0.2671 which is greater than 0.05 and therefore, the data for foreign exchange trading income was normal. The p-value for transaction fees income was 0.1184 which is greater than 0.05 and thus the data was normal. Lastly, the p-value for the log of total assets was 0.4643 greater than 0.05 and therefore the data was normal.

4.5.1.2 Multicollinearity Test

Conducting the multicollinearity test was important to avoid the spurious results and the findings found are depicted in Table 4.4

Table 4.4: Multicollinearity test

Variable	VIF	1/VIF
Fees and commissions	2.04	0.490766
Dividend income	2.27	0.439858
Foreign exchange trading income	1.85	0.539570
Transaction fees income	1.80	0.555433
Log of Total assets	1.11	0.902206

Source: Study data (2022)

The results presented in Table 4.4 shows the absence of multicollinearity among the study variables. A VIF value that is less than 10 indicates no multicollinearity exists between the study variables (Katrutsa & Strijov, 2017).

4.5.1.3 Autocorrelation Test

The presence of autocorrelation causes problems in the regression model because the error term observations follow a particular pattern (Dale & Fortin, 2002). The existence of serial correlation shows that the variables in the design break the presumptions of (CLRM) (Setyawati, Suroso, Suryanto, & Nurjannah, 2017). The research study used the Wooldridge test for autocorrelation and the results are shown in Table 4.5.

Table 4.5 Autocorrelation test

Wooldridge test
H0: no first-order autocorrelation
F (1, 39) = 0.162
Prob> F = 0.6897

Source: Study data (2022)

From the results in Table 4.5, the P-value of the F-test was 0.6897. This indicated that the F-test is not statistically significant at the 5% level. Hence, the study concludes that residuals are not autocorrelated.

4.5.1.4 Heteroscedasticity Test

To test for heteroscedasticity, the Breusch-Pagan/Godfrey test was used, and the results obtained are presented in Table 4.6

Table 4.6: Heteroscedasticity test

Variables: fitted values of Insolvency
Prob> chi2 = 0.8426

Source: Study data (2022)

From the results in Table 4.6, the p-value was 0.8426, which was greater than 0.05. Therefore, the study concluded the absence of heteroscedasticity in the data.

4.5.1.5 Hausman Test

Hausman test is conducted to detect whether there exists endogenous regressors (predictor variables) in a regression model (Frondel & Vance, 2010). This being panel data the study conducted the Hausman test for model specification between fixed and random effects and the outcome is depicted in Table 4.7

Table 4.7: Hausman test

Variable	(b) fixed	(B) random
Fees and commissions	0.9302548	1.909332
Dividend income	1.639355	1.777466
Foreign exchange trading income	1.58042	1.5031
Transaction fees income	0.768042	0.864137
Log of total assets	0.3110459	0..940898

chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 18.54
Prob>chi2 = 0.057

Source: Study data (2022)

The results from Table 4.7 shows that the Hausman test indicated λ=18.54 with a p-value of 0.057>0.05. The study failed to reject the null hypothesis that the random-effects model was preferred to the fixed model.

4.5.2 Effect of Non-Interest Income on Insolvency Risk

The study examined the effect of non-interest income on insolvency risk and the summary of the results are illustrated in Table 4.8

Table 4.8: Effect of non-interest income on insolvency risk

Insolvency risk	Coef.	Std. Err.	t	P>t
Fees and commissions on loans income	2.084406	0.55748	3.74	0.0000
Dividend income	1.939443	0.346459	5.60	0.0000
Foreign exchange trading income	1.366731	0.490124	2.79	0.0050
Transaction fees income	0.90981	0.402392	2.26	0.0240
constant	0.202824	0.04847	4.18	0.0000

R squared= 0.5133

Adjusted R squared =0.461

Source: Study data (2022)

The panel regression model was; $I= 0.202824 + 2.084406X_1 + 1.939443X_2 + 1.366731X_3 + 0.90981X_4$

Where; I= insolvency risk; X_1= fees and commissions from loan income, X_2 = dividend income; X_3 = foreign exchange trading income; X_4= transaction fee income.

4.5.2.1 Fees and Commissions on Loans Income and Insolvency Risk

The first objective of the study was to determine the effect of fees and commissions on loans income on the insolvency risk of commercial banks in Kenya. The regression coefficients show that fees and commission income on loans was positively and significantly related to the Z-score of commercial banks in Kenya (β=2.084406, p=0.000). The hypothesis was determined using the p-value. Based on the results presented in Table 4.8, the p-value was 0.000. The null hypothesis was thus rejected which stated that fees and commissions on loan income has no significant effect on the insolvency risk of commercial banks in Kenya. Therefore, fees and commissions on loan income has a

positive significant effect on the insolvency risk of commercial banks in Kenya. The results concur with Okello and Muturi (2018), who found a significant positive influence on fee income on the performance of Kenyan banks. Busch and Kick (2009) indicated that non-interest income positively and significantly impacts insolvency risk. Nisar, Peng, Wang, and Ashraf (2018) showed a positive impact of fees and commission income on the insolvency risk.

4.5.2.2 Dividend Income and Insolvency Risk

The second objective of the study was to establish the effect of the dividend income on the insolvency risk of commercial banks in Kenya. Dividend income was found to be positively and significantly related to the Z-score of commercial banks in Kenya (β =1.939443, p=0.000). The p value as shown in Table 4.8 was found to be less than 0.05; hence the null hypothesis was rejected that stated dividend income has no significant effect on the insolvency risk of commercial banks in Kenya. Thus, dividend income has a positive and significant effect on the insolvency risk of commercial banks in Kenya. The results concur with Oniang'o (2015) findings which discovered that non-interest income increased ROE in Kenyan Banks. Further, Lepetit *et al*. (2007) indicated that a higher share of dividend income derived from engaging in trading activities results in lower risk for small banks. Chunhachinda (2014) showed that a higher proportion of trading income, particularly in assets like shares, produced positive results regarding insolvency risk reduction. Okello and Muturi (2018) showed that transaction fees, dividend income, forex trading and fees on loans positively and significantly impact performance.

4.5.2.3 Foreign Exchange Trading Income and Insolvency Risk

The third objective of the study was to determine the effect of foreign exchange trading income on the insolvency risk of commercial banks in Kenya. Foreign exchange trading income was found to be positively and significantly related to the Z-score of commercial banks in Kenya (β =1.366731, p=0.0050). The p-value was 0.0050, which is less than 0.05. Therefore, the null hypothesis was rejected, which stated that foreign exchange trading income has no significant effect on the insolvency risk of commercial banks in Kenya. Hence, foreign exchange trading income positively and significantly affects the insolvency risk of commercial banks in Kenya. The results agree with the findings of Abugri, Osah, and Andoh (2016), who found the relationship between foreign exchange trading income and insolvency risks to be negative. Murithi (2013) also found a positive influence on returns due to engagement in foreign exchange activities. Further, Njenga (2014) found that bank performance improves when engaging in foreign exchange trading.

4.5.2.4 Transaction Fee Income and Insolvency Risk

The fourth objective of the study was to determine the effect of transaction fee income on the insolvency risk of commercial banks in Kenya. Transaction fee income was found to be positively and significantly related to the Z-score of commercial banks in Kenya (β =0.90981, p=0.0240). The null hypothesis was transaction fee income has no significant effect on the insolvency risk of commercial banks in Kenya. Since the p-value was 0.0240, which is less than 0.05, the null hypothesis was rejected. Hence, transaction fee income has a positive and significant effect on the insolvency risk of commercial banks in Kenya. The results agree with the findings of Gichure (2015), who found that bank diversification into

other non-loan activities as dividend income was positively related to ROE. Besides, Murithi (2013) found that there was a positive influence on returns due to engagement in transaction fee income. Moreover, Ramasastri, Achama, and Ganagadarans (2004) reported that transaction fee income could reduce total income volatility for Indian banks.

4.5.3 Moderation Effect of Bank size

The study adopted a three-step procedure as specified by Baron and Kenny (1986) to test the moderation effect of bank size. The panel multiple regression results under step one are presented in Table 4.9.

Table 4.9: Effect of non-interest income on insolvency risk

Insolvency risk	Coef.	Std. Err.	t	P>t
Fees and commissions on loans income	2.084406	0.55748	3.74	0.0000
Dividend income	1.939443	0.346459	5.60	0.0000
Foreign exchange trading income	1.366731	0.490124	2.79	0.0050
Transaction fees income	0.90981	0.402392	2.26	0.0240
constant	0.202824	0.04847	4.18	0.0000

R squared= 0.5133

Adjusted R squared =0.461

Source: Study data (2022)

The panel multiple regression model was;

$Y= 0.202824 + 2.084406X_1 + 1.939443X_2 + 1.366731X_3 + 0.90981X_4$

Y= Insolvency Risk (Z score)
X_1=Fees and commission on loans
X_2=Dividend income
X_3=Foreign income
X4=Transaction income

The adjusted coefficient of determination (R squared) was 46.1%. This implied that 46.1% of the variation in insolvency risk measured by the Z-score was determined by fees and

commissions on loan income, dividend income, foreign exchange trading income, and transaction fees income. Moreover, the p-value of fees and commissions on loans, dividend income, foreign exchange trading income, and transaction fees income was 0.0000, 0.0000, 0.0050, and 0.0240 respectively.

The regression coefficients of fees and commissions on loan income were 2.084406 with a p-value of 0.000. Dividend income was positively and significantly related to the Z-score (β =1.939443, p=0.000). Foreign exchange trading income was positively and significantly related to the Z-score with a regression coefficient of 1.366731 and a p-value of 0.0050. Transaction fee income was positively and significantly related to the Z-score. The constant value of 0.202824 indicates that the insolvency risk (Z-score) of commercial banks will be 0.202824 in the absence of non-interest income.

In the second step, bank size which was determined by the logarithm of the total assets was introduced as a predictor variable. The panel multiple regression results are presented in Table 4.9.

Table 4.9: Effect of non-interest income and bank size (log of total assets) on insolvency risk

Insolvency risk	Coef.	Std. Err.	t	P>t
Fees and commissions on loans income	1.909332	0.555618	3.44	0.001
Dividend income	1.777466	0.347624	5.11	0.000
Foreign exchange trading income	1.50310	0.487025	3.09	0.002
Transaction fees income	0.864137	0.398234	2.17	0.030
Bank size **(**log of total assets)	-0.09409	0.033833	2.78	0.005
constant	1.213619	0.366052	3.32	0.001

R squared= 0.5247

Adjusted R squared = 0.480

Source: Study data (2022)

The panel multiple regression model was;

$$Y= 1.213619+ 1.909332X_1 + 1.777466X_2 +1.5031X_3 + 0.864137X_4-0.09409\ X_5$$

The results presented in Table 4.9 indicate the adjusted R squared was 48%. This implies that non-interest income and bank size explain 48% of the variations in the bank insolvency measured by the Z score. The p-value of the non-interest income (fees and commissions on loans, dividend income, foreign exchange trading income, and transaction fees income) and bank size (log of total assets) were 0.001, 0.000, 0.002, 0.030, and 0.005 respectively.

The regression coefficients of fees and commissions on loan income were 1.909332. The regression coefficient of dividend income was 1.77746, foreign exchange trading income was 1.50310, and transaction fees income was 0.864137. The regression coefficient of bank size was -0.09409. The constant value of 1.213619 implied that the Z-score will increase by 1.213619 units in the absence of non-interest income and bank size (log of total assets)

In the third step, bank size was introduced as a moderator variable. Non-interest income interacted with the bank size (log of total assets). The panel multiple regression results are presented in Table 4.10

Table 4.10: Effect of bank size as a moderator variable between non-interest income and insolvency risk

Insolvency risk	Coef.	Std. Err.	z	P>z
(X_1) Fees and commission on loans	0.019597	0.654260	0.03	0.976
(X_2) Dividend income	0.179291	0.447650	0.40	0.689
(X_3) Foreign income	0.104551	0.712407	0.15	0.883
(X_4) Transaction income	0.072051	0.419742	0.17	0.864
(X_5) Log of total assets	-0.060800	0.027094	2.24	0.025
(X_6) Fees and commissions on loans income * Log assets	1.994473	0.863234	2.31	0.021
(X_7) Dividend income* Log assets	1.556900	0.610427	2.55	0.011
(X_8) Foreign exchange trading income * Log assets	0.701871	0.081124	8.65	0.001
(X_9) Transaction Income* Log assets	1.504040	0.625461	2.40	0.016
Constant	0.860797	0.295847	2.91	0.004
R squared= 0.5898 Adjusted R squared = 0.579				

The panel regression model was;

Model: $Y=0.860797+0.019597X_1+0.179291X_2+0.104551X_3+0.072051X_4-0.060800X_5+1.994473X_6+1.556900X_7+0.701871X_8+1.504040X_9$

As per the results presented in Table 4.10, the adjusted R squared was 0.579 (57.9%). This implies that when bank size (log of total assets) was introduced as a moderator variable, the model had a high explanatory power of 57.9% of insolvency risk (Z-score) of commercial banks in Kenya. The p-value of non-interest income (fees and commissions on loans, dividend income, foreign exchange trading income, and transaction fees income) after the interaction with the bank size (log of total assets) were 0.021, 0.011, 0.387, and 0.016 respectively.

The regression coefficients of fees and commissions on loan income after interaction with bank size (log of total assets) was 1.994473. The regression coefficient of dividend income after the interaction with bank size (log assets) was 1.556900. Besides, the regression

coefficient of foreign exchange trading income after interaction with the bank size (log of total assets) was 0.701871. Lastly, the regression coefficient of transaction income after interaction with bank size (log assets) was 1.504040. Therefore, there is a significant effect of the interaction terms between fees and commissions on loans income and bank size (log assets), dividend income and bank size (log assets), foreign exchange trading income and bank size (log assets), transaction income and bank size (log assets).

The p values under the interaction were found to be less than 0.05. Thus, the null hypothesis was rejected, which stated that bank size does not moderate the relationship between non-interest income and the insolvency risk of commercial banks in Kenya. The R-squared increased significantly after the interaction. Hence, bank size moderates the relationship between non-interest income and the insolvency risk of commercial banks in Kenya. The outcomes corroborate with the results of Kasman and Kasman (2016), who showed that insolvency risk was inversely related to bank size, implying that large banks were healthier. Also, Mokni and Rachdi (2016) found bank size had an insignificant negative relationship with insolvency risk for all commercial banks.

4.6 Discussion of Findings

The correlation results showed that all the variables under consideration (fees and commissions on loan income, dividend income, foreign and exchange trading income, and transaction fees income) were positively and significantly associated with the Z-score of commercial banks in Kenya. Based on regression results, fees and commission income was positively and significantly related to the Z-score of commercial banks in Kenya (β=2.084406, p=0.000). Moreover, dividend income was positively and significantly

related to the Z-score of commercial banks in Kenya (β =1.939443, p=0.000). Additionally, foreign exchange trading income was positively and significantly related to the Z-score of commercial banks in Kenya (β=1.366731, p=0.0050). Transaction fee income was positively and significantly related to the Z-score of commercial banks in Kenya (β=0.90981, p=0.0240). The study results showed there is a significant effect of the interaction terms between fees and commissions on loans income and bank size (log assets), dividend income and bank size (log assets), foreign exchange trading income and bank size (log assets), transaction income and bank size (log assets). The p values under the interaction were found to be less than 0.05. Thus, the null hypothesis was rejected. Hence, bank size moderates the relationship between non-interest income and the insolvency risk of commercial banks in Kenya.

The results agree with Chunhachinda's (2014) findings, which showed a higher proportion of trading income, particularly in assets like shares, produce positive results regarding insolvency risk reduction among banks. Moreover, Njenga (2014) found that bank performance improved when engaged in foreign exchange trading. Besides, Nisar, Peng, Wang, and Ashraf (2018) found a positive impact of fees and commissions on insolvency among the Banks. Besides, Oniang'o (2015) found that non-interest income increased ROE in Banks. Kaiguo (2014) concluded no significant relationship between transaction fees and bank insolvency risk among Chinese banks. Also, Ramasastri, Achama, and Ganagadarans (2004) showed that fee income could reduce total income volatility for Indian banks. Kasman and Kasman (2016) showed that insolvency risk IS inversely related to bank size, implying that large banks were healthier. Also, Mokni and Rachdi (2016)

found bank size had an insignificant negative relationship with insolvency risk for all commercial banks.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter demonstrated the summary of the study and conclusions based on the findings. The chapter includes major findings, conclusions, recommendations, and suggestions areas for future research.

5.2 Summary of Major Findings

The summary of the findings is presented per objective.

5.2.1 Fees and Commissions on Loans Income and Insolvency Risk

The first objective of the study was to determine the effect of fees and commissions on loans income on the insolvency risk of commercial banks in Kenya. The Pearson correlation results indicated a positive and significant association between fees and commissions on loans income and the Z-score. As per the regression results, it was found that a positive and significant relationship exists between fees and commission income on loans and Z-score. The null hypothesis was thus rejected and thus fees and commissions on loans income has a positive significant effect on the insolvency risk of commercial banks in Kenya.

5.2.2 Dividend Income and Insolvency Risk

The second objective of the study was to establish the effect of the dividend income on the insolvency risk of commercial banks in Kenya. The study found a positive and significant

association between dividend income and the Z-score. The regression results showed that dividend income is positively and significantly related to the Z-score of commercial banks in Kenya. The null hypothesis was rejected. Hence, dividend income has a positive and significant effect on the insolvency risk of commercial banks in Kenya.

5.2.3 Foreign Exchange Trading and Insolvency Risk

The third objective of the study was to determine the effect of foreign exchange trading income on the insolvency risk of commercial banks in Kenya. It was revealed that foreign exchange trading income is positively and significantly associated with the Z-score. The regression results depicted that foreign exchange trading income was positively and significantly related to the Z-score of commercial banks in Kenya. The null hypothesis was rejected. Hence, foreign exchange trading income positively and significantly affects the insolvency risk of commercial banks in Kenya.

5.2.4 Transaction Fee Income and Insolvency Risk

The fourth objective of the study was to determine the effect of transaction fee income on the insolvency risk of commercial banks in Kenya. The results of the study noted that transaction fee income is positively and significantly associated with the Z-score. On the other hand, the regression results showed that transaction fee income was found to be positively and significantly related to the Z-score. The null hypothesis was rejected. Thus, transaction fee income has a positive and significant effect on the insolvency risk of commercial banks in Kenya.

5.2.5 Moderating Effect of Bank Size

The last objective of the study was to explore the moderating effect of bank size on the relationship between non-interest income and insolvency risk. It was found there is a significant effect of the interaction terms between fees and commissions on loans income and bank size (log assets), dividend income and bank size (log assets), foreign exchange trading income and bank size (log assets), transaction income and bank size (log assets). The null hypothesis was rejected. The coefficient of determination (R-squared) increased when bank size interacted with the non-interest income (fees and commissions on loans income, dividend income, foreign exchange trading income, and transaction income). Hence, bank size moderates the relationship between non-interest income and the insolvency risk of commercial banks in Kenya.

5.3 Conclusion

The study concludes that fees and commissions on loan income have a positive and significant effect on Z-score. This designated that the higher the fees and commissions on loan income, the higher the Z-score. This income is derived from fees and commissions earned during the disbursements of loans. They include loan processing fees, and mortgage fees among other charges that a bank may set during loan advancing. Fee and commission income on loans and advances contribute to total income and support banks by reducing the risk of insolvency.

The study concludes that dividend income was positively related to Z-score. This inferred that dividend income contributes to reducing the risk of insolvency for commercial banks in Kenya. Dividend income is realized by commercial banks holding equity in other firms

as a form of investment. Banks participate in the securities market by trading in shares and other investment vehicles like derivatives to expand the sources of revenue. The higher proportion of trading income, particularly in assets such as shares increases the sustainability of the commercial banks, thus reducing insolvency risk.

The study concludes that foreign exchange trading income was positively and significantly related to Z-score. This indicated the higher the foreign exchange trading income, the lower the insolvency risk. Increased income from foreign exchange trading increases the available income of the commercial banks thus enhancing their sustainability. Foreign exchange trading income had the highest mean to total income, indicating its popularity among commercial banks. This source of non-interest income is not tied to the issuance of loans or provision of routine services but is rather earned by participating in the forex market; therefore, it is negatively correlated with interest income hence reducing bank risk.

The study concludes that transaction fee income was positively and significantly related to Z-score. The null hypothesis was rejected; thus, transaction fee income has a positive and significant effect on the insolvency risk of commercial banks in Kenya. The transaction fees income increases the strength of commercial banks as it increases available funds. Transaction fee income significantly reduces the risk for commercial banks.

The study found that large banks with colossal assets could derive some benefit from diversification activities compared to smaller banks that are exposed to higher risk. Larger banks can invest in various investment opportunities, thus lowering the risk of insolvency. Investors are confident with commercial banks that have vast assets and thus can inject

wealth into those banks. This increases the available capital within banks and thus lowers insolvency risk.

5.4 Recommendations

Commercial banks in Kenya can focus on ways of enhancing non-interest income. Based on the regression of coefficients, it was established that when fees and commissions on loan income increase, the Z-score value also increases. The income is derived from fees and commissions earned during the disbursements of loans and can include loan processing fees and mortgage fees among other charges that a bank may set during loan advancing. Commercial banks need to review fees and commission income rates from time to time to ensure they derive maximum benefit.

The regression coefficients showed that an increase in dividend income leads to an increase in the Z-score value. The banks need to increase equity holding in other firms as a form of investment. Dividend income is realized by commercial banks holding equity in other firms as a form of investment. It is also recommended that commercial banks in Kenya increase their participation in the securities market by trading in shares and other investment platforms to extend their revenue base.

The study recommends that commercial banks develop strategies to increase income from currency trading and commissions from remittances. Banks need to diversify their investment options and also put more focus on foreign exchange trading income since it reduced the insolvency risk. Commercial banks need to strategize how to improve income from currency translation, speculation, and remittances. This will include the need for

technical efficiency; this source of non-interest income is not associated with traditional loan disbursement and is therefore a viable income source for diversification.

Additionally, based on the regression of coefficients, it was found that when transaction fee income increases, the Z-score value also increases. Commercial banks need to review the rate at which they charge for transactions periodically. For instance, having a favorable rate will increase the number of transactions, which will lead to higher revenue, thus lowering insolvency risk. The transaction fees income increases the strength of commercial banks as it increases available funds. Transaction fee income significantly reduces the risk for commercial banks.

The study also recommends that commercial banks expand their total assets. This can be achieved through opening various branches in different locations to increase outreach to more clients who can be encouraged to consume bank products. Large banks with enormous assets derive some benefit from diversification activities compared to smaller banks. Larger banks can invest in various investment opportunities that have higher risks but more returns. Investors are confident with commercial banks with enormous assets and can thus inject their savings into those banks. The consolidations currently witnessed in the banking sector are a testament to the fact that bank size is inversely related to bank risk and the regulator should continue to encourage this phenomenon.

5.5 Contribution to Knowledge

The study findings add critical knowledge to existing literature, particularly finance theories such as portfolio theory and financial intermediation theory. It provides future researchers and academia with information. The recommendations presented in the study

can be included in the theories of agency theory, portfolio theory, financial intermediation theory, and stakeholder theory to increase the knowledge base. The agency theory indicates that managerial decisions are essential for the company's success, portfolio theory clarifies how adding arbitrary securities to a portfolio can enhance or reduce accumulated risks of an organization, and financial intermediation theory reports the development and succeeding trading of agreements that activate funds, share risks and develop valuable details and finally, stakeholder theory shows that stakeholders can be involved in developing strategies that will reduce the risks of the organization.

The decisions that can influence the selection of fees and commissions on loan income, dividend income, foreign exchange trading income as dependent on managerial motives and they impact risk. Economies of scale theory show how large firms can spread risk, thus producing a higher income. Larger firms are expected to have more reliable information concerning their performance, increasing investor confidence, and lowering moral hazard. Hence, the study findings contribute significantly to the available knowledge by proving that bank size is key to the organization. Hence, the study is considered significant in contributing to knowledge.

5.6 Areas for further research

The study recommends future studies can be conducted to examine the effect of interest rates, technology, capital adequacy, and income diversification on the insolvency risk of commercial banks in Kenya. Furthermore, studies can be conducted on other financial institutions, such as microfinance institutions.

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APPENDICES

APPENDIX I: Classification of the Banks according to Peer Groups.

Large Peer Group
1.KCB Bank
2.Equity
3.Co-operative
4.Barclays
5.Standard Chartered Bank
6.Diamond Trust Bank
7.Stanbic Bank
8.Commercial Bank of Africa
9.I & M Bank
Medium Peer Group
10.NIC Bank
11.Baroda
12.Prime
13.National
14.Citibank
15.Bank of India
16.Family Bank
17.SBM Bank
18.HFC Ltd
19.Ecobank Kenya Ltd
Small Peer Group
20.Bank of Africa (K) Ltd
21.Victoria
22.Gulf African Bank
23.Guaranty Trust Bank
24.African Bank Corporation Ltd
25.Sidian Bank
26.Habib Bank
27.Credit Bank
28.Guardian Bank
29.First Community Bank
30.UBA Bank
31.Development Bank
32.M-Oriental Bank
33.Transnational
34.Consolidated
35.Paramount
36.Jamii Bora
37.Mayfair
38.DIB
39.Middle East 40.Spire

APPENDIX II: Insolvency Risk Data Review Form

Year	Net Profits	Total Assets	Equity Capital	Total Earnings to Assets	ROA= Net Profits/ Total Assets	Z score
2012						
2013						
2014						
2015						
2016						
2017						
2018						
2019						

APPENDIX III: Non-interest Income Data Review Form

Year	Net Profits	Net fees	Net foreign	Net dividend income	Net transaction income
2012					
2013					
2014					
2015					
2016					
2017					
2018					
2019					

APPENDIX IV: Secondary Data Collection Template

Number	Year	Bank	Fee and commission income	Dividend Income	Foreign Exchange Trading Income	Transaction fees income	Log of total assets	Z score
1	2012	KCB						
2	2013	KCB						
3	2014	KCB						
4	2015	KCB						
5	2016	KCB						
6	2017	KCB						
7	2018	KCB						
8	2019	KCB						
9	2012	Equity						
10	2013	Equity						
11	2014	Equity						
12	2015	Equity						
13	2016	Equity						
14	2017	Equity						
15	2018	Equity						
16	2019	Equity						
.	.	.						
.	.	.						
.	.	.						
320	2019	40						

APPENDIX V: Work Plan

Activity	January-April (2021) Week				May-July (2021) Week				August 2021 - January 2022 Week				February - July (2022) Week			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Topic selection & approval																
Supervisor appointment																
Produce draft proposal																
Incorporate supervisors' reviews																
Proposal ready for presentation																
Incorporation of panel comments																
Data collection																
Data processing and analysis																
Review of draft by supervisor																
Booking for defense																
Incorporate Panel comments																
Submit project to board of postgraduate studies																

APPENDIX VI: NACOSTI Letter

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