BANKS' PORTFOLIO DIVERSIFICATION ON FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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DECLARATION

This thesis is my original work and has not been submitted for a degree in any other university

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This thesis has been submitted for examination with our approval as University supervisors

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DEDICATION

This thesis is dedicated to my parents who have always believed in my ability to achieve what I have set out to do. The research study is dedicated to my family whose support and encouragement has given me a positive transformation in life and may God bless them abundantly.

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ACRONYMS AND ABBREVIATIONS

CBK	Central Bank of Kenya
CLRM	Classical Linear Regression Model
COC	Cost of Capital
CPI	Consumer Price Index
DFL	Degree of Financial Leverage
DOL	Degree of Operational Leverage
EAC	East Africa Community
EPS	Earning Per Share
FEM	Fixed Effects Model
FY	Full Year
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GoK	Government of Kenya
GSIBs	Global Systemically Important Banks
HHI	Herfindahl-Hirschmann Index
KNBS	Kenya National Bureau of Statistics
KIPPRA	Kenya Institute for Public Policy Research and Analysis

LM	Lagrange multiplier
MPT	Modern Portfolio Theory
NIM	Net Interest Margin
NPL	Non-performing loans
OLS	Ordinary Least Square
REM	Random Effects model
ROA	Return on Assets
ROE	Return on Equity
ROCE	Return on Capital Employed
TCE	Transactional Cost Economics
SACCO	Savings and Credit Cooperative Societies
SPSS	Statistical Package for Social Sciences
STATA	Statistic and data software
TSCS	Time Series and Cross Sectional
VIF	Variation Inflation Factor
VECM	Vector Error Correction Model
WACOC	Weighted Average Cost of Capital

DEFINITION OF TERMS

Bank Size	It is estimated by the natural logarithm of entire assets of a company. Size of any bank is employed in capturing economies and diseconomies of scale (Borlea, Achim & Mare, 2017).
Banks' Income	Income for specific period in most cases for a single year ((Pathan & Faff, 2013)).
Commercial Banks	Are financial institutions whose main goal is to offer solutions such as taking deposits and extend to business, retail, auto, and mortgage lending, and common products of investment among them savings and transactional accounts, fixed deposit and foreign currency trading. Intermediation is the main responsibility of commercial banks (Cetorelli, Mandel & Mollineaux, 2012).
Credit	Finance advanced by a financial institution to individuals, or organizations, inform of cash loans. Bank Credit constitutes loans and overdrafts extended to enterprises by formal banking institutions (Kimutai & Jagongo, 2013).
Deposit Diversification	Decreasing the ratio of acquiring deposits from one specific source (individuals, business, public sector) at local and foreign levels, or it might be achieved through reorienting customers deposits to specific accounts (demand, saving, time deposits) or by issuing certificates backed by those deposits. (Alshomaly, 2014).
Deposits	Money that has been given to Banks meant for custody and categorized as a liability by Banks. It is money owed to the customer (Business Dictionary, 2015).

Economic Sector It is referred to as a particular form of business activity entrenched in an economy specifically where chain of production normally takes place (Business Dictionary, 2015).

Financial Performance Subjective indicator of how best an institution can make use of assets derived from its primary line of business to create income that translates to profit. It can as well be utilized as universal indicator of an institution's all-inclusive financial health over a firm year for comparison with similar institutions across same or different industries or for aggregated for sectors comparison (Business Dictionary, 2015).

Income diversification Defined as the growth into new income earning financial products and services other than the traditional intermediation services (Doumpos, Gaganis, & Pasiouras, 2013).

Investment Diversification Defined as a way of managing portfolio whereby an investor diminishes instability and risks of her/his set of the portfolio through holding a range of unlike investments are lowly correlated with one another (Derek, 2015).

Investments Merchantable assets and government securities. Instruments held to maturity and available for sale are described depending on their contractual structure while merchantable assets are described in the demand time bucket after deduction of discount to reflect a feasible fire sale position (Rosenbaum & Pearl, 2009).

Portfolio Diversification Method of managing portfolio by which an investor moderates variability and exposures of a class of portfolio

through holding a variety of unlike investments that are lowly correlated with one another. It is a strategy of managing portfolio through ushering well balanced diverse assets so as to ensure decline of the universal risk linked with investment portfolio. (Derek, 2015).

Return on Assets Financial ratio referring to the total profit before tax divided by the total asset owned and controlled by a Bank (Pathan & Faff, 2013)

Return on Equity Referred to as a financial ratio used to indicate how much is earned as profit by a firm in comparison to the overall amount of equity owned by shareholders as per the firm's balance sheet (Ongore & Kusa 2013).

Sectoral Credit Diversification Defined as an investment strategy by which an investor or a portfolio manager attempts to balance risk versus reward by adjusting the percentage of the amount of credit extended in a particular sector according to the risk tolerance of the bank, goals and the lending time frame (Shubiri, 2010).

ABSTRACT

It is complicated to efficiently manage bank's portfolio, simultaneously maximize returns and minimize risks while being subject to managerial and regulatory constraints. This paper has discussed pertinent issues in bank portfolio diversification in the banking industry while focusing on elimination of existing classes of risk. Banks' portfolio diversification as a strategy in the context of a country like Kenya is assessed on fundamentals of available theoretical literature supported by empirical literature with the focus being commercial banks in Kenya. Taking the current balance sheet position as the starting point, this thesis aims at constructing a multi-objective approach for attaining an optimal balance sheet whereas at the same time bringing into consideration constraints that banks in Kenya encounter. This study was guided by five specific objectives; to assess the effect of sectoral credit, income streams, deposit types and investment portfolio diversifications on the financial performance of commercial banks in Kenya. The study in addition sought to ascertain the moderating effect of bank size on the relationship between banks' portfolio diversification and commercial banks' financial performance in Kenya. The study embraced descriptive and correlational research design. The forty-three institutions of commercial banking officially licensed by Central Bank of Kenya by December 2018 made up the population targeted by this study. Data subjected to analysis in this study was secondary unbalanced panel data with time series and cross sectional attributesand was gathered from published accounts on websites of individual banks, statistical reports by Kenya National Bureau of Statistics, World Bank website, Central Bank of Kenya supervision reports, and the Banking survey publications for a timely scope ranging from 2003 to 2018. The five hypotheses were estimated using Panel data techniques of fixed effect and random effect models. Generalized Method of Moments (system GMM) was utilized to estimate short run model and to purge unobserved firm specific time–invariant effects and also to help in mitigating presence of endogeneity problems. The study carried out pair-wise correlations existing between the study variables. Wald and F- tests were employed in the study to estimate the significance of the regression whereas coefficient of determination and R- square estimate were thereby adopted to explain extent of variation in dependent variables was accounted for by the explanatory variables. GMM revealed short run significant effect of lagged return on equity and lagged return on assets on financial performance. Sectoral credit diversification, income streams diversification, deposits diversification and investment diversification had significant positive effect on financial performance respectively. Bank size in both dynamic and static models revealed a positive moderating effect on the effect of banks portfolio diversification and financial performance. The study concluded that spreading a portfolio over multiple, unrelated investments reduce the risk of a sudden, unexpected outcome and in a diversified portfolio, a loss or risk in one investment is offset by gains from another investment. The study recommended that there should exist risk mitigation measures set aside through portfolio management. Commercial banks should focus their activities to promote confidence, develop marketing policies that encourage diversity and establish the best assets combination that can yield an efficient portfolio through portfolio diversification.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Commercial banks, like many other profit-making institutions, are expected to create profits through efficient and effective portfolio utilization of available capital resources to ensure advancement and deliver on shareholders' expectations of maximum returns on their investments. Financial intermediation, which is to a large degree the primary job of commercial banks, can be defined as the reception of funds from units with surpluses in the form of changing deposit accounts in order to extend to units with deficits through loans and advances at different prices. Turkmen and Yigit (2012) stated that diversification versus concentration is very pertinent to commercial banks as it significantly contributes to financial stability. Banks should be connected to the circle of economic and social growth of a nation in order to perform their primary tasks of intermediation. Banks are at a critical period of crisis in this era of economic challenges and reforms. There is a need to develop solutions to aid in the recovery of the banking industry. It is therefore critical to strengthen the portfolio composition of the banks (Olarewaju, Migiro, & Sibanda, 2017).

For development and rapid growth of a country's economy, the banking system contribution is fundamental since deposited surpluses in banks is the avenue through which resources are extended in a style deemed efficient and effective to units of the economy experiencing a deficit and hence foster liquidity, and propel proper functioning of a countries' financial systems (Al Karim & Alam, 2013; Nasieku, 2014; Kamau & Oluoch, 2016). The financial sector participates in the composition of existing assets types that the public can accept to hold, from the liabilities types debtors will be willing to incur. It will, therefore, embark on size transformation, maturity and riskiness of various classes of assets, and henceforth enhances the ambitions of savers with perspective to buy long term assets. Retail banks mainly raise short term deposits but can still make these deposits behave as if they are of long-term structure through a continuous flow of deposits from depositors. Intermediation of resources is the basic and pertinent business of the banks, more so

in nations that are developing like Kenya where resources available seem not to be adequate or sufficiently able to fulfill the economic capital and developmental needs (Nnanna, 2005). It is important to examine the input-output mix portfolio of these banks and how they have interacted with one another to determine the individual aggregate performance levels of banking institutions in Kenya.

1.1.1 Global Overview of Banks' Portfolio Diversification and Financial Performance

Theories related to diversification in banking advocate for existence of multiple diversification categories and have long dated empirical review with Liang and Rhoades (1991); Palich, Cardinal and Miller (2010), suggesting that banking establishments can diversify portfolios of credit covering varied classes of loans in rather than being geographically heterogeneous. In addition to issuing loans, banking institutions diversify their portfolios by investing in financial instruments and engaging in other activities. Diversification additionally encompasses amongst others, services or activities (Christiansen & Pace, 1994), geographical and international (Obinne et al., 2012; Lin, 2010), revenue (Gambacorta, Scatigna, & Yang, 2014), asset, deposit and sectoral loans (Goetz et al., 2013; Berger et al., 2010), even though it was known as diversification of products, and it closely resembles income diversification (Ebrahim & Hasan, 2008). Related to this preposition, banks can diversify also their investments, not only their lending facilities portfolio (Saksonova & Solovjova, 2011). The most consequential and regular diversification strategies in banking are sectoral credit, income streams, assets, deposit types, geographical and international diversifications.

Derek (2015) defines diversification as a methodology of management of portfolio by which an investor minimizes unpredictability and risks in sets of portfolios by holding a variety of disparate investments that are minimally correlated with each other. Cernas (2011) defines diversification as a strategy of managing a portfolio through ushering together varied assets to bring down the universal risk linked with an investment portfolio. The common benefit of diversifying any portfolio is that it brings together various investments along with a variety of categories of financial

tools, by which each bear proportionate risk-return. This diversification grouping is spearheaded with the essential objective of bringing down the anticipated risk that may come to light after all resources are set up in a single investment category.

Deposit diversification's major goal is to protect commercial banks from liquidity risk, especially when their relative borrowing capacity is limited, costly, or both. This form of risk can be related to unanticipated customer withdrawals or an increase in acceptable loan requests. (Rose & Hudgins, 2010). Deposit diversification can be easily achieved, according to Ross et al. (2011), by reducing the ratio of deposits acquired from a single source, such as individuals, the public sector, and businesses, whether at a global or local level. It can also be accomplished by redirecting deposits made by clients to certain accounts, such as demand, call, saving, and fixed deposits, or by issuing deposit-backed certificates. These portfolio diversification avenues will play the purpose of improving the efficiency of bank borrowing and, as a result, lowering the WACOC.

Credit diversification aims to reduce the levels of risk emanating from loan default on the side of borrowers, which is known as default risk, through deposit allocation and non-deposit funds borrowing among different customer groups belonging to more sectoral units or geographical regions or by the introduction of new products regarding credit facilities (Jahn et al., 2013). Lending specialization can also help achieve the reduction of credit. Lending specialization can be attained by reducing diversification ratio either in the diversity of customers who qualify for credit or in credit types, which in return lead to enhancement of bank's ability in screening out doubtful loans category.

Banking institutions' non-interest income streams include fees and commissions, money market instruments investments, among other revenues directly relating to the nature of bank activities specialization (Stiroh, 2004). Limiting the dispersion of revenue and the quality of revenue-generating channels, nevertheless, could be attained by concentration of revenues (Mercieca et al., 2007). The question arising is, are diversification strategies cost-free? There is an indication from the literature of banking that concentration that is low will debilitate control of banks over more

divergent activities, and as a result, diminishes their functional know-how. It will raise the costs that are direct and indirect which may encompass the diminishing of commercial banks' competitive power and up-surging bankruptcy and agency costs occurring or coinciding with diversification activities

Banks' income diversification will be attained by raising the weight of non-interest income compared to interest income. It can also be done by diversification of the sources relating to non-interest and interest income composition in the portfolio of revenue in commercial banks (Gurbuz et al, 2013).

According to Reilly and Brown (2012), diversification of investment portfolio aims at eliminating the component of individual investment risk that is non- systematic through reallocation of resources among wide classes of asset. Diversification of banks' portfolio will be attained by alteration of investment model achieved by undertaking a long positioning in specified investment and short positioning in other investments expected to be correlated adversely. According to Hull (2009), this strategy successfully offsets the investments' systematic risks but not total elimination. It ought not to be concluded that these risks types cannot be altered or controlled. Systematic risks measured by covariance amongst return of stock and market return could be minimized by lowering the volatility in the price of a stock, as achieved per the efficient market hypothesis, by reducing fluctuation of earnings which may be also achieved by diversifying bank activities.

Miller and Yang (2016); Chakrabarti, Singh and Mahmood (2007) found out three main reasons exist as to why non-interest revenue may raise the earning volatilities. First, a financial institution can lose customers that it signs into relationships specifically fee-based rather than those that are loan-based. Downplaying greater sensitivity to rates of interest movements and downturns in the economy, incomes emanating from a bank's traditional activities of lending are probable to overtime stabilize because costs of switching and information sourcing make it hefty for either clients or institutions to deviate from relationships bound by lending. Secondly, the preference of non-interest to interest income will come along with major fixed investments may it be technological or human resources. Consequently, an upsurge

in operational leverage and volatility in earnings will be realized. Thirdly, many fee-based activities can be undertaken by investing fewer or no required capital suggesting a more advanced level of leverage financially as a result, experience earnings volatility.

1.1.2 Regional Overview of Banks' Portfolio Diversification and Financial Performance

Banks commercially trading in Sub-Saharan Africa tend to face great competition and, for them to survive this tide of competition, they ought to engage in diversity in terms of their income streams (Ismail, Hanif, Choudhary, Nisar, 2015). In the African context, a study done by Landi and Venturelli (2012) sought to address the question of whether diversification is practiced in the African banking sector. The study sought to determine whether diversification in the banking industry is playing an up-surging important role of which the trend is proving hard to ascertain without at first stating and categorizing the business lines of financial intermediation role. Secondly, the venturing of banking institutions' focus towards the services of insurance, fee-based activities and industry of government securities has implications that are beneficial in terms of stabilization and concentration of financial systems. The analysis that was done to compare banks with those of the European market was achieved with the use of data of available database for all banks and the profitability of a bank, in particular, the profitability of these banks. Results were that diversification affected efficiency in terms of profits, prices and revenue growth. However, there was a need for more focus on specific banks diversification that affects banks financial performance significantly.

Nakane and Weitraub (2015) highlighted that there is a need for more empirical investigation of Sub Saharan Africa dynamic financial systems. Oyewobi et al. (2013) conducted an investigation on how the diversification of businesses impacted the performance of South African construction firms. The findings indicated that firms in the construction industry earned more profit margins. The study failed to single out the criteria in use to specify and separate large construction companies, medium-sized and newly upgraded companies.

Kiyota (2011) utilized the approach called stochastic frontier in an analysis that compares efficiency in terms of profit and inefficiencies in the cost of banking firms that was in operation in 29 countries in Sub-Saharan Africa for the period 2000-2007. The outcome indicated foreign banks were more efficient in terms of profit compared to domestic banks. It was depicted that smaller banks are more efficient in profit-making. Medium or relatively larger banking firms tend to be more efficient in their costs of operations.

Olarewaju, Migiro, and Sibanda (2017) who concurred with other authors' theoretical prescriptions among them Markowitz (1952, 1959); Meressa (2017); Kazan and Uludag (2014) by stating that all these diversification avenues such as sectoral credit, assets, deposit types and income streams are avenues in banks to make use of, to be able to exploit new viable ventures to add to their intermediation services that are regarded as traditional to accrue market power and as well withstanding stringent growing competition.

Referring to Cytonn Kenyan banking sector report (2019), Kenya's banking sector has witnessed heightened M&A activity over the last 5years. Consolidation activity remained one of the key highlights witnessed in FY'2019 as players in the sector are either acquired or merge, leading to formation of relatively larger, well capitalized and possibly more stable entities. Banks therefore has continued with a focus of diversifying their revenues streams targeting transactional fee-based income as well as surging revenue from nonbanking subsidiaries. Oyatoye and Arileserre (2012) indicated that it is of importance for all sectors to endure and progress in diversification to mitigate potential underwriting losses and achieve increased financial strength and hence increase profits.

1.1.3 Kenyan Overview of Banks' Portfolio Diversification and Financial Performance

Different scholars have pinpointed variables that can inform bank performance and they highlighted one of them to be diversification, whereas Olweny and Shipho (2011), inferred that despite this, there exists no consensus regarding how income streams diversification has contributed to cost efficiency and spurring upsurge in

performance in this particular region. Kiweu (2012); Mulwa (2018) stated there is a need though urgent to scrutinize income streams diversification in the region classified as SSA and is motivated by curiosity to bring to light its effect on bank performance after 2008 crisis. Efficient functioning of retail banking institutions that energize capital market deepening is the building block of formation of capital. The Kenyan financial system is considered to be at the top in rank among systems in sub-Saharan Africa (Odhiambo, 2008). Commercial Banking institutions have expanded and registered increased asset. The Kenyan banking system consists of 43 commercial banking institutions and 2 companies for mortgage financing. The commercial banks are grouped into three tiers depending on the asset base. Bank performance is connected with how bank managers assemble resources, allocate resources and manage the inherent risks. It could also be seen concerning the quality of assets portfolio, level of liquidity, and net contribution to the development of a nation's economic development.

In comparison with other Economies in East Africa, the banking sector in Kenya has been applauded for its diversification as well as its size. Portfolio allocation is seen to be drifting to favouring of assets that are less risky such as liquid cash and government securities. By September 2016, Government securities contribution was at 24% of the sector's balance sheet in comparison to about 18%-year average from 2011 to 2015. Private credit to GDP, which is the accepted financial development index, was estimated at 34.9% in 2015, in comparison to 45% average for countries in Africa Sub-Sahara (CBK, 2016).

Banks' portfolio of deposits types and sectoral credit if not carefully managed, will make it challenging in the realization of expected performance. Portfolio in this regard attributes to mix of deposits in the form of term structure and associated costs while portfolio mix of sectoral credits allocated is by term structure and rates applied to lend. Composition of these portfolios may translate into risks to banks and these risks consequently affect performance. A portfolio is normally synonymous with diversification since it explains ways applied in management of factors of unsystematic risk that are inherent in the type of operations undertaken by banks (Kipleting & Bakongo, 2016). The assessment discovered that diversification

covering both interest stream and non-interest stream of income generating undertakings intensify profitability by downsizing insolvency exposure.

A study undertaken by Sissy (2015) across 329 banks in the context of 29 countries in Africa spreading over a period from 2002 to 2013 insinuated that banking across borders raises revenue stream diversification as a result of competition. This insight the suggestion that geographical and revenue stream diversification makes banks' performance better and the steadiness of aforementioned performance. As Kiweu (2012) stated, there is the need especially in Kenya to look at the different classes of deposits as well as the capital base and how they impact the performance in terms of revenues of commercial banks via a portfolio of credit granted. This is borne out of the expectation that a good match between deposits and credits portfolios will ensure profitable performance. It is expected in effect that there will be a connection between portfolio of deposits and credits, capital base and all collectively affecting banks performance.

Among the studies done in Kenya that includes Mulwa and Kosgei (2016), Oloo (2011), Kiweu (2012) and among other studies Mulwa (2013), Magambo (2013), Wafula (2014), Mutega (2016); Sanya and Wolfe (2011); Teimet, Ochieng and Anywa (2011); Kipleting and Bokongo (2016) agreed that the main essence of management of portfolio and diversification of product in special reference to retail banks is to spread and minimize unsystematic risks associated with the banking business, maximize shareholders wealth, keep the business alive, amid stiffened competitiveness in the industry. The banking system existing in Kenya has progressed over the years as a result of remarkable changes among them depth and breadth of operations, number of institutions as well as ownership structure. These transformations have been as a result of challenges posited by deregulation which occurred in the financial sector, globalization of various banks operations, innovations in form of technology and adoption of various requirements which are supervisory and prudential leading to conformity with standard internationally. It is important to examine the input-output mix in the portfolio of these banks and the way they have interacted amongst them to determine the individual aggregate performance levels. Moreover, most of the studies, though they have collected panel

data, have not considered diagnostic tests prior to data analysis. Indeed, both stationarity and Granger causality has not been tested in most studies. Bank size was employed in the current study as a moderator.

1.1.4 Bank Size

Empirical literature on size of bank dated back with Clarke, (1984) who stated that sizeable firms are seen to be extra efficient and profitable than in the case of smaller firms as a result of their superiority in terms of efficiency as outlined by the hypothesis of relative efficiency. Fama and French, (2005) apprehended much of the across sections average stocks returns by suggesting from a firm's perspective, that firms with smaller size face a higher cost of capital as opposed to sizeable firms. An important question underlying policy on financial institutions at what point do size optimizes efficiency.

Regulators in the financial sector have continued to emphasize the size of the players by prescribing the minimum capital base. It is regarded as likely growing in size and stability is enhanced. Intuitively, it is expected that a positive relationship will arise from the knowledge that bigger commercial banks can build material, human, financial and technical resources thus promoting their efficiency level. In a divergent direction, since agency problem, dysfunction as well as coordination, are more inherent in bigger firms, the expectation will be that smaller banks inculcate inefficiency scores that are lower than of bigger firms (Karray & Chichti, 2013).

The Market-Power hypothesis explains that the effect emanating from growth in size on the profitability of an institution seems significant and largely positive (Athanasoglou et al., 2008). Expanding the size of the firm may in consequence cause separation of control from ownership if the size reaches a threshold. The association existing between the size of an organization and profitability can turn to retrogressive afar from the threshold size of the firm. The firm size was used as a moderator in this study to explain why large banks had a wider variety of products and higher credit diversification ratings.

The impact of bank size on financial results is uncertain because, on the one hand, greater diversification implies lower risk and, as a result, a lower required rate of return, while, on the other hand, bank size brings into perspective the differences that result from it such as economies of scale. In the case of larger companies, their size allows them to easily do their bargain, manage costs and as a result realize significantly higher prices for the specific product (Muriithi, 2016). The size of a bank is used in the financial sector to help capture economies of scale as well as diseconomies of scale. Natural logarithms of banks total assets are used to estimate commercial banks' size, as is the case in most finance literature. The natural log of total assets in billions was included in the regression model to account for potential nonlinearities resulting from scale diseconomies as banking firms grew larger.

1.1.5 Commercial Banks' Financial Performance

Samadquadri (2013) elaborated financial performance as the extent to which a venture can make use of its assets to maximize turnovers and consequently revenues. Financial performance is termed as an overall index of assessing the general financial strength of a firm over a specified era and is highly used to make comparisons of firms either in a similar industry or sectors that are related. Boru (2011) added that financial performance is a pertinent element as it indicates whether a firm is making losses or profit and whether the firm profitability is growing. Financial performance and measures of financial performance have been defined by various studies in the world. Taking into cognizance accounting perspective and strategic management empirical literature review, study by Fauzi and Idris (2013) outlined performance as the matching of internal and external business environment, strategic goals, internal framework and systems of control and henceforth performance is habitually impacted by the determinants that explains it. Kang and Kinyua (2016) over a great extent contended that financial performance is an indication of institutions' policies and functioning in monetary terms. Financial performance in a way can be elaborated to mean to what extent institutions attain goals and objectives (Busch, Bauer, & Orlitzky, 2015). Busch et al., (2015) further alluded that economic blueprints and social objectives are intertwined, making financial performance inextricable with social goals.

In the Kenyan context, banking financial performance has been of major attention to academic research and all stakeholders. This is due to the fact that financial performance assumes a critical role in growing the economy of any country and overall it is considered to act as the reflector of financial development and economic environment of a country that it assumes in addition to its role of intermediation in an economy (Gatuhi, 2015; Ongore & Kusa, 2013).

Accounting indicators of performance comprise of ROA, ROE, EPS, assets turnover among many others, while measurements that are qualitative comprise of survey respondents or persons who supply subjective estimations like judgments and opinion on utilization of institutions' assets (Busch et al., 2015). It was found that ROE and ROA have been put into context widely as measures of performance. ROE quality level is in the range of 15% and 30%, for ROA the span is at least 1%. Wong et al. (2008) suggested that the efficiency of commercial banks by using ROE is more appropriate as it demonstrates to what length banks utilize income invested back to generate yields in future. Acharya et al. (2006), DeYoung and Rice (2004), Stiroh (2004), Lee et al. (2014), Pennathur et al. (2012) and Turkmen and Yigit (2012) have used ROE and ROA as performance metrics and suggested both are best fitting measures of financial performance.

1.1.6 Commercial Banks in Kenya

The Kenyan banking system composition sums up to a total of 40 banks from the existing 42 as I&M Holdings has concluded the purchase of Giro Commercial Bank and Diamond Trust Bank Kenya is currently in the process of acquiring Habib Bank Limited Kenya. Banks that are under receivership include Chase Bank and Imperial Bank. One mortgage finance firm, twelve licensed microfinance banks, eight offices representing foreign banks, eighty-six bureaus of foreign exchange, fourteen providers of money remittance services and three credit reference bureaus. In Kenya, Financial inclusion is continuously surging considering that the population living within 3 kilometers of an access point of financial services has risen to an average of 77.0% in 2016 from 59.0%-year average in 2013. This has been accelerated by

digital banking, Mobile Financial Services (MFS) emerging as the method preferred in accessing financial services in 2016 (CBK, 2016).

Referring to the Central Bank of Kenya Supervision Report, (2014) the banking actors are faced with challenges which include new regulations imposed which commercial banks, as well as mortgage firms, are required by December 2012 to retain a core capital of KES 1 billion or USD 11.9 million and above. This requirement during implementation posed a challenge to some of the existing low and mid-tier banks, as to comply they were forced to merge. According to Beck, Demirguc-Kunt and Levine, (2009), the global financial crisis had a significant effect in the Kenyan banking industry about the mobilization of deposits, reduction of volumes of trade and ultimately assets performance. Comparing Kenya with other states from East Africa, for many years Kenya's financial sector with specificity to commercial banking has been praised for its size as well as diversification. Financial development standard indicator of Private credit to GDP was found to be 23.7% in the year 2008, compared to 12.3% which was the median of Africa Sub-Saharan. Using that indicator, Kenya is leading Tanzania and Uganda at 12.3% and 7.2% respectively.

As evidenced from the Central Bank of Kenya Supervision Report, (2013), the industry has risen in size remarkably over the years in terms of Assets, revenue, deposit base, products range and networks mainly underpinned by both locally and regionally, an industry-wide branch network expansion. For the ten years up to the year 2012, the sector advanced upwards in assets from 456.7 billion shillings to 2.35 trillion shillings while its deposits expanded from 360.6 billion shillings to 1.76 trillion shillings over a similar period. The number of accounts held at banks rose from 1.9 million opened accounts in 2002 to 17.6 million accounts in 2012 (Ndung'u, 2013). This growth continued through 2013 to 2014 with cumulative un-audited pre-tax profits that arose by 18.4% in quarter one report of 2014 compared to a similar period in the year 2013. There is an expectation for the banking sector to sustain its momentum for growth on the backdrop of macro-economic environment that is stable as well as domestic, regional and international expansion by banks (CBK, 2014).

1.2 Statement of the Problem

Notwithstanding major reforms in the financial sector in Africa as early as the 1980s and 1990s, performance by commercial banks has remained anaemic, inefficient and ineffective in the overall role of financial intermediation due to rising levels of credit risk emanating from higher incidences of non-performing loans, inadequacy of capitalization, poor asset quality, inefficiencies and high cost of operation, and higher levels of risk as a result of low level of liquidity. According to CBK (2019) some banks in Kenya are still declaring losses. Commercial banks in Kenya registered anaemic growth in EPS in 2018 FY' at 8.6%, 2016 FY' at 4.4%, and FY'2015 at 2.8%, compared to 13.9% 5-year average. Average Return on Assets (ROA) for entire industry of 3.7 in 2010 to 2.96 in 2014 and 2.70 in 2018 was experienced. In 2008, return on equity was 26.5 percent which declined to 24.4 in 2017 and 20.8 in 2018 (CBK, 2019). This poor performance resulted from sector's structural challenges specifically on non-performing loans provisioning, shrinking growth in private sector credit, deposit and liquidity challenges. Banks in Kenya recorded growth of 8.1% in gross loans and advances to Kshs 1.9 trillion in FY'2016 from Kshs 1.8 trillion in FY' 2015, a slow rate from 14.6%, which was a 5-year average growth. Deposits grew at the rate of 6.7% to Kshs 2.1 trillion in FY' 2016 from Kshs 2.0 trillion in FY' 2015, as well less compared to 5-year average of 14.6%. 95% of banking institutions are troubled with risk. Banks in Kenya have diversified not only their income streams but also their assets and liabilities (Berger et al., 2010). Variations in performance relating to entire banking industry have been found to have far-reaching implications on the economy.

Banks have resulted in strengthening their portfolio mix by diversifying their portfolios to eliminate risks, increase their revenue streams, remain profitable and survive in the competitive environment. Diversification being the main solutions banks challenges aims at minimizing the variability of operations and reducing the concentration of deposits, loans and revenue that is generated from these activities (Berger et al., 2010). Deposits diversification protects banks against liquidity risk exposures (Rose & Hudgins, 2010). Credit diversification main objective is to lower the probabilities of default risk (Jahn et al., 2013). Income diversification aims at

increasing the sources of interest as well as non- interest income, reducing interest rate risk and total unsystematic risk (DeYoung & Rice, 2004). Capping of rates of interest has been judged to be a threat to the performance of the banking institutions in Kenya and thus a need for commercial banking institutions to strengthen by diversification of their income streams (World Bank, 2017). Investment portfolio eliminates components of non- systematic risk from independent investment through resources reallocation over wider asset categories. Firms having diversified investment portfolio enjoys high leverage and debt capacity (Reilly & Brown, 2012).

Several local and international studies have addressed portfolio diversification by Banks in a piecemeal manner failing to acknowledge the efficacy of banks' portfolio diversification on financial performance in a comprehensive view. For instance, Mulwa, (2018); Meressa (2017); Yudistira and Anggono, (2013), researched on Credit diversification. Lomuto (2008) studied on deposit diversification. Teimet, Ochieng and Anywa (2011); Kiweu (2012) studied on income diversification. Rop et al., (2016) studied on investment diversification. The studies are limited and have conflicting conclusions leaving a margin for investigation. For instance, Mulwa, Tarus and Kosgei (2015); Mulwa and Kosgei (2016); Mwau et al. (2015); argued that portfolio diversification contributes to improving financial performance in developing institutional environments such as Kenya. Gönenç and Kılıçhan (2004) observed an opposite relationship linking diversification and return on asset. Patrick (2012) acknowledges that there exists no consensus about the positive, negative or neutral influence of portfolio diversification on financial performance. Doaei, Anuar, and Hamid, (2012) pointed out that a non-significant diversification-performance association is probable. Palich et al., (2010) concluded the presence of a curvilinear linkage between the value of the firms and diversification. Berger et al. (2010); Nakane and Weitraub (2015) highlighted that there is a need for more empirical investigation of Sub Saharan Africa dynamic financial systems.

The study sought to answer whether banks' activities should be concentrated or diversified (Acharya, Hasan & Saunders, 2006), whether diversification played a role to help improve banks' performance and which type of portfolio diversification by banks bears the most significant impact on the financial performance (Turkmen et

al., 2012). The study investigated the individual and joint effect of the independent variables, employ system Generalized Method of Moments (GMM) context leading to the methodology being more superior from preceding studies as well as introduced bank size as the moderator variable which had formerly not been addressed in prior studies. Moreover, most of the studies though they have collected panel data, they have not considered diagnostic tests prior to data analysis. Indeed, both stationarity and Granger causality has not been tested in most of prior studies.

1.3 Research Objective

1.3.1 General Objective

The main objective of the study was to ascertain the effects of Banks' portfolio diversification on the financial performance of Commercial Banks in Kenya.

1.3.2 Specific Objective

This study was guided by the following specific objectives are:

i. To assess the effect of sectoral credit on the financial performance of Commercial Banks in Kenya.

ii. To ascertain the effect of income streams on the financial performance of commercial banks.

iii. To scrutinize the effect of deposits portfolio on the financial performance of commercial banks in Kenya

iv. To determine the effect of investments portfolio on the financial performance of commercial banks in Kenya.

v. To assess the moderating effect of bank size in the relationship between portfolio diversification and commercial bank financial performance in Kenya.

1.4 Research Hypotheses

This study sought to address the following pertinent research hypotheses;

$H_0$1: Sectoral credit has no significant effect on the financial performance of commercial banks in Kenya.

$H_0$2: Income streams have no significant effect on the financial performance of commercial banks in Kenya.

$H_0$3: Deposits portfolio has no significant effect on the financial performance of commercial banks in Kenya.

$H_0$4: Investment portfolio has no significant effect on the financial performance of commercial banks in Kenya.

$H_0$5: Bank size has no significant moderating effect on the relationship between the Banks' portfolio diversification and financial performance of commercial banks in Kenya.

1.5 Significance of the Study

This study would provide commercial bank shareholders with a better understanding of portfolio diversification as a driver of efficiency, providing opportunity to hold company executives accountable for improving the highlighted aspects of efficiency over time. If intermediation quality is improved, shareholders would profit the most. Furthermore, it has the potential to improve shareholder loyalty and confidence in the banking sector, resulting in increased stock purchases. Shareholders would be more confident in their decision to keep their portfolio with the prospect of increased returns over time and make well-informed decisions about their investments.

The study does suggest additional ways for banks to boost their financial results by diversifying their portfolios.The research study, on the other hand, would serve as a springboard for new discoveries and future research in this discipline of banks' diversification.These important results will serve as a reminder to bank executives

and board members of the considerations that must be made when determining the extent and degree of diversification. Banks are experiencing difficult times in this period of changes and economic challenges. There is a call to develop policies to aid in the recovery of the banking sector. In banks, it is critical to solidify the balance of various portfolios. It will also help in the mitigation of banking industry distresses, especially those affecting commercial banks.

The study's results and recommendations would benefit both senior and junior scholars, as well as the body of knowledge, since the emphasis is on the impact of portfolio diversification on the financial performance of Kenyan banks. This thesis would have a significant impact on the larger field of academic research because it contributes to the already existing and published empirical literature that can be used for academic investigations as well as conducting research in the field of bank portfolio diversification and financial performance. The thesis will be used to make references and future studies will be suggested as research areas that can be further explored for those upcoming researchers.

In the context of Africa, commercial banks should learn from this study conducted in Kenya when deciding on portfolio diversifications that can be repeated in their banking operations to help boost financial efficiency. The results of the study would enlighten them on the advantages of portfolio diversification in terms of financial efficiency, allowing them to save money on the costs of performing or replicating the analysis in their institutions or nations.

The findings of this Kenyan study are extremely valuable, especially to policymakers and government institutions responsible for regulating the banking sector in Kenya. Throughout the study, they will be provided with valuable insights into the impact of diversification on bank profitability, enabling them to adopt and enforce policies and procedures that serve as a regulatory structure for diversification in commercial banks' best interests. The study has the potential to be significant because it will assist regulatory agencies and organizations in their monitoring of banks, as well as other necessary stakeholders, in the optimization of management objectives that are formal in optimizing returns.

1.6 Scope of the Study

The research used a combination of descriptive and correlational research methods. The study's sample size was calculated using the data from Kenya's forty-three commercial banks. The study's sample size was calculated using the data from Kenya's forty-three commercial banks. With the assistance of professional research assistants, secondary data was collected using document check index. The impact of portfolio diversification on bank financial results was the focus of this assessment's conceptual scope of concern. The impact of sectoral credit, income sources, deposit forms, investment diversification, and the moderating effect of bank size were all highlighted in the study.

Microfinance banks, the Nairobi stock exchange, commercial and investment banking institutions, insurance firms, and pension funds are all part of Kenya's financial industry.In terms of background, this investigation was limited to commercial banks operating in Kenya as of the end of 2018, with data sourced from the Kenya National Bureau of Statistics, the Central Bank of Kenya Statistical reports, and Capital market Authority website. The study's targetted population included all commercial banking institutions in Kenya that were registered and operational by the end of 2018.

The study settled on a duration of fifteen firm years. The years 2003 to 2018 were chosen because they reflected current years and coincided with the global financial crisis of 2009, and information was readily accessible. The fifteen-year period chosen was deemed to be long enough to yield reliable results. Gurbuz, Yanlk, and Ayturk (2013) stressed the importance of similar long study periods to satisfy the need for data requirements for research adequacy. This investigation was based on a census.

Time-series and cross-sectional secondary data were used. TSCS are designs that have long been regarded as one of the most preferable for causation studies. When using unbalanced panel data regression analysis, TSCS data provides distinct strengths in addition to their ability to infer causal correlations. The current study assumed that all commercial banking institutions' annual audited financial statements

will be available. This analysis used an unbalanced panel of all commercial banks that were in service between 2003 and 2018. This was done to address flaws in previous research caused by sample size.

Despite the fact that a number of theories have been applied to intricate on the impact of banks portfolio diversification, this study focused on modern portfolio theory developed by Markowitz (1952, 1959), shift-ability theory which was proposed by Moulton (1915) and further advanced by authors such as Dodds (1982) and Herbert (2009), theory of financial intermediation and delegated monitoring proposed by Diamond (1984), theory of transaction cost economics which was firstly articulated explicitly by Coase (1937), and subsequently deeply advanced by Williamson (1985),and finally, the liability management theory proposed by Elliot, (1984). This research on bank portfolio diversification and financial results was rooted within the five theoretical frameworks, as well as the moderation impact of bank size calculated by total earning assets.

1.7 Limitations of the Study

This study relied heavily on secondary data, which was subjected to the limitations imposed on banks' financial statements as published for the general public and under the custody of the CBK's supervision division, as well as the Kenya National Bureau of Statistics. Even though these reports were considered credible and required to meet international financial reporting standard standards in terms of quality, there are instances of undetected errors that may result in inherited weaknesses if original entries are incorrect.However, these flaws have no bearing on the validity of the study's results.

Due to time and resource constraints, the analysis only assessed the portfolio diversification in the banking industry and did not include other financial stakeholders such as the stock market, companies in the insurance industry, microfinance firms, licensed Savings and Credit Cooperatives and pension funds institutions. Nonetheless, the omission provides a study area for further research recommendation.

Sectoral credit, income sources, deposit and investment diversification were the only components of bank portfolio diversification studied. Other types of diversification, such as geographical diversification, asset diversification, or the use of alternative metrics, can confirm or refute the current findings.This study was restricted by the fact that it did not look at other factors that could affect bank performance like cost to income, consumer price index, GDP. This was factored in by employing mitigation measures through thorough and intensive empirical review and analysis by comparison of the varying measurement embraced in global, regional and sub-Saharan African, and local perspective. Future researchers therefore can include these internal and external variables.

The study limited theoretical literature to five theories namely; financial intermediation and delegated monitoring theory proposed by Diamond (1984), modern portfolio theory which was originated by Markowitz (1952, 1959), shift-ability theory which was proposed by Moulton (1915) and advanced further by Dodds (1982) and Herbert (2009), the theory of transaction cost economics which was first articulated by Coase (1937), and subsequently advanced by Williamson (1985), and finally, the liability management theory that was initially proposed by Elliot, (1984). This was subsequently factored through intensive theoretical review and analysis by indepth comparisons of the varying theories and their development over the years.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section outlines the literature reviewed relating to banks' portfolio diversification and financial performance of commercial banks in Kenya. It discusses key diversification theories underlying banks' portfolio diversification, empirical review of literature underlying sectoral credit, income streams, deposits, and investment diversifications and expounds on the summary and critique of existing literature and concludes by the acknowledgement of the research gaps.

2.2 Theoretical Review

This section reviews theories which are relevant to banks' portfolio diversification and financial performance of commercial banks. According to Cooper and Schindler (2011), theory is a set of systematically inter-related concepts, definitions and propositions advanced to expound on or predict facts.

2.2.1 Financial Intermediation and Delegated Monitoring Theory

This study will be anchored by the theory of financial intermediation and delegated monitoring proposed by Diamond (1984). The theory of financial intermediation was founded on minimization of costs associated with producing information useful for resolution of problems of incentive whereby banking institutions share advantages of gross cost in acquisition of the information. This theory foresaw two avenues of diversification; diversification by enlarging the agents' numbers in the intermediary or sharing of risks and diversification as a result of enlarging the number of undertakings carried out by single intermediary or adding of risk. The financial intermediary theory as was envisioned by the author is a pure asset transformer whereby the only diversification possible is that of adding independent identically distributed projects by one agent or what was referred to as diversification within the intermediary. This minimizes the per-entrepreneur prevailing costs of intermediation since monitoring costs for large number of projects by a single intermediary would

be far much less than the sum of delegation cost for proper monitoring of similar costs by several intermediaries through risk sharing.

According to Mulwa (2018) this theory approaches concept of diversification from a cost and risk minimization perspective and argues that diversification within the intermediary becomes key to accruing net cost advantages as a result of solid similarities subsisting between intermediaries with the depositors. From the foregoing, intermediation potentially becomes viable when the costs associated with delegation (equal to the risk premium) is lowered by centralizing monitoring to one intermediary undertaking multiple projects. The approach of financial intermediation and delegated monitoring expounds on bank diversification in the context of risk and that of neutrality to risk. In the risk model of neutrality, diversification raises the chances that the intermediary possesses sufficient proceeds from loan to compensate a fixed debt claim by depositors and hence lowering the probability of bankruptcy. In the model of risk aversion, diversification raises the exposures tolerance by financial institutions toward every loan, enabling the imperative risk uptake for incentive purposes to cost less.

This model of delegated monitoring insinuates financial intermediary that has a well-diversified capital structure comprising mainly of debt, arising from customers' deposits, but having very minimal default probability notwithstanding the high leverage. The theory highlights also some conditionality for a financial intermediary to be classified as viable. Firstly, depositors ought to earn an expected return for every unit of deposit; secondly, financial firms ought to gain an expected return net of costs associated with monitoring and deadweight penalties expensed; and lastly, every entrepreneur ought to reserve an expected return above what can be incurred if he contracted directly with depositors. This third condition is very key for bank diversification since if diversification do not minimize transaction costs associated with monitoring to a degree lesser to that the depositors can get by directly transacting with the borrowers, the banking institutions would find it difficult to pay interest to savers/depositors and in return reserve an expected return net of costs associated with monitoring and henceforth the depositors could be in a better position if they directly contracted with borrowers.

As it was cited by Diamond (1984), diversification undertaken by financial institution has been cited as a precursor to the existence of intermediaries. The author indicated that after undertaking diversification, financial institutions assume the expensive work of credit contracts monitoring. Intermediaries thereby have to enter into a contract that accrues return to financial institution. For risk/exposures mitigation, diversifying its activities becomes the solution to these intermediaries which is not possible for individuals to undertake. With the diversified activities, the losses arising from moral hazard or adverse selection are lowered and hence financial intermediaries can bear them.

In the process of a financial intermediary expanding in terms of size, it endeavors to extend facilities to unit with surplus only if activities of appropriate monitoring are being undertaken by the intermediary (Casu et al., 2006). Demirgüç-Kunt and Klapper (2012), in their observation concerning financial intermediation, articulated that eliminating imperfections in the financial market brings about expanded opportunities for individual and henceforth, creating a positive and significant incentive effect.

As brought forward by Ongore and Kusa (2013), for sustainable and successful financial intermediation, banking institutions need to trade profitably. The financial system in Kenya contributes significantly to the GDP of the nation. The role played by banking institutions remains fundamental in general financing of the activities in the economy and in particular, the various market segments. A banking system that is both profitable and sound is in a better way able to easily withstand negative shocks pull and eminently contribute to its stability (Athanasoglou et al., 2008). As a consequence, banking institutions have increasingly reviewed their models of conducting business into new non-traditional financial activities to enable them to maintain their responsibility of financial intermediation. Kanyugi et al. (2019) further intimated that historically financial intermediaries have heavily been subjected to regulations by the apex bank and the critical intention of these regulations is to bring about the safety and protection of the banking institutions and ultimately protect depositors.

The theory was applied to anchor this study and support sectoral credit diversification as it explains how intermediary possesses sufficient proceeds from loan to compensate a fixed debt claim by depositors as well as explaining the benefits that accrue from bank diversification by bringing out the concept of cost benefits which accrue to a diversified intermediary and the efficiency in monitoring attained by incorporating risks. By broadening the banking institutions' risk tolerance, diversification minimizes the costs associated with delegated monitoring beyond what borrowers could attain if left on their own and deposit money banks hence earn a return more than what is earned by fund suppliers/depositors while in the same note lowering its probability of risks of bankruptcy by putting measures of enhanced delegated monitoring efficiency.

As was stated by Kiai (2016), this theory has got a number of shortcomings. Firstly, the theory held an assumption that for an investment to be there, an intermediary must exist. However, as was inclined by Arrow and Debreu model, when allocating resources, households and institutions interact through the markets for purposes of investment. Financial intermediaries henceforth, play no role with this. Subsequently, in the instances where the markets are perfect, resource allocation becomes Pareto efficient and there is no scope at all for a financial intermediary in improvement of welfare. In such a scenario, this theory does not hold. For the process of financial intermediation to happen, big transactions pertaining financial instruments are needed for it to take place except for rare cases that are exceptional. This is not the case though in the emerging markets, yet financial intermediaries play a very significant role.

2.2.2 Modern Portfolio Theory

Modern portfolio theory originated from work done by Markowitz (1952, 1959). MPT is a theory of investment whereby it aims at maximizing yields expected from the portfolio for a specified risk arising from such a portfolio, or equally lowering risk level for a particular degree of anticipated expected return, by varying the levels of different classes of assets. MPT theory suggests that investors will realize better portfolio performance by diversifying the investments they own into financial

securities classes and other segments that are not expected to react similarly if there is an emergence of new information. Solnik (1974) extended MPT theory into a global context and pointed out that diversifying globally, contrary to a strict domestic portfolio, will result in the optimization of the risk-return tradeoff. Investors should, therefore, diversify their money investments into assets that do exhibit low return correlation.

Modern Portfolio Theory is a preposition of investment whereby an investor attempts to balance risk with the expected yield for maximum gains from a whole portfolio. Portfolio diversification is a successful method of increasing gains while bringing down risk in a combination of investments. Strategies of portfolio selection have received a substantive review in the literature pertaining finance. MPT introduces an analysis of mean-variance that simplifies problems of selecting a portfolio. The study by Markowitz (1959) discussed how to pursue quantification of risk and also exhibited quantitatively in what way and manner diversification in a portfolio can work to reduce investors' risk exposure. Exposure in a portfolio is quantitatively described as the standard deviation of expected yield from a period to the next, and the portfolio acquisition challenge is minimized to composing an 'efficient' portfolio, whereby it heavily brings down the exposure for a particular level of gain in a period.

As maintained by the portfolio theory of Markowitz (1959), the higher the anticipated return, the appealing the investment. The minimal the return's standard deviation, the more attractive the investment portfolio. MPT is a theory whereby there is an indication that we can lessen the standard deviation of yields or exposure by bringing together securities that are anti-covariant. Every class of asset ideally tends to have levels of return that are different as well as riskiness and portrays a unique behaviour so that when one of the asset values is increasing, the other is decreasing or at least not rising as much. Kazan and Uludag (2014) extended this theory by stating that even though classical risk measurement tools can assist to quantify exposures, they are not able to provide a remedy on how these exposures can be lowered. Portfolio model of Markowitz, therefore, prescribes how risks can be minimized.

The financial sector has practically applied MPT to a greater extent (Sharpe, 1964). MPT mathematically is a construct of diversification idea in investing, whereby the main purpose is to ensure that investors can succeed in negating investment assets that have jointly lowest risks than a sole asset. Given that this is achievable, it can be perceived intuitively since assets that are not similar and often exhibit value change in the opposite manner. According to Mandelbrot (2004), an investor needs to do an approximation of anticipated returns and variance or risk that may be attributable to every portfolio of asset and then choose the one which has is more viable based on the parameters.

MPT was used to anchor investment diversification because of its applicability on scrutinizing diversification and financial performance. MPT theory acknowledges diversification as very important for risk mitigation and increasing expected returns. The theory advocates for mathematically evaluating portfolio diversification to maximize returns. According to MPT theory, spreading investments throughout unrelated stocks can lead to maximization of the firm's potential revenues irrespective of whether there is economic growth or not. Scholars have put across that the asset classes allocation across various markets with the independence of liquidity minimize the effect of diversifiable risk as a result of contingencies from exterior factors one and all of the different markets (Lewellen, 2001). Diversification, therefore, assists in the reduction of firms' vulnerability to exposures. Leontiades (2009) suggested that more diversified firms reap higher gearing and debt volume hence improve their financial performance. In the framework of MPT, classes of assets and portfolios mix are deemed efficient if no other possible offering that give higher expected yields for similar or lesser risk and investors will henceforth weigh out all potential classifications (Pandey, 2015).

This theory supported investment diversification and as suggested by Lubatkin and Chatterjee (1994); Njeru, Dominic and Fredrick (2015), the theory has however found a wide application beyond the domain relating to the management of securities for which it was the original intention. It's used in the evaluation of corporate diversification where it is argued that the expected risk measured by variance in returns of firms is reduced by a combination of independent, non-interactive lines of

business by unrelated diversification strategy. When two unrelated businesses are combined, portfolio theory predicts a sharp drop in the unsystematic risk measured by variance in the returns of these diversified firms.

Various criticisms of the modern portfolio preposition have sprung up especially as a result of its superficial assumptions being a predominating biasness. Application of the theoretical prescriptions of the MPT preposition into a feasible portfolio construction algorithm is faced by astounding technical hinderances sprouting from the instability of the indegeneous optimization limitation with respect to information availablility. The major criticism was as a result of failure of the theory to model the market. There is also a failure of the theory toput into consideration personalized attributes, environmental dimensions, strategic facets, or social elements of investment decisions. MPT preposition limited itself by not taking into cognizance of its own efficacy on prices relating to assets (Omisore, Yusuf & Nwufo, 2012).

2.2.3 Shiftability Theory

The proponent of this theory was Moulton (1915) and further advanced by authors such as Dodds (1982) and Herbert (2009). It indicates that the liquidity of banks will be maintained if it's holding shiftable assets or that can be sold for cash to other lending firms or investors. Shiftability of assets points to the capability of a financial resource to be moved amongst persons or banking establishments at negotiated prices. Liquidity of any bank, according to shiftability theory, is dependent on the capability to move assets to another person at the negotiated price. It is a theory based on an assumption that liquidity of banks will be sustained by retaining assets that have resale value or shifted to other lenders, investors or institutions for cash at short notice.

Banking attentiveness on deposit tends to be handled well if these assets can be shifted to enable it readily attain liquidity as the need arises. In Kenya, the shiftability theory is widely acceptable by banks which do a considerable investment of their resources in government securities that includes treasury bills, treasury certificate and marketable securities. The shiftability theory does not recommend

commercial loans to be termed as inappropriate bank assets but rather recommends commercial loans are not the only appropriate asset (Herbert, 2009).

The theory intends to attract bankers' activities from credit to investment to enhance bank liquidity. It is only appropriate for banks to hold a portfolio that comprises open market short-term investments. If investments in the short-term are held, it could aid banks in meeting the demands from customers for withdrawals of available cash or assets of near cash easily bought for cash. If loans are not repayable, loans collateral security can only be sold in the open market depending on their marketability, or discountable with the central bank. Converting an asset into money by way of sale or shiftability, the transaction can only be voluntary between the two money holders. According to Mutton, (1981), shifting an asset is seen as a simplistic act to the extent to which it can be transferred to an individual or institution. Bank deposits thus satisfy the requirement of shiftability as it can be extended as loans or used to purchase other investments.

Shiftability theory holds the assumption that there is a need for assets not to be tied not only to self-liquidating bills, but also to the ones held in other forms of assets that are shiftable in the open-market like government securities (Moti, Masinde, Mugenda, & Sindani, 2012). The shiftability theory has taken a more general view in regard to the banking business by widening classes of assets owned by commercial banks legitimately. The motivation from shiftability theory emanates from the fact that liquidity of a bank is dependent on its capability for shifting its possessions to another person at a predictable price. According to Hosna, Manzura and Juanjuan (2009), the shiftability theory had a profound effect on banking practices whereby can hardly be denied. What it did was to redirect the attention of bankers and authorities of banking to deviate from loans to investments to boost liquidity.

The theory is appropriate for the study since it presumes that it can only be if credit meets the criterion that ensures satisfaction of rules like the commercial papers self-liquidating feature. It further contends that banks ought to hold government securities that are extremely marketable in order to meets needs of liquidity. Shiftability approach permits banks to run effectively while holding low reserves level or by

venturing into long term assets investments. Banks in normal circumstances endeavor to prevent crisis due to liquidity in many instances by offloading their securities by selling them at best prices the shiftability theory presumes. Commercial banks will hold marketable assets and convert these securities at will at fair prices as opposed to discounted prices. Shiftability theory ensures that bank remains liquid by facilitating in assets shiftability (Koranteng, 2015). The defect of the theory was that despite one bank obtaining required liquidity by changing its portfolio of assets, it doesn't hold for banking institutions combined.

2.2.4 Theory of Transaction Cost Economics

To begin with, this theoretical framework was explicitly articulated by Coase (1937), and subsequently deeply developed by Williamson (1985). TCE holds theoritical argument that there supersists costs of transacting associated with facts brought forth by Coase to be "price mechanism," and what Williamson refered to as "market governance." The significance of the claims stems from the existence of costs related to transaction negotiation and contracting (transaction costs) arising from the open market, which are reduced by distributing them through other transactions that are independent in nature and performed by a single corporate entity. There is presence of contractual economies of scale, for instance, where incurred costs are tracked on a unit contract are prorated over to multiple transactions. Its noteworthy that Coase (1937) inculcated possessor or factor of production not necessarily thereof entitled to make rotating contracts within the firms with whom factors being co-operated on, as should be obligatory, if the reprieves emanates directly from price mechanisms. These chains of contractual transactions can be referred to as substituted ones.

About specifically diversified firms, Williamson (1975) postulated that existence of efficiencies concerning transaction cost that an intramural 'miniature' capital market assumes to take control which external capital market doesn't which was also supported by Ralston (2014). Silverman (1999) went ahead to provide a similar explanation about the reason why firms diversify. The author expounded on properties by a firm for rent generation and concluded that whenever these highly important resources exchange hands through the market process, the transaction will

accrue higher contractual hazards such as license secrecy, loyalties, and problems emanating from learning curve edge. Taking into consideration that these features are important components that explain the returns that are appropriated to an institution, the author highlights that diversification by a firm is a wiser decision to mitigate the severity extent of exposures that surround a contractual alternative from diversification. Ketokivi and Mahoney (2016) underlined that firms will benefit with higher returns after leveraging on their resources and capabilities through diversification.

The theory supports income diversification by recommending at what time the firm should plan newer activities to be around firm's boundaries and how institutions can be in a position to accrue benefit out of sharing resources among the businesses that are within firm boundaries. It is a theoretical framework that put across the importance of diversification by allowing firms to get greater market power by locking out competition through integrating vertically in terms of portfolios. Diversified companies are in a position to cross-subsidize their lines of ventures, and lower prices, which assist in elevating entry obstacles and/or being able to squeeze competitors completely out of the existing market (Miller, 2009). From the perspective of transaction cost, firms are to diversify whenever in their businesses they expand in the market power and engage in organizing their extra activities more efficiently than the current market or their competing firms (Aguilera & Jackson, 2010).

Many researchers have shown varying degrees of dissatisfaction with TCE's approach. For example, Moran and Goshal (1996) labelled assumptions made by TCE to be soo weighty and insinuated misuse of non-pragmatic facts which subsequently limit the applicability of this theory. The opportunity cost principle was proposed in order to portray a pessimistic view of human motivations.The scholar went on to say that the technique used to prevent expediency by closely monitoring and exercising power of control resulted in poor execution by workers and henceforth creating an opposite effect from what was anticipated. Hill (1990); Ketokivi and Mahoney (2016) uses reasoning derived from game-theoretic to assert how tasks played by expediency are exaggerated in TCE. Another source of criticism

in TCE is the categorization of firms as homogeneous.As a result, TCE explains why the companies exist, but not why they have such disparate characteristics.TCE can no longer be able to justify why institutions in the same sector that differ only in their capital funding perform better than one another.

2.2.6 The Liability Management Theory

The theory was proposed by Elliot (1984) and developed further in subsequent years. The three theories of commercial banking discussed in the previous section all have one view in common: They concern exclusively on the side of assets of a balance sheet. This preoccupation with assets is typical of the views traditional to banks as being a continued accepter of liabilities. Banks historically have been thought of as having no control over the liability component size or mix and it simply does wait patiently for its customers to offer it money and then extend to them various deposit types they want such as demand deposit, savings deposit, and fixed deposits. Several developments that are significant in practices of commercial banking during the 1960s were radical in changing this commercial banking traditional view. It is out of these innovative practices that a new theory emerged, the theory of liability management of commercial banking (Herbert, 2009).

Liability management can be seen as a misnomer. It does not necessarily allude that the bank does the management of its liabilities only and becomes passive when it comes to its assets. The theory proceeds to recognize that the bank's structure of assets has a part to play in the bank more so provision of liquidity. Theory negates beyond the approach to liquidity which is one dimensional and protests that the bank may utilize its liabilities for liquidity management purposes. The question that begs is how a bank can manage its liabilities so that they become the source of liquidity. The answer to this question is that when the bank requires money, it just goes out and buys it. But this answer is too short as it doesn't convey in an adequate way the fundamental nature of the commercial banking practices changes as a result of liability management concept (Dudley, 2001).

Legally, a bank is bound to pay its customers of demand deposits whenever they want them, which alone is enough to dictate the concern by banks for liquidity. But there is a second reason why a bank needs liquidity, and this reason while not a legal necessity, is almost equally as compelling: The bank needs to be in a position to satisfy the reasonable loan demands of its customers. Among other reasons, bank loans are very profitable, secondly, a bank that won't or can't extend loans facilities to its depositors when they need funding likely can't keep those depositors for long (Dudley, 2001; Herbert, 2009). As with the theories discussed previously, commercial banking theory and practice interacted with each another in the development of the liability management concept of commercial banking. The beginning of Liability management was in the late 1950s with the steady rise of the federal funds market, but much later in the 1900s for most developing economies in the world (Herbert, 2009).

The practice of liability management may eventually have profound consequences for the structure of commercial banking. It is a concept that is well suited to large commercial banks but poorly suited to small commercial banks. A small bank simply does not have the necessary access to the money market needed to engage in liability management as a routine matter although it can to some extent do so indirectly through its international correspondent bank. And note that, within limits, the practice of liability management permits a bank to determine its size. Liability management may thus ultimately lead to increasing both the qualitative and quantitative variances between low tier and top tier commercial banks (Herbert, 2009). In recent time this theory of commercial banking has adopted the systems and contingency view in the management of bank assets and liabilities. Also utilized in this regards are popular quantitative and operations research techniques aimed at aiding commercial bank managers to make more effective and efficient decisions with regards to the management of investment activities, assets, bank operations, liabilities and bank credits and loans disbursement through the adoption of diversification strategies (Dudley, 2001). Ajibola, John and Lezaasi (2013), suggested that banks should transform their liabilities into earning assets as soon as possible.

One backdrop of widening the size and scope of activities undertaken by banks is the introduction of complexity cost sometimes that may reduce significantly the benefits achievable (Rajan et al., 2000). Banks that are diversified can employ this edge to be run with higher leverage, the reason being many fee-based avenues can be undertaken to hold small or no required capital, and to do high-risk lending. Institutions that are diversified can be distinguished by earnings from investment undertakings of banking that are volatile, low costs of switching for clients from current banking services that their basis is transaction-based bank-client relationships and rising operational leverage given the heavy technological fixed investments and required human resources, raising earnings volatility and hampering risk adjustable performance measures (Rajan et al., 2000). As it was posited by Koranteng (2015) the theory contributes to bank by ensuring that by borrowing cash or liquid assets from capital and money markets, the institutions can in an efficient manner solve problems relating to liquidity and therefore the theory is appropriate for the study as it supports bank size variable. The theory was however criticized by scholars as depicted by Koranteng (2015) that banks ought to put into consideration both sides of balance sheet for enhancement of liquidity as it widens in its size and scope of activities.

2.3 Conceptual Framework

A concept can be termed as an abstract or universal idea, deduced or that are extracted from the specific instance (Kombo & Tromp, 2009; Reichel & Ramey, 1987). Concepts, as opposed to theories, need not be articulated to be understood (Smyth, 2004). A conceptual framework can be termed as a set of broad ideas and principles accrued from an enquiry of interrelated fields and get used to lay a structure for subsequent presentation (Kombo & Tromp, 2009). A conceptual framework thus is a tool used in undertaking research whose purpose is to aid a researcher to come up with awareness and deeper understanding of the field being scrutinized and to effectively transmit it. If well and clearly articulated, a conceptual framework does have major benefits as a tool to aid a researcher place meaning on any finding. It builds part of the agenda for the situations being assessed, tested, reviewed and applied from any investigation conducted and elaborates the possible correlations among variables (Smyth, 2004).

The conceptual framework for this study elaborated the effect of banks' portfolio diversification on the financial performance of commercial banks in Kenya as it was captured in Figure 2.1. This Figure 2.1 is a framework outlined to conceptualize bank diversifications which includes sectoral credit diversification, income streams diversification, deposit diversification and banks' investment diversification effect on the financial performance of all the commercial banks in Kenya measured using return on equity and return on asset.

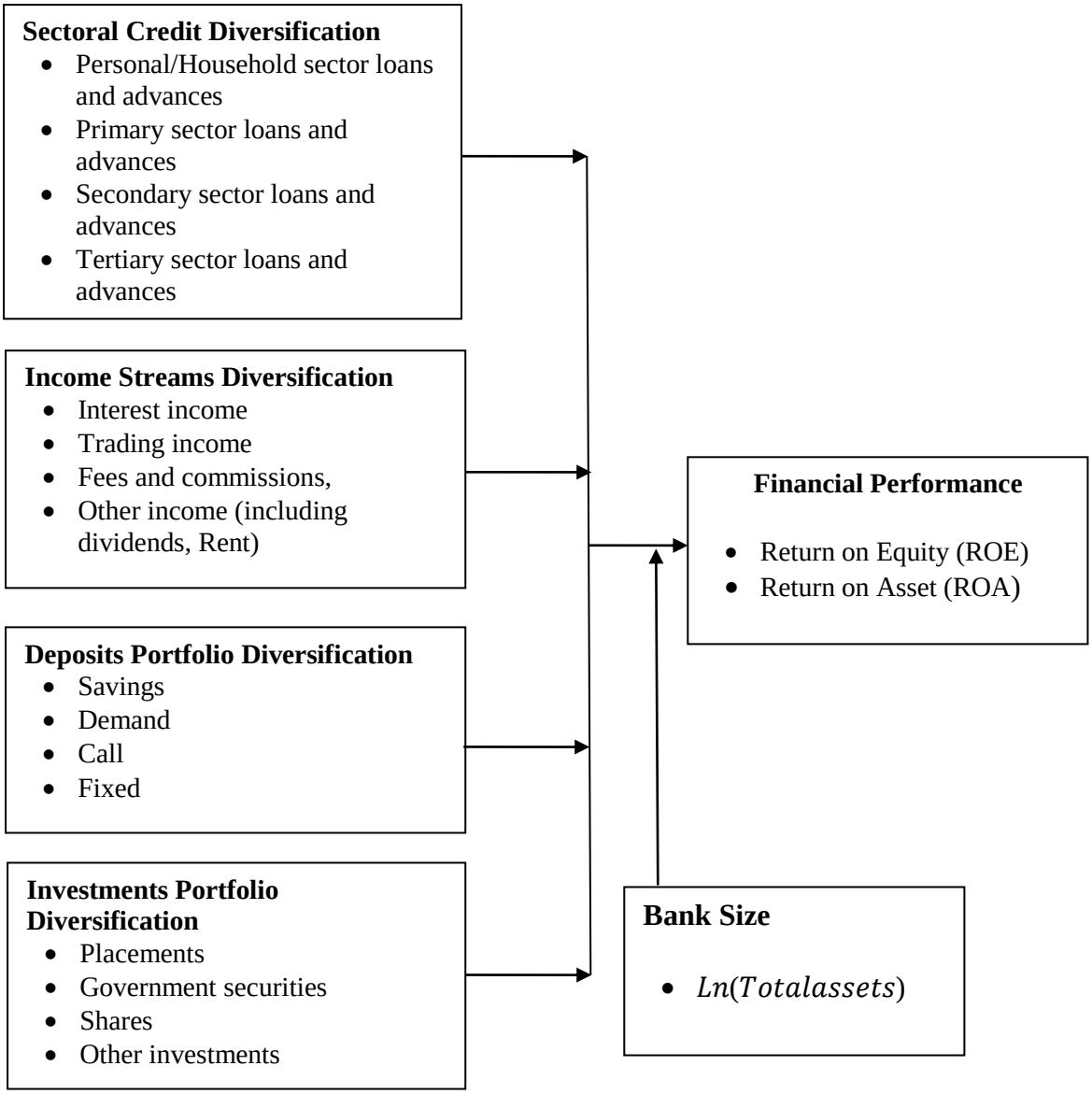

Figure 2.1: Conceptual Framework

According to CBK, (2016) sectors are categorized into eleven classes. To approximate the diversification of credit, credit portfolio was separated into four classes from the eleven sectors namely Personal/Household, Primary sector comprising of Agriculture, Mining and Quarrying, Secondary sector comprising of Manufacturing, Building, construction, Real Estate Energy and water, Tertiary sector

comprising of Trade and Financial Services, Tourism, Restaurant and Hotels, Transport and Communication. To approximate the diversification degree of income streams portfolio, major streams of income among them income from interest, trading income, fees and commissions, and other income (include less frequent income items such as dividend income, licence fees, gain from disposal, rental income) were considered (Acharya et al., 2006).

There are four classes of deposit by banks that comprise demand, savings, call and fixed deposits. This type of facility of deposit called demand is held in current accounts which are designed for customers in need for money meant for purposes of transactions. Savings is a type of deposit meant for customers who wish to save their money, however, at the same time who need to accrue interest income. Savings account holders save their money for motives that are precautionary while are at the same note motivated by their investment motives and desires. Holding money for precautionary motives refers to the inclination of customers to hold balances in cash to cater for any contingencies that are unforeseen in the future. Call and fixed facilities are offered by banks to satisfy motives for investment by clients who in most cases have funds that are idle and are at the same note are searching for returns on their money (CBK, 2016).

For the sole purpose of estimating the diversification scale of investment, bank investments were split into four investment categorizations namely placements, government securities, shares and other investments. Placements include Placements and balances with other banks and with CBK. Government securities include Treasury bonds and Treasury bills. Investment in shares includes investments in associates, joint ventures and investment in ordinary shares available for sale. Other investments include other assets bought by the bank with the sole purpose of generating income directly. As in cases of most literature from finance, natural logarithms of banks total assets are used to measure commercial banks' size. Size squared was be included in the regression model for purposes of taking into account for prospective nonlinearities arising from diseconomies of scale as banking firms become bigger (Athanasoglou et al., 2008).

2.4 Empirical Review

Following work of Zikmund et al., (2010), an empirical literature review is a planned search of published works that include periodicals and books that states and explains theory and analyses empirical findings related to the area which is under review. Empirical review is a survey that is very comprehensive comprising of previous inquiries relevant to the question of research. Kaifeng and Miller, (2008) stated that empirical Literature can in most cases be wider in scope, covering several years, perhaps centuries of the reviewed material. It ought to be well-tailored to scholarly work and address only the relevant literature to the question of research. With the aid of an approach that is systematic to previous scholarships, literature review permits an author to place the research into a context that is intellectual and historical. Kaifeng and Miller, (2008) further stated that the literature review assists the author determine and state why their research is important.

2.4.1 Sectoral Credit Diversification and Financial Performance

Sectoral credit diversification was recently put under scrutiny by Mulwa (2018). Firstly, the assessment sought to understand whether sectoral credit diversification improves bank profitability; and secondly, whether banks are in a position to effectively monitor and accord attention to many portfolios that arise due to diversification practice. To solve the questions, data in secondary form was gathered from reports pertaining to Bank Supervision as posted by central banks in countries that form East African Community (EAC) and scoped for eight firm years beginning from 2008 up to2 015 and analysis done by employing Generalized Linear Models (GLM). A positive incentive effect that was significant at critical level of diversification of sectoral credit on banking returns on assets was depicted. This outcome was an indicator that sectoral credit diversification enhances banking monitoring effectiveness. The scrutiny, therefore, recommends portfolio of loans that is diversified where intermediation services are distributed in terms of credit offerings across diverse sectors in the economy. However, the analysis did not take into consideration the period pre financial crisis of 2008.

Meressa (2017) study investigated sub-sectoral credit and advances distribution and their linkage with operating profit of private banks over the entire period between 2010 and 2016 using an unbalanced short run panel modeling. Following the post-positivist paradigm, the paper used a correlational design having the angle of variables ex-post control; dimension of longitudinal time; an in-depth quantitative approach, and method of enquiry known as deductive. The study targeted all 16 privately owned Ethiopian banks. Banks that had seven years of a financial yearly report from the year 2010 to the year 2016 were sampled purposely. The comparison was carried out among Pooled OLS, models of FE and RE to choose the model best fitted for the study. Accordingly, a model of random effects was appropriate. From the findings of a model of random effects GLS, it was deduced that sectoral allocation of credit to trade in domestic market and service, sector of manufacturing, and category of import and export had statistically positive and significant linkage with operating profit. Sectoral allocation to secondary sector building and construction and transportation had a positive relationship that was statistically insignificant with income from interest. Banks' allocation of credit to sector classified as agricultural revealed a negative linkage that was statistically insignificant with operating profit of banks. The study was limited to only seven years and sixteen banks. The current study takes into consideration post and pre financial crisis of 2008.

Yudistira and Anggono (2013) did research that aimed at analyzing lending by banks to various economic sectors in Indonesia for the period between the year 2003 and year 2011 and their link to banks' operating profit. Data on trade, building, manufacturing, transport, agricultural, export and import were gathered from statistics of banking institutions in Indonesia. Regressions were employed to assess the linkages between credit allocations to each of the sectors of the economy to operating profit of the banks. The author's findings can be useful to banks when making decisions on the distribution of credit. The analysis revealed that tertiary sector including Oil and Gas, Electricity and Water Sector, Building Sector, Transport, Warehousing, and Communication, Business Services, and Consumer Loans classifications had an effect that was significant and that had a strong relation with commercial bank's operating profit. The study failed to acknowledge

dynaminism that takes place in the banking sector thus inadequate in methodology. The study also applied operating profit as explained variable. In the current scrutiny, system Generalized Method of Moments (GMM) will be made use of to scrutinize dynamism of the models and how the performance of the immediately preceding period exerts influence on the present period financial performance. ROE and ROA were used as measures of financial performance

Turkmen and Yigit (2012) using descriptive design ascertained the impact of diversification of loan in sectors and regions on banking performance in the context of Turkey and tried to scrutinize the extent to which diversification affects banks' performance. The paper argued whether diversification pursued through credit allocation both in sectors and geographically benefitted banks. To assess link existing between diversification of credit and how fifty Turkish banks performed for period between the year 2007 and 2011, data from The Banks Istanbul Stock Exchange, Association of Turkey, Banking Regulation and Supervision Agency concerning eight sectors namely, Textile, Food, Financial institutions, Construction, Beverage and Tobacco, Metal and Crude mine, Fishing, Intermediate trade, Wholesale trade, Tourism and Agriculture was collected. In this study, ROA and ROE represented an indicator of performance and Herfindahl Index-HI measurement of banking diversification was adopted. The study employed credit number and credits amounts that banks lent to borrowers to utilize as overdrafts as control variables. From the findings of this analysis, it was depicted that variables classified as dependent that included ROA and ROE were significantly explained by diversification scale by banks. The tertiary sector, wholesale, trade and Construction are two sectors that drive the economy and that bank commercially and preeminently lend for most years. The study did not recognize the dynaminism in the banking sector and made use of modal period of four years.

Kazan and Uludag (2014) did a study on the selection of credit portfolio in accordance with sectors in risky environments, the practice of Markowitz. In this assessment, information analyzed was from Central Bank in the context of the Republic of Turkey. It was a research on the way the loan rate of repayment can be raised and ways risk of default in the banking sector can be lowered with the help of

Portfolio Theory of Markowitz. Wholesale and retail, construction, agriculture and textile among other categorizations were assessed based largely on data from the central bank. Groups of portfolio composition were identified, and risks measured by variances of the portfolio classes, underwent assessment in accordance with the portfolio theory by Markowitz which was successful than the other instruments used for portfolio identification. Even though classical risk measurement tools can assist to quantify exposures, they are not able to provide a remedy on how these exposures can be lowered. Portfolio model of Markowitz, which was considered in the study, prescribes how risks can be minimized. This was taken care of in the current study.

Acharya et al. (2006) empirically studied whether banks should adopt diversification being evidence from loan portfolios of individual banks. The main aim was to establish the focus effect or specialization versus return diversification and the riskiness of banks. The inquiry utilized data for 105 banks from Italy along with a duration from 1993 to the year 1999. The study analysis was on the tradeoffs existing between the portfolio of loan or focus and diversification using data that led to the identification of loan exposures to different industries, various sectors among others agriculture, manufacturing, household, energy, and based on a bank by bank. The study findings were consistent with the hypothesis that proposes effectiveness of monitoring deterioration by banks at higher grades of risk exposure and upon expanding of lending into fresher or competitive industries. The most pertinent finding was that sectoral lending diversity and industrial diversification of credit reduces the return of banks as it produces endogenously riskier loans for banks of high diversity in the sample. Diversification for lowly risky banks either produces inefficient risk-return tradeoff or produces a marginal improvement financially. A more robust empirical study finding that emerged was that diversifying assets of a bank does not guarantee superior results or greater performance for banks. The study failed to infer whether the results can be replicated in developing nations like Kenya.

Chen et al., (2013) study was on credit diversification into sectors and the effect on return and risk of banks which was an evidence of banks listed in China. The paper sought to investigate impacts resulting from sectoral diversification on yields and exposure of Chinese banks. Sectors included personal, manufacturing, trade and

financial services, transport and communication energy, water, mining and quarrying, building, construction and real estate, agriculture, tourism. The study used panel data on a total of sixteen listed banks for the duration between the year 2007 and 2011 period. A different diversification measure was constructed by considering systematic risks in various sectors and weighting these risks with their betas and undertakes a comparison of the results with those of more convectional HHI measure. The study findings were sectoral diversification has a minimal association with the return and similarly lowers risk, which indeed, disputes findings in existence in developed countries and more so emerging economies. The study additionally, utilized a modal period of only four years warranting need for the current study.

Mokaya and Jagongo (2014) did a research study in Kenya that sought to investigate the effect of diversifying the portfolio of corporate loan on management of credit risk, the population of focus being commercial banks. The assessment was propelled by specific objectives which were; to scrutinize whether there is a relationship subsisting between diversification geographically and reduction of credit risk, to investigate the exact association of industry or sectors diversity and management of risks on credit and to investigate type of linkage that exists between borrowing size of the company and management of risks on credit of banks operating in Kenya. The research design employed in this assessment was descriptive. The study target respondent totaled to 86. Collation of data was done with the aid of questionnaires which were structured. Data gathered was sorted, coded in excel and statistical analysis undertaken with the aid of SPSS. Statistical inferences which were descriptive were employed and data presented in plots and tables. The findings on diversification geographically were p=0.113, r=0.197 indicating no association with credit risk management. On industry or sectors diversification, p=0.001, r=0.515 highlighting an association was found to exist between sectoral diversity and credit risk management. On size diversification and banks management of risk on credit, p=0.004, r=-0.351 was also found suggesting the existence of an association. The study recommended the establishment of a framework that assists determine the borrowing companies' size and their ability to flourish over a span of time, establish standards that help to identify borrowing companies based on the level of corporate tax parameters and sectors such as manufacturing, wholesale and retail, construction,

textile, agriculture, production and service industries. The study utilized primary data while the current study utilized secondary data.

The study that was done by Gönenç and Kılıçhan (2004) sought to investigate the connection that subsists between the diversification of the portfolio of credit and the performance level of all the banks operating in Turkey. The estimation methodology used in the research study was linear panel data method. The study data had to be limited for only two years between 2001 and 2002 because of data limitations such as availability. The authors' observation was that there subsists an opposite relationship which is significant between diversification and performance level measured by ROA. More study emphasizing on longer periods of study needs to be conducted due to advanced technology and data availability. Dynaminism in the banking sector also needs to be recognized through use of system GMM methodology.

2.4.2 Income Streams Diversification and Financial Performance

Nisar et al. (2018) paper was done as a precursor to the continuing debate on the gains and shortcomings of diversifying streams of revenue by banks. Scrutinizing a panel set of information comprising of 200 commercial banks domiciled at countries in South Asia, it was discovered that generally diversification of revenue into non-interest stream positively impacts profitability and likewise stability of commercial banks domiciled at countries in South Asia. Further, diverse forms of non-interest stream-generating undertakings possess divergent impacts on bank performance and thereby impacting their stability. It was noted that as fees and commission streams had an impact that was negative on profitability and solidity of commercial banks domiciled at countries in South Asia, other non-interest streams had positive results. The greatest implication as depicted by the outcome is that banks can accrue gains from diversifying revenue streams if they venture into specified forms of non-interest stream-generating undertakings. Findings were robust and most importantly applicable to the usefulness of alternative measures related to revenue stream diversification, profitability and solidifying banks. Gains are accrued by banks if activities of diversifying streams of revenue are characteristically of minimal risk and

accrue maximum returns, whereas it may possibly weaken banks if diversified undertakings are increasingly risky and accrue minimal returns. Even though the study did employ panel data, it failed in scrutinizing stationarity of the variables and serial auto correlation which were pertinent and could eliminate events of inferring biased conclusions.

Diversification of income streams was put into perspective following the work of Ebrahim and Hasan (2008) as the venturing into new earnings in income and generating monetary streams other than normal services of intermediation that are traditional. The study was about the value relevance as a result of diversification of product of commercial banks domiciled in the United States. The paper examined variances in the utility relevance derived in bank institution's interest component of earnings to activities of noninterest banking among them fees and commissions, income from trading and income from dividend earned. It studied specifically reactions off the market to variations in revenue of banks from non-interest activities that emanate from extension into innovative financial services lines apart from traditional intermediation activities. A sample from the commercial banks was scoped for duration ranging from the year 1993 and 2002. Analysis from the study showed that annually, abnormal returns have a positive and significant association with variations in the noninterest segment of bank earnings in comparison with changes in the segment of earnings from interest. The trend for smaller banks is obvious and preceding the year 1999, in whereby act by Gramm-Leach-Bliley permitted venturing by commercial banks into more noninterest activities of banking. The study acts as an extension of a long research of accounting standoff in derived value relevance of earnings as an application to components of bank earnings.The study subsequently fell short on data analysis procedure as CLRM assumption was not tested hence future scholars mneed to consider panel diagnostic tests prior to perfoming the regression analysis.

In the Kenyan context, Kiweu (2012) study sought to establish how the concentration of revenue versus diversification influences banking institutions' financial performance. The study examined how income diversification affects commercial banks earnings, for it is assumed that it can minimize volatility and inherent risk. The

assessment focus was on commercial banking institutions' primary income sources of non-interest among them fees and commissions, trading income and interest earnings. HHI diversification index was used to compute income stream diversification while ROA, ROE and risk-adjusted returns were used to measure financial performance. The information discovered from the study highlighted little benefits if after all there existed any to be anticipated from income diversity away from the traditional and normal banking activities however it also revealed benefits of growing non-interest incomes during the duration of inquiry ranging from the year 2000 and 2010. The enquiry also was successful in establishing that top tier banks tend to adopt more diversity as opposed to low tier banks and generates higher returns. The study fell short as it considered two main form of revenue while calculating HHI Index. In the current scrutiny, system Generalized Method of Moments (GMM) will be made use of to scrutinize dynamism of the models and how the performance of the immediately preceding period exerts influence on the present period financial performance.

Teimet, Ochieng and Anywa (2011) investigated the diversification of the sources of income and commercial banking institutions' financial performance. In their investigation, HHI was used to enable analyze diversification and concentration. The design employed in this research was a longitudinal approach. Five years of trends of income streams pertaining to all commercial banking institutions in Kenya were studied. This investigation upheld that top tier commercial banks are more diversified than small tier ones. The investigation, on the contrary, found that level of diversification has a significantly positive impact on Kenyan commercial banking financial performance and the two main avenues of revenue which are non-interest and interest are positively associated to financial performance. This study however, failed to recognize the dynaminism in banking sector. It would have been more robust to employ panel regression analysis to analyse panel data.

Sanya and Wolfe (2011) scrutinized the diversification effect of revenue on banking institutions' performance and risk in the context of emerging economies. The results showed that diversification reduces risk of insolvency and enhancement of profitability of banks. The enquiry undertook a panel dataset which was consisting of

226 commercial banks that were listed across the eleven emerging economies. A new approach of methodology, System GMM estimators, was used and what was found in the study empirically provided evidence on the dexterities of a shift observed in the direction of activities generating non-interest revenue on the risk of insolvency and performance by banks. The most important finding was that diversification around the two activities for generating income from interest as well as income classified as non-interest reduces risk of insolvency and henceforth profitability is enhanced. As per the findings, these advantages are sizeable for banks with modest risk vulnerabilities and that are bigger in size. These results by extension to stakeholders have significant shrewd implications. The stakeholders include managers of banks, supervisory regulators and those who have a common interest and direct benefit in promoting bank performance and stability. Although, the data utilized by the study was panel, panel data diagnostic tests such Jarque Berra for normality, unit root for stationarity, serial correlation and multicollinearity test were not undertaken thus likelihood of spurious results.

Gambacorta, Scatigna, and Yang (2014) using a nonlinear approach did a study on diversity and earnings of banking institutions. Information from ninety-eight active banks internationally headquartered in twenty-seven countries over the period 1994 to 2012 was used. The design employed in the study was descriptive. The link between the diversification of income stated ratio of noninterest earnings to the summation of total earnings and nonlinear ROA of banks was analyzed. The most important result found indicated the existence of correlation which is positive between streams of income diversity and profitability but to a certain degree of 30% of the ratio of diversity. Benefits of diversification in global systemically important banks (GSIBs) are small in value but significant when we use returns that are volatility-adjusted to be a measure of the profitability of banks. The outcome of the study cannot be replicated in Kenya due to heterogeneity of financial development.

Doumpos, Gaganis, and Pasiouras (2013) studied diversification of banks and overall financial strength, which was a shred of evidence around international crisis. The study used an indicator of rigorous overall financial strength which was founded along CAMEL framework dimensions. The study examined the relationship that

exists between on-and-off balance sheet diversity, income diversity and earning assets diversity on banks' overall financial strength. Diversification of income was found to be of more importance to banks functioning in countries that are least developed as compared to the banks in economies that are advanced. However, it was concluded the contrary concerning diversity amongst on and off-balance sheet activities. The discovery divulged that diversification of earning assets as well as of income can lessen the negative impact of the monetary difficulty on bank achievement of financial soundness. A positively significant association was prevailing on diversification and overall financial strength which was found to exist after nesting effects, endogeneity and self-selection having been accounted for, and having used a varying way for setting up of the indicator of financial strength.

Elsas, Hackethal, Holzhauser (2010) did a research study on the structure of banking institutions' diversification, which was issued in the publication of banking and finance. Research design made use of in this study was quantitative and panel data gathered from nine countries for the duration of eight years from 1996 to 2003. The study tested how diversification of revenue simultaneously with expanding size of bank impacts the value of banks. Employing a framework that is comprehensive for bank performance quantification, the study findings were that there is an absence of evidence for discounts that are conglomerate, unlike research studies concentrating on industrial firms. Diversification of revenue that includes fees and commissions, trading income, rental income, and other incomes contributes positively to the profitability of bank and is connected with a soaring market valuation. The effect on financial performance does not necessarily depend on whether diversification was reached by means of organic growth. The results of the study thus recommend further studies to be done on the anatomy of bank diversification. The study had a limited sample size and for only eight years,

A research study done by Calmes and Theore (2013) was on diversification, the product mix of banks change and performance where the multivariate GARCH was applied to bank data in Canada. The study period under which the study was conducted was between the year 1997 and 2010. Some key conditional volatility revealed these benefits may be varied over the various cycles of business as well as

through time. A new composition with a basis on the multivariate GARCH methodology and an adjusted Hausman test was used. The main finding suggested that the composition of income from non-interest activities produce diversification gains that are ineligible as opposed to traditional business lines of banks. Diversification normally works for the composition that is related more to banking and as well market-oriented, that is capital market fees and trading income. During crisis episodes not surprising even though these benefits derived from diversification seem to fade for a majority of the components, other than for securitization and insurance since they act as buffers. The study suggested a conclusion consistent with the literature, despite the coming into being of the model of business of banking, fees and commission related to traditional activities to banks that includes credit card, deposit and loan fees. They are the most steady and profitable income sources. Ideally, this engages the shift from heavily relying on income from interest streams linked with activities of intermediation in traditional mechanisms to alternative innovative activities that earn income from non-interest streams.

Olweny and shipho (2010) study evaluated and determined bank-specific factors which included operational cost efficiency, capital adequacy, quality of assets, liquidity, and diversification of income effects and the banks' profitability in the context of the Kenyan market. The additional intent was to evaluate the influence of factors of market structure, market concentration and foreign ownership, on the Kenyan commercial banks' performance measured by indicators of profits. This research study adopted the design of panel data using explanatory approach to undertake the study objectives. Yearly financial statements and published reports of thirty-eight commercial banks in Kenya from the year 2002 to 2008 were derived from the CBK and survey report of banks. The financial data was examined using the technique of multiple linear regressions. Survey data outcome indicated that every factor that was bank-specific exhibited an impact that was quantitatively significant on profitability, while it was observed an insignificant effect on the market factors. The study basing on its findings recommended policies that would stimulate diversification of revenue, operational costs reduction, decrease risk from credit and motivate banks to decrease their holdings in liquidity. Further research on determinants that impact commercial banks liquidity in the Kenyan context could be

of value addition to the banking institutions' financial performance and scholarly literature.

2.4.3 Deposits Diversification and Financial Performance

Olarewaju, Migiro, and Sibanda (2017) did a scrutiny on the impact of operational diversification on banking performance using the pooled, FEM, REM and System GMM for duration ranging 2006 to 2015 and were across two hundred and fifty commercial banks from 30 nations in the region of Sub-Saharan Africa. As a result of strength of robustness of SYS-GMM, it was revealed in the outcome of this assessment that using Herfindahl Hirschman index, every component relating to operational diversification that included; deposit, revenue, asset, liability, and inclusive of control variables like bank size, ratios of liquidity, loan-loss ratio, cost-income ratio and the lagged return on average asset were deemed significant at 1% level having only deposit diversification (HHIde), which had a negative link with ROAA. This assessment however, reached a conclusion that diversification of activities relating to operation of banks in the region of SSA have direct and significant effect on financial performance. It was noted that greater attention should be taken in monitoring the diversification strategies especially on deposits to guarantee that no aspect of banks' operation is disregarded.

According to discussion paper by Nafula (2003) presented in KIPPRA, an econometric analysis on the bank portfolios and bank earnings in Kenya, the author's findings suggested that except for investments in subsidiary companies and deposits from customer, portfolios such as government securities, loans and advances, certificate of deposit, balances of deposits from other banks, placements, loans and advances to building societies and other financial institutions, and other banking assets impact positively bank earnings. Customer deposits generally include demand deposits, call deposits, savings deposits and fixed deposits. These types of deposits also constitute a cheaper fund source available to commercial banks. Financial performance of a commercial bank is dependent on its swift capability to get deposits and offer the same as loans and advances. A method of improving a bank's profitability or earnings is to come up with policies for growing personal deposits.

The Central Bank of Kenya demands that banks retain a particular proportion of their liquid cash in terms of deposits with themselves. The results of this study suggested that the customer deposits variable enters the equation negatively with very significant coefficients in all the regressions. There is need to employ other econometric models tht take into accounted lagged variables to depict dynaminism in the banking sector.

Mulwa (2013) did a paper that answered the question of whether financing diversification matters. The study was an assessment of performance by savings and credit cooperative societies (SACCOs) in the context of Kakamega County in Kenya. Traditionally, SACCOs have accumulated savings in the form of deposits from their members until not long ago when liberalization of the financial sector happened in the 1990s and licensed them to be able to expand their sources of financing by offering services that are front office related. SACCOs all over the globe make use of an array of products such as fixed-term and demand for savings mobilization. Deposits that are on-demand do not have withdrawal dates initially predetermined and allow withdrawals in unlimited sequence. Savings with a fixed term are called certificates of deposit or programmed savings and are undertaken in a single deposit with interest payable upon maturity. The intention of the scrutiny was to assess the influence of financing diversification on the performance of SACCOs in context of Kenya in terms of finances. A descriptive correlational design was used with the population of the study being all SACCOs that were in operation in the county of Kakamega and registered with Kenya Union of Savings and Credit Cooperatives. Data for all individual SACCOs was collected using a questionnaire and inferences made using descriptive and inferential statistics. For identification of trends and dispersions in the data, descriptive analysis was done, and zero order correlation coefficient of Karl Pearson was employed to estimate the extent of the link between the diversity of financing and performance of the SACCOs. Model of regression was done to ascertain the link between the diversity of financing and Sacco financial performance. The study findings were that diversity of financing had an effect that was significantly positive on Sacco performance. The study recommendation was that further investigations be done to certify the implications of risks as a result of diversification of financing sources of SACCOs and commercial banks. Panel

diagnostics needed to have been undertaken prior to fitting regression model and in case of anyviolations taken care of. Longer period ought to have been considered.

Gul et al. (2011) utilizing data collected from top tier fifteen commercial banks in Pakistan spread over the period year 2005 and 2009 conducted an investigation on the impact of assets, credit, total equity, banks' deposits, growth of economy, inflation and capitalization of market on profitability indexes which are ROA, ROCE, ROE and NIM. Results of this study indicated that deposits, among other independent variables, were positively correlated with ROA. Classes of deposits among them demand, savings and fixed deposits, however, portrayed a negative relationship with return on capital employed. Comparably, total deposits ratio to total assets ratio indicated a negative correlation existence with ROCE. These two observations led to a conclusion that banks dependent on deposits as the only source of funding are less profitable. Panel diagnostics needed to have been undertaken prior to fitting regression model and in case of any violations taken care of. Longer period ought to have been considered in favour of the four years employed.

Lomuto (2008) did an empirical study on commercial banks operating Kenya with the purpose to identify and assess key determining factors of banks growth in deposits. The main goal was to examine determining factors that impact the growth of deposit in Kenyan commercial banks. Secondary data time series form and covering the period between 1968 and 2006 were examined. The model used for estimation was a multiple regression equation where deposit was the variable classified as dependent and explanatory variables being investment income ratio, rate of deposit, rate of nominal exchange, real GDP, number of cleared cheques as innovations present in the financial sector proxy, ratio of monetary GDP to summation of GDP and SAPs representing structural adjustment programs. Model estimation was performed by use of the technique of Ordinary Least Squares (OLS) with the aid of a statistical package called Econometric Views or E-views. The characteristic of time series data was assessed using tests of unit root to remedy for the stationarity of variables under investigation. Test for co-integration undertaken was for the purpose of determining long run relationships of non-stationary variables. Results of the analysis indicated that lagged deposits of the commercial bank plus

other independent variables that included structural adjustment programs influence commercial banks' deposit growth significantly in the Kenyan context. Several policy implications basing on the findings were highlighted that aimed at encouraging the growth of deposits by banks for advantages of mobilization of local deposit. Policies that aim at enhancing growth and promote the growth of banks deposits are essential. Secondly, the stability of the macro part of the system of an economy should be maintained. Innovations by financial sector lastly stimulate the growth of deposit in Kenyan commercial banks as customers minimize their carrying cash appetite. The study fallen short as it was an empirical study.

Harald and Heiko (2008) empirically assessed the demand for deposits of Lebanese commercial banks. Deposit types highlighted in the assessment included demand, fixed, savings and call deposits. The study used secondary quarterly data of 50 banks from Lebanon from the year 1993 to the year 2008 from regional financial centre. Variables were classified into macro-level variables and micro-level variables. The study found that coincidental measure for the real economic activities in Lebanon among domestic variables such as, consumer prices, as well as the differential interest linking domestic currency and United States dollar, are significant. In this study, the number of VECM for accounting for co-integration in non-stationary time series was estimated. It was found that at micro level, domestic determinants for example activity of the economy, levels of prices, and differential interest linking the domestic currency and the United States dollar significantly explained demand of deposit, same case as external factors among them developed economic and financial state and proxy determinants to the Gulf funds availability. At the level of micro, the study found that bank specific determinants, for example, the individual banks' perceived riskiness, their buffers of liquidity, exposure of loan, and margins of interest, hold an influence deemed significant on the demand deposits for banks. The study findings suggested that out that factors which are domestic and international, assist expound deposit demand. Considering that domestic and external variables significantly explain deposit demand, an analysis of impulse reaction functions and variations decomposition underline the corresponding significance of the external variables. Regarding variables deemed bank-specific, the study concluded that banks' considered risk level using z-score, the buffers of liquidity, exposures related

to loan and margins of interest all have influences found to be significant on bank-level growth of deposit and at the same time controlling for domestic, external macroeconomic factors. The study fallen short as it was an empirical study. Future studies should correct data, test and make inferences from analytical models.

2.4.4 Investments Diversification and Financial Performance

Rop et al. (2016) did a study in Kenyan context which sought to ascertain the influence of investment diversification on the financial performance of all the existing commercial banking firms in Kenya. The objectives specified by author were to ascertain relationship existing between insurance investments, government securities, real estate investment, buying of shares and performance of commercial banking firms. The design employed in this research was exploratory. The population of concern in this research consisted of all commercial banking firms operating in Kenya. Sample of forty commercial banks that were on operation as at the time of the study was selected. Data in secondary form was gathered by the use of data collection sheets as the main data collection tool and primary data was put together using an interview schedule. ANOVA and multiple regressions assisted to make inference using the data. The study made a conclusion that a majority of the banks were observed to over the years have in practice employed the use of investment in insurance to improve earnings of commercial banking firms in the Kenyan context. The study recommendation was that banks should focus their attention to enhance the confidence in diversification of banks portfolio and enhance marketing and management policies that encourage its use. However, the study fallen short as it employed explaratory design instead of descriptive research design. The study failed to apply panel data analysis which have long been considered among the best for descriptive experiments.

The impact of diversification of investment on commercial banks' financial performance in the context of Kenya was studied by Kipleting and Bokongo (2016). The design employed in this research was exploratory. Entire population of this study was derived from the commercial banks that were operation in Kenya and were in total forty. The researcher made use of data collection sheets to collect secondary

data and was the main tool for data collection and also employed schedules for interview for collecting supplementary primary data. The tools were guided by the specified intents of the study. After in-depth analysis using explanatory, inferential statistics and multiple regressions the study made conclusions that a majority of banking institutions along the years had in tandem adopted insurance investment, government securities, shares from exchanges as well as bonds so as to enhance their profitability and subsequently better returns to their shareholders. Panel diagnostics ought to have been tested prior to fitting regression model. Longer period ought to be considered in future studies which has hitherto addressed by the current study.

Mulwa, Tarus and Kosgei (2015) in their study on commercial banking institutions diversification which was a theoretical survey indicated that competition has to a larger extent diminished cost advantages of banks in raising funds and their financial performance. For commercial banks in Kenya to survive, two alternatives are available which includes enhancing models of traditional lending of banks into new and more riskier ones, and additionally, banks should pursue new activities classified as off-balance sheet and those that accelerate profit-making. These two alternatives have led to immense levels of diversification in banking sector in entire world as commercial banking firms have given a response by accelerating their focus in intermediation services to nontraditional among them investment banking and banc-assurance and venturing in activities that were once described as risky that increases trading income, fees and commissions, foreign exchange income. The research study concluded that common methods whereby commercial banks embrace diversification are assets diversification, international diversification, income diversification, credit diversification, geographical diversification. These types of diversification form the basis of the current study. The study was a theoretical perspective which ought to be enriched by performing additional data collection and analysis.

Hailu and Tassew, (2018) did a study that aimed at investigating the efficacy of investment diversification on financial performance in the context of seventeen Ethiopian Commercial Banks. The scrutiny covered a duration ranging from 2013 to 2017. A research approach employed was quantitive and gathered data was analysed by use of panel random effect regression model. Outcome highlighted that

investment in financial assets, securities issued by government, productes from insurance, credit portfolio and investment size had a positively significant association with financial performance of Banks in Ethiopia. The study concluded that investment diversification positively associates with the financial performance of commercial banks in the context of Ethiopia. Banking institutions ought therefore, to focus its undertaking in promotion of the confidence in portfolio diversification, lead in developing marketing policies that propagate its utilisation and seek to find the best combination of portfolio that can result to an efficient portfolio. The study can not be universally applicable in Kenya due to heterogeinity of financial development.

Oyatoye and Arileserre (2012) undertook a study on an insurance institution portfolio management of investment non-linear programming model in the context of Nigeria. This study did a combination of a Lagrangian expanded function with a modified method of trust region to come up with a method for getting a solution on management challenges facing insurance firms' investment portfolio. The method proposed by this study was implemented to solve insurance firms' challenges arising from the management of a portfolio. Findings from the study suggested that investing in different investments with opposite correlations improves the chances of a company to earn good return though not guaranteed because of the uncertainty facing the nature of investments. Construction of efficient investment portfolio has been found to be organizations enablers to diversify risks, as a result, improving the earning ability of the portfolio. This study further proposed that it is of importance for all sectors to endure and progress in diversification to mitigate potential underwriting losses and achieve increased financial strength and hence increase profits. This study was conducted in insurance institution hence need to conduct further analysis on other financial players such as commercial banks.

Bartaula et al. (2018) study scrutinized the influence of investment diversification on Nepalese Commercial Banking institutions' financial performance.ROA and ROE were explained variables. The explained variables were investment in insurance, Investment in bonds, investment in sector of real estate, credit portfolio, ivestment in securities issued by government, corporate sector investment, and foreign banks investment. The assessment was conducted using data secondary form from twenty

commercial banks totaling to 100 observations for a duration ranging from 2011/12 to 2016/17. Models of regression were estimated to test the significance of the hypothesized objectives. Outcome indicated that bond investment, government securities investment, and corporate shares investment were positively and significant linked to ROE. However, foreign investment, insurance investment, investment in total loan, and real estate investment were negatively associated to ROE.The study had a limitation as it was based on the panel data gathered from 20 Nepalese commercial banks with only a total of 100 observations for the study duration ranging from 2011/112 to 2016/17 which did not take into consideration pre and post financial crisis of 2008. The current study addressed this gap.

Gamra and Plihon (2011) study was on diversification relating to revenue as a result of investment diversification in emerging institutions of banking and its implications on the financial performance of these institutions. Theoretical hypotheses were estimated with OLS and using a sample of seven hundred and fourteen banks across fourteen East Asian and Latin American states during the period post year 1997 crisis. The study indicated that for commercial banks to respond to the competition pressure, they have raised their involvement in unconventional intermediation solution like investment banking and banc-assurance and venturing in streams that were perceived of high-risk. The study findings highlighted that gains arising from diversification tend to be more than offset by the cost out of up-surging exposure to income from non-interest streams, especially as a result of volatility from trading income. Banks have adopted an incentive to make their footing and functions on financial markets felt by mixing lending and other noninterest banking services. Commercial banks typically tend to drift from loans and engage in innovative fee-based business lines and investing in government securities, shares and placements. More study thus needs to be undertaken in developing economies such as Kenya.

2.4.5 Banks Portfolio Diversification and Financial Performance

In the Kenyan context, Mulwa and Kosgei (2016) conducted a research examination on commercial banks' diversification and financial performance. The scrutiny also endeavoured to ascertain the moderating role of risk. Employing a design that was ex

post facto explanatory, the examination explored whether bank diversification affects financial performance and whether this effect is moderated by solvency and credit risk. Estimation was done using panel statistics from 34 commercial banking institutions with operations in Kenya over a period extending to nine firm years. The author's results indicated that income together with the diversification of asset, negatively and significantly impacted commercial banks' ROA whereas diversifying geographically significantly affected positively ROE and ROA. The risk was found to moderate the link between banking institutions' diversification and financial performance. More focus was needed on other forms of diversification such as deposit diversification.

In the African context, a study done by Landi and Venturelli (2012) analyzed the impact and determinants of diversification on efficiency and profitability amongst African banks. The author sought to address the question of whether diversification is practiced in the African banking sector. The need to look closely at the economic impacts of diversification in the sector of banking emerges from two major purposes. Firstly, diversification in the banking industry is playing an up-surging important role of which the trend is proving hard to ascertain without at first stating and categorizing the business lines of financial intermediation role. Secondly, the venturing of banking institutions' focus towards the services of insurance, fee-based activities and industry of government securities has implications that are beneficial in terms of stabilization and concentration of financial systems. The analysis that was done to compare banks with those of the European market was achieved through the use of data of available database for all banks and the profitability of a bank, in particular, the profitability of these banks. Banking groups that were the principal one was also asssesed in the terms of their strategic behaviours with the aid of documentary material and the reports that were published annually. Results were that diversification affected efficiency in terms of profits, prices and revenue growth. However, there was a need for more focus on specific banks diversification that affects banks financial performance significantly.

Goetz (2012) examined ways diversification by a bank can affect its individual behaviour of taking risk of banks that are competing and non-diversified from the

United States between the years 1977 and 2006. Two empirical strategies were employed based on the timing of intrastate branching deregulation and a gravity model, which explains a bank's expansion behaviour within a state. These findings highlighted diversification by a bank will impact the risk appetite of competitors, cognizant on the fact that these banks may not to a greater extent diversify their activities. More focus ought to be given on sub Saharan African to assess the dynaminism of the banking sector.

Oyedijo (2012) researched on how product-market diversification affected growth and financial indicators of selected companies in Nigeria. This study adopted a design that was descriptive and involved use of correlation test, multiple regressions and independent sample test. The multiple regression analysis findings obtained showed that diversification that is linked impacted significantly on performance whereas diversification which was not in any way related insignificantly and negatively impacted growth and performance. The researcher however recommended that more time scope was necessary to investigate the existing difference in financial performance before diversification and after diversification for taking the least a minimum of seven years.

Oyewobi et al. (2013) conducted an investigation on how diversification of businesses impacted the performance of South Africa construction firms. A case study was the design employed in this study. Data was then gathered by the use of interviews sheets for a period extending to five years. The explained variable of the assessment was performance and measured using Profit Margin, ROCE, and Return on Total Assets. The predictor or independent variables were Product-service Diversification (PD), Geographic Diversification (GD) and intervening variables that were considered in this study included firm size, firm age, capital structure, and technical ability of the firms. The findings indicated that firms in the construction industry earned more profit margins. The study failed to single out the criteria in use to specify and separate large construction companies, medium-sized and newly upgraded companies.

Baele, De Jonghe and Vennet (2007) in the study to identify whether the market value of stock diversification among banks investigated whether or not functionally diversified banks enjoys comparative advantages in the long term in terms of performance and low-risk profile in comparison to specialized and concentrated competitors. This study used measures that are market-based which included risk of bank and return potential. The franchise value of European Banks is calculated over time as a measure of their potential for long-run performance. Risk is measured using both systematic and component which is idiosyncratic risk stemming from the bank's architecture of stock return. Return/risk trade-off was analyzed and expressed in unalike strategies of functional diversification using analysis of panel data for the period between the year 1989 and 2004. A higher share percentagewise of non-interest income to total income greatly impacts positively intrinsic values of banks. Income streams diversification from distinct and traditional financial activities raises the bank systematic risk category as the impact on the component of idiosyncratic risk is predominantly nonlinear and with descending slope. In this study, it's evident that the findings have conflicting implications to relevant stakeholders, who include investors, bank shareholders and bank managers.

Rop, kibet and Bokongo (2016) did an assessment on the effect of portfolio diversification on commercial banking institutions financial performance. Research design adopted by the assessment was exploratory and specifically, secondary data was gathered by use of data collection sheets and further interviews undertaken to gather primary data from a sample that comprised 40 banking institutions. The study henceforth reached a conclusion that additional work is required to be undertaken in order to enhance banks portfolio diversification in an optimal and cost-effective manner.

2.4.6 Bank Size and Financial Performance

Teimet et al., (2019) paper examined banks size effect on the commercial banks' profitability and in addition, scrutinized whether there existed an equilibrium or disequilibrium association amongst the two variables. The study utilized time series data gathered from Kenyan commercial banks which were 42 in number and scoped

for the period between years 2009 to 2018. The weighted composite model adopted by the apex bank for quantifying bank size was utilized, whilst the attribute pertaining to profitability was captured using return on assets operationalised as earnings before interest and tax over assets. Analysis was done using regressions that assessed the magnitude and direction of the association while the autoregressive distributed lag model was utilized to detail the equilibrium steadiness and equilibrium adjustment speed. The outcome alluded that banks size exhibited a positively significant relationship with returns on assets. In addition to this outcome, the study highlighted the existence of an association both in the long-run and short-run with a 95 percent adjustment speed to equilibrium in a firm year. The study conclusion indicated that the size of a bank to a greater extent related with ROA and at a greater length, strategies of banks consolidation and other expansion measures contributes to enhancement of bank profitability as it was confirmed by bidirectional causality that existed between the variables under study. More measures of financial performance among them ROE should be applied in future studies.

Nouaili, Abaoub and Anis (2015) examined what drives bank financial performance in the context of Tunisia. The study applied bank size, inflation, GDP, capital average ratio, risk, privatization, efficiency, quoted and concentration as explanatory variables and ROE, liquidity (LIQ), NIM and liquidity ratio were the dependent variable. The technique adopted by the study was panel data technique. Panel regressions analysis with linear model of Bourke (1989) found bank size, efficiency and concentration had negative influence on financial performance while quotation, capitalization, and privatization had positively influenced ROE, NIM, ROA and LIQ. Business cycle when measured with GDP had positively influenced performance whereas inflation rate had adversely influenced financial performance. Implication of the result was that policy makers had to refocus and take corrective measures aimed at promoting bank performance and financial sector as a whole through expansion and consolidations and consequently improve the Economy of a country as a whole. The study failed to single out the criteria in use to specify and separate large commercial banks, medium-sized and newly upgraded companies.

Kiyota (2011) utilized the approach of stochastic frontier in an analysis that compares efficiency in terms of profit and inefficiencies in cost of banking firms that were in operation in 29 countries in Africa sub-Sahara for the period 2000-2007. Tobit regression was used to quantify the influence of environmental variables on the efficiency of commercial banking firms. The outcome indicated foreign banks were more efficient in terms of profit compared to domestic banks. It was established that smaller banks are more efficient in profit-making. Medium or relatively larger banking firms tend to be more efficient in cost. More focus should be given on a larger period of study. Pnael data analysis was not employed as well as diagnostics tests.

Nodeh et al. (2016) did a study that main objective was to empirically investigate the relationship of determinants of structure of boards of management and financial performance of banks. The author established the importance of the role played by bank size as the moderator variable on the link between independence and size of the board with the financial performance of these institutions. Population of thirty-seven commercial banks in Malaysia that included twenty-one conventional and sixteen Islamic banks from 2005 to 2014 were covered. Panel data analysis was used and models of OLS and FEM showed that independence as well as the size of the board has an impact that is positive on firms' performance. Size of banks had a moderating impact that was positive on the relationship between the determinants of structures of board and firms' financial performance. The study failed to infer whether the results can be inferred in the developing nation and hence the need for the current study.

Said et al. (2008) research study was an investigation on the performance and financial ratios of commercial banking institutions in two countries namely China and Malaysia. Specific objectives investigated the impact of factors that were specific to a bank among them credit, liquidity, operational expenses, capital, and the size of banking firms on how they perform in terms of profitability. The standard performance measure used as the indicator included return on average equity and return on average asset. Secondary data was extracted from the financial statement of commercial banking firms in Malaysia and China. The financial statement reports were drawn from the BankScope database for the duration between 2001 and 2007.

The investigation was founded on data that was panel and model of a fixed effect that incorporated a balanced series of yearly data. The deductions from the study indicated that size and level of liquidity in banks don't bear any influence that is significant on how banks perform in the two countries. The study had a limitation as it failed in scrutinizing stationarity of the variables and serial auto correlation which were pertinent and could eliminate events of inferring biased conclusions.

Al Karim and Alam (2013) sought to assess whether the size of a bank, asset management, risk of giving credit and efficiency of operations do have an impact that is significant on performance internally based measures such as return on asset of commercial banks in Bangladeshi. The performance measures used were based on the market as indicated by Q model by Tobin among them Price to Book ratio, performance indicators that were indicated by internal based measures such as Return on Assets, and performance measures that were based on economy measured using an index of Economic Value. Yearly time series data between the year 2008 and 2012 of the banks selected extracted from their audited financial reports annually were employed and multiple regression analysis used to assess the impact of independent variables and to come up with a good-fit regression model that assisted predict the future commercial banks' financial performance. It was found that size of the bank, risks from credit, and efficiency in operations and how assets are managed do have a significant and positive effect on how banking firms in Bangladeshi perform. Due to heterogeinity of financial development the study findings and inferences can not be replicated in Kenyan context.

In general terms, the relationship that exists between bank size of banks that are commercial, and their performance is considered to be positive (Teimet et al., 2019; Kiyota, 2011; Nodeh et al., 2016). However, some several research studies have implicated bank size impact to be non-linear with profitability increasing with commercial bank size and shrinking as a result of bureaucratic among other reasons (Said et al., 2008). Nouaili, Abaoub and Anis (2015) found bank size had negative influence on financial performance. Taking into consideration of the above studies, Said et al. (2008) and Nodeh et al. (2016) findings are different from the suggested findings and conclusions by Al Karim and Alam (2013) hence the researcher is

warranted to investigate further the moderation effect of bank size on the relationship between banks portfolio diversification and financial performance of commercial banks in the context of Kenya.

2.5 Critique of the Existing Literature

From critical appraisal of literature, it is evident that a larger number of prior empirical studies have examined the effect of bank portfolio diversification on the financial performance by employing contrasting indicators. The financial performance metric widely accepted in a majority of studies is ROA and ROE. Mulwa (2013) contemplated a diversified credit union in cases whereby there more than one stream of financing to accumulate funds comes to play. Olo (2009) stated that the grand financial strategy that involves diversification comprises a substantive and unique deviation from the firm's prevailing circumstances of operations that is traditional banking to an unrelated business line aided through consolidation and expansion.

Mokaya and Jagongo (2014) study in Kenya that sought to scrutinize the relationship subsisting between diversification of corporate loan portfolio and management of credit risk management recommended establishment of framework that assists determine the borrowing companies size and their ability to flourish over time, and remedies that helps to identify borrowing companies based on level of corporate tax parameters be established. It failed to recognize the sectoral diversification of loans. In the study by Acharya et al., (2006) more robust empirical study finding that emerged was that diversifying assets of a bank does not guarantee superior results or greater performance for commercial banks.

Mulwa (2013) did a paper that answered the question of whether financing diversification matters. The study was an assessment of the performance of savings and credit cooperative societies (SACCOS) the context being Kakamega County in Kenya. The study findings were that diversity of financing had an effect that was significantly positive on Sacco performance. Harald and Heiko (2008) empirically assessed demand for deposits of banks that are commercial in Lebanon. The study findings suggested that out that factors which are domestic and international assist

expound deposit demand. Regarding bank-specific variables, the study deduced that banks' considered riskiness using z-score, buffers of liquidity, loan-related exposures and margins of interest had a significant influence on bank-level growth of deposit and at the same time controlling for domestic and external macroeconomic factors.

Rop et al. (2016), Gamra and Plihon (2011) indicated that for Banks to respond to the competition pressure, they have raised their involvement in non-traditional intermediation streams like investment banking and banc-assurance and entering in avenues that are perceived to be risky. Commercial banks typically tend to do away of their lending activities and engage in new business lines including activities that are fee-based and investment in government securities. The studies, however, failed to state the various bank portfolio diversifications that are significant. Mulwa, Tarus and Kosgei (2015) in their theoretical study on commercial bank diversification suggested that banks venture into banc-assurance as well as venturing in activities that were once described as risky. The research study concluded that common methods deployed by commercial banking firms to apply diversification are assets diversification, international diversification, income diversification, credit diversification, geographical diversification. These types of diversification form the basis of the current study.

In banking, according to Baele et al. (2006) diversification can easily be done functionally by mix of what is referred to as conglomerate of activities namely banking activities, trading in securities, services of insurance and other services of offering finances or as prescribed by Kahloul and Hallara (2010) view of forming a conglomerate of a number of banks through a bank holding company or banking groups. The study done Gönenç and Kılıçhan (2004) sought to investigate association that subsists between the diversification of the portfolio of credit and the levels of performance of banking firms in Turkey observed that there exists an opposite relationship which is significant between diversification and performance level measured by return on asset.

Ebrahim and Hasan (2008) indeed explained bank diversification as the venturing into new financial products and services apart from the activities of traditional

intermediation. There is need therefore in this regard to define bank diversification which in this specific study can be defined as a conglomeration of contrasting streams which comprises of deposit streams, income streams, assets and liabilities in banking operations. Chen et al. (2013) study found that sectoral credit diversification usually has an impact of reduced return and decreasing risk, a contradiction with the findings that already exists in developed countries and economies that are emerging.

Pieces of evidence and results from the empirical literature of diverse studies highlighted uncertain tendency on the effect arising from bank portfolio diversification on financial performance. There are clear justifications from the appraisal of literature that despite a set of circumstances whereby the same metric of financial performance in banks have been made use of, contradicting empirical outcomes have been presumed. An unspecified number of studies have shown an insignificant or significant negative relationship while others have provided for an insignificant or significant positive effect. There are also the extreme results of some studies that have posited absence of relationship existing between explanatory variables and explained variable. The clear absence of concurrence depicts that the scrutiny failed in finding a comprehensible association subsisting among bank portfolio diversifications and financial performance. The mode of the link that subsists on bank portfolio diversification and financial performance seems still inconclusive and need further studies to be done.

It is also evident that in the reviewed empirical studies, the dynamism that subsists in the banking sector seems not to be adequately recognized and considered. Analysis in most of the studies carried out using the OLS or long-run models. In the current scrutiny, system Generalized Method of Moments (GMM) will be made use of to scrutinize dynamism of the models and how the performance of the immediately preceding period exerts influence on the present period financial performance. The reason being it is imagined that leaderships of banks take steps to safeguard the performance of the present period by making use of information of preceding period performances.

Taking into consideration the deductions by Mulwa and Kosgei (2016); Oloo (2011); Kiweu (2012) and among other studies Mulwa (2013); Magambo (2013); Wafula (2014); Mutega (2016); Sanya and Wolfe (2011); Teimet, Ochieng and Anywa (2011) studies that have been done in Kenya seem not to be wholly comprehensive as some broaden the ideals of financial performance while studying how the diversification affect the performance of financial institutions. The studies failed to record the element of banks deposits, sectoral allocation of credit and investments as constituents of bank portfolio diversification. Though it has been found that Kenyan researchers have conducted investigations on the effects of bank portfolio diversification on bank financial performance, there is still an insufficiency of researches that focus on digging deeper on effects of other important variables among them banks' size role as a moderator.

2.6 Research Gaps

Based on the aforementioned empirically reviewed relevant literature, it is indicating that research work in the field of bank portfolio diversification has been undertaken but not comprehensively and conclusively approached. The empirically reviewed literature in most cases indicated that earlier researchers majorly concentrated on credit and revenue diversification leaving out the investments as components of assets and deposits as the liabilities component as well as sectoral allocation of credit and thus the current study is wider in terms of scope by covering additional important variables of that were neglected by previous researchers. In totality, it makes the study is more comprehensive, detailed and conclusive. From the empirical review of existing literature that is relevant to the study, it has been shown that there are few studies specifically in Kenyan context on the linkage between Bank portfolio diversification and performance of commercial banking firms. There was the omission of important variable bank size as a moderator. Most of the studies do not take into consideration a moderating variable at all.

The research study by Mulwa, Tarus and Kosgei (2015) concluded that common methods through which commercial banks pursue diversification are assets diversification, international diversification, income diversification, credit

diversification, geographical diversification leaving out deposit diversification. These types of diversification form the basis of the current study. Gönenç and Kılıçhan (2004) investigated diversification of portfolio of credit, Mulwa (2013) paper was on financing diversification on savings and credit cooperative societies (SACCOS), Rop et al. (2016); Gamra and Plihon (2011) concentrated on non-traditional intermediation services such as investment banking and banc-assurance neglecting sectoral credit and deposits diversification. The main gap addressed by this study was to answer whether banks' activities should be concentrated or diversified (Acharya, Hasan & Saunders, 2006), whether diversification played a significant in helping to improve banks' performance and consequently answer which type of portfolio diversification by banks bears the most significant influence on the financial performance (Turkmen et al., 2012).

Theories related to diversification in banking advocate for existence of a number of diversification classes which encompass amongst others, geographical and international (Obinne et al., 2012; Lin, 2010), revenue (Kiweu, 2012; Gambacorta et al., 2014), services or activities (Christiansen & Pace, 1994), asset, deposit, sectoral loans (Goetz et al., 2013; Berger et al., 2010). Banking institutions do diversify by undertaking investments in financial securities and engaging in other collaterals in addition to extending loans (Liang & Rhoades 1991). Even so authors such as called it diversification of products, it resembles closely to income diversification (Kiweu 2012; Ebrahim & Hasan, 2008). Liang and Rhoades (1991); Palich, Cardinal and Miller (2010) additionally, suggested that banking institutions can additionally diversify portfolios of credit covering varying classes of loans in lieu to being geographically diversified. Related to this preposition, banks can diversify also their investments not only their lending facilities portfolio (Saksonova & Solovjova 2011). The most consequential and regular diversification strategies in banking are credit, income, assets, deposit, geographical and international diversifications.

The study main intention was to fill these pertinent gaps in the literature. There is need to test whether diversification necessarily leads to better performance or higher security for the banking institutions in developing countries like Kenya.The study tends to deviate from others because the model of Generalized Method of Moments

was used to enable recognize dynamism found in the banking sector. It was based on the inherent fact that approach of contributory variables highlighted above failed to put into consideration all of the contributions availed in the current study. By making use of the Generalized Method of Moments (GMM) context, the researcher was in a position to conceptualize more reliable approximations of the dynamic panel data model. The study consequently applied pre and post diagnostic tests to take into account any deviations from the assumptions of classic linear regressions models. Further, the study intends to pursue the element of banks deposits, sectoral allocation of credit and investments as constituents of bank portfolio diversification that has hitherto not been addressed in majority of the studies.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The specific goal of this chapter was to provide justification for the research methodology that would be used to address the fundamental question of the impact of bank portfolio diversification on commercial banking institutions' financial performance in Kenya. This chapter provides background information on research philosophy, research design, target population, data collection procedures and instrument, operationalization of variables, techniques of data processing, manipulating the data and analysis to test the hypotheses as outlined in chapter one. This chapter details the independent, dependent and moderating variables that were used to test the five hypotheses as well as pre and post-testing rationalizations. In addition, the research study panel models and research methods used to conduct a detailed review of secondary data were presented.

3.2 Research Philosophy

The building of knowledge in its natural form is due to research theory, as is retaining relevant assumptions on the researchers' way of seeing the world (Saunders, Lewis & Thornhill, 2014). The two major philosophies used to inform how people come to understand what they know are Ontology and Epistemology. There exist two branches of epistemological research philosophies that social sciences research is underpinned. They include positivism and phenomenology. Positivism is based on the idea that measurement is obtained by objective criteria rather than subjective inferences, and that the observer must be independent of what is being observed (Mugenda & Mugenda, 2013). It is based on the absence of bias, the validity of results, neutrality, real facts, and measurement. Positivists make use of existing theories for hypotheses development which is put to the test and found to be acceptable or debunked in whole or in part. This information is then used to educate and guide the creation of further testable theories through study. The second epistemological theory is phenomenology, which is regarded as perceptional since it

focuses on subjective qualities and phenomena. The emphasis is on the present experience, and it progresses from the known to the unknown. (Mugenda, 2013; Saunders et al, 2014; Cooper & Schindler, 2014).

The anchoring paradigm in this study was positivism, which aimed to objectively evaluate facts by empirically explaining relationships between banks' financial output (the dependent variable) and sectoral credit, income sources, deposit and investment diversifications (the independent variables). The positivist theory was chosen for the study because it is a proposition that searches for and discovers evidence or tenets of business or social phenomena with little or no regard for the individual's personalized state (Cooper & Schindler, 2014). The researcher deduced that the guiding philosophical basis was positivism after considering five principles namely; the intent of the study, the archetype of the investigation performed, the extent of the researcher's involvement, the time during which secondary data was gathered, and finally the form of examination. This is in the view of the fact that the researcher acted independently from the observations made.

Mureithi (2016), for example, attempted to determine the efficacy of financial exposures on the performance of banking firms in the Kenyan context; Muiruri (2015) attempted to evaluate the efficacy of CBK mechanisms of regulation on bank performance in the Kenyan context. The studies were designed to evaluate theoretical constructs in situations where the theory was first used as a conceptual framework for hypothesis formulation and testing, and the researcher then emphasized the use of deductive reasoning.

3.3 Research Design

A research design depicts the step by step plan of action presenting in detail how the researcher carried out the study (Sekaran & Bougie, 2013; Kothari, 2011; Cooper & Schindler, 2014). Besides, Saunders, Lewis and Thornhill (2014) described a research design as a blueprint that details the study's shape and confirms how the objectives were met from beginning to end. The study used a descriptive correlational research design, which entails gathering and analyzing data from study units at a specific point in time in order to determine the strength of relationships

between variables. (Saunders et al., 2014; Mulwa, 2013). Also, the researcher extracted information concerning the current status of sectoral credit, income streams, deposit types, investment diversification, ROE and ROA of commercial banks where quantitative data was collected.

According to Sekaran and Bougie, (2013); Kothari (2013); Mugenda and Mugenda (2013); descriptive research is used to acquire information on current phenomena status to explain “what exists” regarding variables under study or existing conditions. It also describes the characteristics of a given population in a systematic and accurate way (Sekaran & Bougie, 2013). Other studies using this research design include Githira, Muturi, and Nasieku (2019), who looked at the financial characteristics and stock returns of listed non-financial companies on East African securities exchanges; Mokaya and Jagongo (2014), who looked at the relationship between diversification of corporate loan portfolios and credit risk management; Ogilo (2012) who studied the impact of credit risk management on banking performance in Kenya; banking survey report conducted by Oloo (2011) and determinants of banking performance in Kenya (Ongore & Kusa, 2013). A descriptive correlational survey is the most suitable design given the above meanings, descriptions, and strengths, as the research tried to investigate a cause-effect relationship.

The study used panel data which is Time Series and Cross-Sectional (TSCS) which was quasi-experimental and according to Lempert (1966), TSCS designs have long been considered among the best for correlational experiments, second only to a purely random experiment. According to published work by Lempert (1966), TSCS designs are referred to as "par excellence" due to their benefits. TSCS designs have a few distinct advantages in addition to their unrivaled ability to identify correlational relationships. On the one hand, the variables are inferred amongst varying institutions and they are analyzed in diverse period of time from 2003 to 2018.

Unbalanced panel data estimation technique was adopted in this study to quantify, analyze and explain the influence of banks’ portfolio diversification on the financial performance of commercial banks that operated in Kenya during the period between 2003-2018. Logic arising from the selection of the years is to assist collect the most

up to date data. As it was quoted from Olweny and Shipho (2010), the advantages of using panel data are that it allows for individual heterogeneity to be regulated, variable collinearity to be reduced, and movement patterns to be monitored in the data, all of which are qualities that data from simple cross-sectional time-series do not provide (Baltagi, 2005). Panel methodology allows for more informative data by combining cross-sectional observations and time series, variable, less collinearity of study variables, more efficiency and degrees of freedom. Panel data besides lowered the biasness which arises as a result of aggregating individual banks. It also resulted in the enrichment of empirical research in formats that would not have been possible if cross-sectional or time-series data were used separately (Ogboi & Unuafe, 2013). As opposed to cross-section or time series analysis, panel data analysis has an advantage because it allows accounting of unobservable heterogeneity.

3.4 Population

Population is described as an absolute category of individuals, occurrence or objects having similar behaviour that heed to a given description (Cooper & Schindler, 2013). The targeted population in the study constituted all licensed commercial banking institutions in Kenya as obtained from the Central Bank of Kenya. As maintained by CBK (2019) annual report, the aggregated total of registered commercial banking firms was forty-three by end of the financial year 2018. The Central Bank of Kenya assumes regulation and licensing of commercial banks in Kenya role and henceforth was employed as the banking sector information authoritative source. The reasons that formed the basis of selection of banking sector stemmed from its pertinent functions to spur the growth of the economy because of the role of intermediation it plays between the users and the suppliers of the fund. The operational efficiency of funds directly impacts banks' specific risks and systematic risks. This efficacy was accomplished through diversification of income streams, credit facilities, or deposits types, unlike nonbanking institutions which are faced by constraints relating to diversification alternatives.

3.5 Data Collection Instrument

Burns and Grove (2010) stated that data collection is the systematic gathering of relevant information about a research area's sub-problems using established criteria such as interviews, participant observations, focus group discussion, case histories, and narratives. The analysis examined secondary data, which was extracted as follows; data on credit facilities was drawn from audited financial statements and annual reports of institutions in commercial banking and Kenya National Bureau of Statistics website. Revenue diversification data was collected from Banks' financial statements and publications done by CBK among them statistical bulletin and yearly reports of accounts. Data on deposits and investments was gathered from the CBK, and Statistical bulletin (Teimet et al., 2019). The study scoped 16-firm year period between January 2003 to December 2018. Data collection schedules as outlined in appendix II for each commercial bank was used to collect secondary data. Herfindahl-Hirschmann Index was used to ascertain diversification ratios (Choi & Kotrozo, 2006; Mulwa & Kosgei, 2016).

3.6 Data Processing and Analysis

This part described the approach that was useful in data analysis and for testing the variables being studied. By the use of excel program, data was organized by the researcher to assist operationalize the study variables. The collated data was run with the aid of STATA software version 13.0 since it has an interface of point-and-click together with a command syntax which makes it very easy for analysis to be done. STATA software also simplifies the generation of plots of data, graphs and findings.

3.7 Variables Definition and Measurement

Publication by Creswell (2014) elaborated that there exists a need for the variables to be specific in researches that are in form quantitative to ensure that readers understand what groups are in the receiving end of the experimental treatment and what results are going to be evaluated. The study, therefore, adopted financial performance as the only dependent variable. Credit diversification, deposit diversification, income streams diversification and Investments diversification

comprised the explanatory variables. The researcher introduced bank size as the moderating variable.

3.7.1 Financial Performance

ROE can be described as a financial ratio that attributes to how much profit in terms of net income an institution earns in comparison to total amount of shareholders' equity invested as indicated on the balance sheet and ROA can be described as a financial ratio that is attributed to how much profit in terms of net income a company earned in comparison to the total amount of assets as indicated on the balance sheet (Ongore & Kusa, 2013). Performance of commercial banks was evaluated by application of ROE and ROA since the measures reflect that banks participate in the reinvestment of earnings to generate profits in the future (Busch & Kick, 2009; Ongore & Kusa, 2013).

$$Return\ on\ Equity = \frac{NetIncome}{\sum ShareholdersEquityCapital}$$

$$Return\ on\ \text{Assets} = \frac{NetIncome}{\sum TotalBankAssets}$$

3.7.2 Diversification Measure

To measure the scale of diversification, the author applied the Herfindahl Index. Acharya et al. (2006) defined this indicator as the summation of squares of individual exposures as a fraction of sum exposures under a set categorization. Herfindahl index will be preconceived as the summation of squares of a portfolio expressed as a percentage of the square of the entire portfolio (Choi & Kotrozo, 2006).

3.7.3 Diversification Scale

The following diversification scale was adopted in this study to judge the values of the Herfindahl Index (HHI), as shown in the below table:

Table 3.1: Scale of Diversification

Value of HHI		
From	**To**	**Conclusion**
1	0.76	Highly concentrated
0.75	0.51	Lowly diversified
0.5	0.26	Diversified
0.25	0	Highly diversified

(Source: Acharya et al. 2006)

3.7.4 Sectoral Credit Diversification

According to CBK (2016), the author calculated credit diversification (HHIcr) by separating bank loans into eleven sectors, which were further divided into four categories: personal/household; primary sector, which includes agriculture, mining, and quarrying; secondary sector, which includes manufacturing, building, construction, real estate energy, and water; Tertiary sector comprising of Trade and Financial Services, Tourism, Restaurant and Hotels, Transport and Communication.

$$HHICr=\left(\frac{Personal\text{Sector}}{\sum \text{Loans}}\right)2+\left(\frac{\text{Primary}\text{Sector}}{\sum \text{Loans}}\right)2+\left(\frac{\text{Secondary}\text{Sector}}{\sum \text{Loans}}\right)2+\left(\frac{\text{Tertiary}\text{Sector}}{\sum \text{Loans}}\right)2 \quad (3.1)$$

3.7.5 Income Stream Diversification

According to the following model, the author used the HHI index on four major streams of income: interest income, net trading income, fees and commissions, and other income (including less frequent streams such as dividend income, license fees, gain from disposal, and rental income) to approximate the degree of diversification of income streams (Acharya et al., 2006).

$$HHIInc = \left(\frac{InterestIncome}{\sum Income}\right)^2 + \left(\frac{NetTradinIncome}{\sum Income}\right)^2 + \left(\frac{FeesCommissions}{\sum Income}\right)^2 + \left(\frac{other}{\sum Income}\right)^2 \quad (3.2)$$

3.7.6 Banks Deposits Diversification

According to CBK (2016) there are four classes of deposits by banks that comprise of demand, savings, call and fixed deposits.

$$HHIDep = \left(\frac{Savings}{\sum Deposits}\right)^2 + \left(\frac{Demand}{\sum Deposits}\right)^2 + \left(\frac{Call}{\sum Deposits}\right)^2 + \left(\frac{Fixed}{\sum Deposits}\right)^2 \quad (3.3)$$

3.7.7 Investment Diversification

In order for the author make an estimate of the diversification degree of investments (HHIinv), bank investments were separated into four classes namely; placements, government securities, shares and other investments according the following model (CBK, 2016).

$$HHIInv = \left(\frac{Placements}{\sum Investments}\right)^2 + \left(\frac{GovSec}{\sum Investments}\right)^2 + \left(\frac{Shares}{\sum Investments}\right)^2 + \left(\frac{OtherInv}{\sum Investments}\right)^2 \quad (3.4)$$

3.7.8 Measure of Bank Size

According to Smirlock (1985), bank size was computed by estimating the total assets. Size of banks is the moderating variable used in analysing performance of commercial banks in Kenya. Bank size was represented by calculating the natural logarithm of total asset of all the individual banks. The impact of the size of a bank on profitability indicator was predominantly expected to be positive.

$$Banksize = Ln(Totalassets) \quad (3.5)$$

Table 3.2: Summary of the Research Variables Data Measurement

Variable	Category	Operational Indicators	Measurement	Hypothesized direction
Financial Performance	Dependent	Return on Equity (ROE)	Net income/Shareholders Equity	Positive/Negative
		Return on Assets (ROE)	Net income/total Assets	Positive/Negative
		Personal/Household sector loans and advances		
Credit portfolio Diversification	Independent	Primary sector loans and advances	Credit Herfindahl-Hirschmann Index (HHIcr)	Positive/Negative
		Secondary sector loans and advances		
		Tertiary sector loans and advances		
Income diversification	Independent	Interest income Trading income Fees and commissions Other Income-Forex dividends, Rent	Income Herfindahl-Hirschmann Index (HHIrev)	Positive/Negative
Banks Deposits diversification	Independent	Savings Deposits Demand Deposits Call Deposits Fixed Deposits	Deposits Herfindahl-Hirschmann Index (HHIdep)	Positive/Negative
Investment diversification	Independent	Placements, Government securities Shares Other investments	Investment Herfindahl-Hirschmann Index (HHIinv)	Positive/Negative
Bank Size	Moderating Variable	Proxy for the Size of the bank in terms of assets	Measured by taking natural logarithm of total assets for each bank	Positive/Negative

(Source: Smirlock 1985; Acharya et al., 2006; Busch & Kick 2009; Ongore & Kusa 2013; Berger et al., 2010).

3.8 Statistical Models Specification

This section sought to lay a framework of analysis basing its ground on the reviewed studies, and it involved adoption of a model that assisted in demonstrating the responsiveness of the key variables being studied. Data analysis as defined by Montgomery (1991) involves carefully examining collected information in an organized format to aid in understanding the increasing trend in any condition. Publication by Creswell (2014) outlined that analysis of data is the process that conclusions are step wise drawn, explanation of findings done and recommendation of a way forward in reference to study. Regression analysis based on panel data was used and was conducted using STATA version 13 data analysis statistical tool to examine the exact relationship nature of the that prevails between deposit, credit, investment, revenue and return on equity over the period of the study.

As outlined by Baltagi (1995), use of panel data makes it possible for the time effects recognition and be able to control for heterogeneity of individual banks, captured by components from models of random or fixed effects which are firm specific, that leads to biased results when neglected in estimations that employ time series cross section data. To make a prediction on the effect of deposit, sectoral credit, income streams and investment diversification on the commercial banks' financial performance in Kenyan context, the study deployed two models i.e. long run or static model and short run also referred to as dynamic panel model. Static or long run model made an assumption that performance from preceding period did not have an impact on the present period's performance and as a result, no lagged or persisting dependent explanatory variables was present in the estimation. Models in the short run held the assumption that immediate previous period performance, lagged dependent explanatory variable, had an influence on the present period's performance. Model in the short run as a result held an assumption that there was incomplete adjustment persisting in the performance process. Taking an example; banks in the short run can make use of their previous period's performance to cover for their present period performance, hence partial adjustment in the panel model in the short run. In conclusion, the short run, the long run models for the various objectives of the study are outlined as below based on hypotheses of the study:

Hypothesis 1

$ROE_{i,t}$ = f (CRPER, CRPRI, CRSEC, CRTER) (3.6a)

$ROA_{i,t}$ = f (CRPER, CRPRI, CRSEC, CRTER) (3.6b)

Upon linearization and parameterization which involved transforming the variables into natural logarithms the long run model was specified as:

$$ROE_{i,t} = \beta o + \beta_1 CRPER_{i,t} + \beta_2 CRPRI_{i,t} + \beta_3 CRSEC_{i,t} + \beta_4 CRTER_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.6c)$$

$$ROA_{i,t} = \beta o + \beta_1 CRPER_{i,t} + \beta_2 CRPRI_{i,t} + \beta_3 CRSEC_{i,t} + \beta_4 CRTER_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.6d)$$

And the short run model was specified as:

$$ROE_{i,t} = \beta o + \lambda ROE_{i,t-1} + \beta_1 CRPER_{i,t} + \beta_2 CRPRI_{i,t} + \beta_3 CRSEC_{i,t} + \beta_4 CRTER_{i,t} + \alpha_i + \varepsilon_{it} \quad .(3.6e)$$

$$ROA_{i,t} = \beta o + \lambda ROA_{i,t-1} + \beta_1 CRPER_{i,t} + \beta_2 CRPRI_{i,t} + \beta_3 CRSEC_{i,t} + \beta_4 CRTER_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.6f)$$

Where: CRPER is Personal/Household, CRPRI is Primary sector (Agriculture, Mining and Quarrying), CRSEC is Secondary sector (Manufacturing, Building, construction , Real Estate Energy and water), and CRTER is Tertiary sector (Trade and Financial Services, Tourism, Restaurant and Hotels, Transport and Communication) for Bank i at time *t*, αi is bank specific effect which held an assumption of normal distribution and with a variance that is constant and εit is the idiosyncratic error term which held an assumption of normal distribution and denotes other variables that were not included in this study. B represents coefficients of explanatory variables, $\lambda ROE_{i,\,t-1}$ is lagged bank performance. β_0 is the value of the financial performance when all independent variables effect is equal to zero.

Hypothesis 2

$ROE_{i,t}$ = f (INT, NTI, FC, OIC) (3.7a)

$ROA_{i,t}$= f (INT, NTI, FC, OIC) (3.7b)

Upon linearization and parameterization which involved transforming the variables into natural logarithms, the long-run model was specified as:

$$ROE_{i,t} = \beta o + \beta_1 INT_{i,t} + \beta_2 NTI_{i,t} + \beta_3 FC_{i,t} + \beta_4 OIC_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.7c)$$

$$ROA_{i,t} = \beta o + \beta_1 INT_{i,t} + \beta_2 NTI_{i,t} + \beta_3 FC_{i,t} + \beta_4 OIC_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.7d)$$

And the specification of short run model was:

$$ROE_{i,t} = \beta o + \lambda ROE_{i,t-1} + \beta_1 INT_{i,t} + \beta_2 NTI_{i,t} + \beta_3 FC_{i,t} + \beta_4 OIC_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.7e)$$

$$ROA_{i,t} = \beta o + \lambda ROE_{i,t-1} + \beta_1 INT_{i,t} + \beta_2 NTI_{i,t} + \beta_3 FC_{i,t} + \beta_4 OIC_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.7f)$$

WhereINT, NTI, FC, OIC are interest income, Net trading income, fees and commissions, other income respectively for Bank *i* at time *t*.

Hypothesis 3

$$ROE_{i,t} = f(SD, DD, CD, FD) \quad (3.8a)$$

$$ROA_{i,t} = f(SD, DD, CD, FD) \quad (3.8b)$$

Upon linearization and parameterization which involved transforming the variables into natural logarithms the long run model was specified as:

$$ROE_{i,t} = \beta o + \beta_1 SD_{i,t} + \beta_2 DD_{i,t} + \beta_3 CD_{i,t} + \beta_4 FD_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.8c)$$

$$ROA_{i,t} = \beta o + \beta_1 SD_{i,t} + \beta_2 DD_{i,t} + \beta_3 CD_{i,t} + \beta_4 FD_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.8d)$$

And the short run model was:

$$ROE_{i,t} = \beta o + \lambda ROE_{i,t-1} + \beta_1 SD_{i,t} + \beta_2 DD_{i,t} + \beta_3 CD_{i,t} + \beta_4 FD_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.8e)$$

$$ROA_{i,t} = \beta o + \lambda ROE_{i,t-1} + \beta_1 SD_{i,t} + \beta_2 DD_{i,t} + \beta_3 CD_{i,t} + \beta_4 FD_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.8f)$$

SD, DD, CD and FD are savings deposit, demand deposit, call deposit and fixed deposits.

Hypothesis 4

$ROE_{i,t} = f(PLA, GOV, SHA, OTH)$ (3.9a)

$ROA_{i,t} = f(PLA, GOV, SHA, OTH)$ (3.9b)

Upon linearization and parameterization, the long run model was specified as:

$$ROE_{i,t} = \beta_o + \beta_1 PLA_{i,t} + \beta_2 GOV_{i,t} + \beta_3 SHA_{i,t} + \beta_4 OTH_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.9c)$$

$$ROA_{i,t} = \beta_o + \beta_1 PLA_{i,t} + \beta_2 GOV_{i,t} + \beta_3 SHA_{i,t} + \beta_4 OTH_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.9d)$$

And the short run model was:

$$ROE_{i,t} = \beta_o + \lambda ROE_{i,t-1} + \beta_1 PLA_{i,t} + \beta_2 GOV_{i,t} + \beta_3 SHA_{i,t} + \beta_4 OTH_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.9e)$$

$$ROA_{i,t} = \beta_o + \lambda ROE_{i,t-1} + \beta_1 PLA_{i,t} + \beta_2 GOV_{i,t} + \beta_3 SHA_{i,t} + \beta_4 OTH_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.9f)$$

Where PLA, GOV, SHA, and OTH are placements, government securities, shares and other investments respectively for Bank *i* at time *t*.

Hypothesis 5

A general panel regression model accommodating all the hypotheses that explain Banks portfolio diversification and the independent variables obtained there from, the study can therefore be adopt following the work of Berger et al. (2010). The model is dependent on the calculated values of ROA, ROE and HHI values of independent variables of each bank for the period 2002-2016.

$ROE_{i,t} = f(HHI_{Inc}, HHI_{cr}, HHI_{dep}, HHI_{inv})$ (3.10a)

$ROE_{i,t} = f(HHI_{Inc}, HHI_{cr}, HHI_{dep}, HHI_{inv})$ (3.10b)

Upon linearization and parameterization, the static model was stated as below:

$$ROE_{i,t} = \beta o + \beta_1 HHIInc_{i,t} + \beta_2 HHIcr_{i,t} + \beta_3 HHIdep_{i,t} + \beta_3 HHIinv_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.10c)$$

$$ROA_{i,t} = \beta o + \beta_1 HHIInc_{i,t} + \beta_2 HHIcr_{i,t} + \beta_3 HHIdep_{i,t} + \beta_3 HHIinv_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.10d)$$

And the short run model was:

$$ROE_{i,t} = \beta o + \lambda ROE_{i,t-1} + \beta_1 HHIInc_{i,t} + \beta_2 HHIcr_{i,t} + \beta_3 HHIdep_{i,t} + \beta_3 HHIinv_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.10e)$$

$$ROA_{i,t} = \beta o + \lambda ROE_{i,t-1} + \beta_1 HHIInc_{i,t} + \beta_2 HHIcr_{i,t} + \beta_3 HHIdep_{i,t} + \beta_3 HHIinv_{i,t} + \alpha_i + \varepsilon_{it} \quad (3.10f)$$

$HHIcr_{i,t}$, $HHIInc_{i,t}$, $HHIdep_{i,t}$, $HHIinv_{i,t}$ are sectoral credit diversification, Income stream diversification, deposit diversification, and investment diversification respectively for Bank i at time t.

Introducing Bank Size as a Moderator

The fifth objective of the study was to scrutinize the moderating effect of bank size on the relationship between banks' portfolio diversification and financial performance of commercial banks in Kenya. Awang (2012) analysis methodology to assess bank size moderation on the relationship between bank portfolio diversification and financial performance of commercial banks was used. Assuming a multiplicative functional form between explanatory and explained variables by introducing bank size as a moderator;

Linearized and parameterized long run models (Fixed or Random effect) were as shown in equations 3.11a and 3.11b

$$ROE_{i,t} = \beta_0 + \sum_{j=1}^{4} \beta_j X_{i,t} + \beta_q M_{i,t} + \sum_{j=5}^{8} \beta_j X_{i,t} M_{i,t} + \alpha_{i,t} + \varepsilon_{i,t} \quad \text{.....(3.11a)}$$

$$ROA_{i,t} = \beta_0 + \sum_{j=1}^{4} \beta_j X_{i,t} + \beta_q M_{i,t} + \sum_{j=5}^{8} \beta_j X_{i,t} M_{i,t} + \alpha_{i,t} + \varepsilon_{i,t} \quad \text{.....(3.11b)}$$

Linearized and parameterized short run models (GMM) were as specified as;

$$ROE_{i,t} = \beta_0 + \lambda ROE_{i,t-1} + \sum_{j=1}^{4} \beta_j X_{i,t} + \beta_q M_{i,t} + \sum_{j=5}^{8} \beta_j X_{i,t} M_{i,t} + \alpha_{i,t} + \varepsilon_{i,t} \quad (3.11c)$$

$$ROA_{i,t} = \beta_0 + \lambda ROE_{i,t-1} + \sum_{j=1}^{4} \beta_j X_{i,t} + \beta_q M_{i,t} + \sum_{j=5}^{8} \beta_j X_{i,t} M_{i,t} + \alpha_{i,t} + \varepsilon_{i,t} \quad (3.11d)$$

The test of moderation is operationalized by the product term X*it*M*it* the multiplication between independent variable X*it* and moderator variable M. For testing moderation in the model, there was need to test β5- β8 which was the coefficient of interaction term X*it*M*it*. If β5- β8 were significant, conclusion was that moderator variable bank size moderates the relationship between banks' portfolio diversification, X*it* and financial performance, Y*it*. If =1, bank size is large, otherwise is zero. M*i,t* is bank size measured by natural logarithm of total assets of a bank at time t.

3.9 Panel Data Regression Model Estimation

It is of great importance that the study should ensure there is no inherent violation of the assumptions held by the classical linear regression model (CLRM) before any attempt for panel model equations estimation. If the panel model equations are estimated when there is a violation of some or all of the assumptions that are held by CRLM, it invites the risk of getting inconsistent, inefficient and biased parameterized estimates. It was indicated by Baddeley and Barrowclough (2009) that panel data sometimes has group effects that are either time effects, unobserved, or both being included in the estimated error term. These effects can be random, fixed or combination of the two effects. These two types of effects can result in endogeneity and heterogeneity and the estimators thus seem inconsistent, inefficient, and biased. Baum (2006) highlighted that the panel data models which are model of fixed effects or random effects, does permits across the various panel units for heterogeneity and sometimes across time often strictly the heterogeneity are intercept confined terms of

the relationship. Dynamic panel models, as well as constant coefficients models, are analytics model of panel data that were of interest in this study.

3.9.1 Fixed or Random Effects Model

In the model that has fixed effects, unobserved bank effects are permitted to have a correlation with the variables which are explanatory, hence there is an allowance of endogeneity that is in limited form (Cameron & Trivedi, 2009). This model is good in controlling or partial out for variables that are omitted and differing between the banks but are over time constant (time-invariant), hence termed as banks fixed effects. The random effects model holds the assumption that there exists no correlation between unobserved effects with all the independent variables. Baum (2006) stated that the effects that are individual-specific are estimated or parameterized as random and additional disturbances. The random-effects model enabled researcher estimate for some variables omitted and are over time constant, shows variance between banks and other variables omitted, over time vary and between banks are constant. To avoid covariance matrix complication, an assumption that neither autocorrelation nor heteroskedasticity existed within the panels was held.

3.9.2 Dynamic Panel Model

Dynamic panel also called lagged regression models can be explained as models that take into consideration time lags. There was a likelihood that there existed panel specific autocorrelation or across all panels autocorrelation. According to Wooldridge (2012), the need for dynamic panel analysis is as a result of lagged residuals auto-regression which may suggest non-existence or existence of autocorrelation. Ordinary Least Squares is not appropriate in situations where the problem of multi-collinearity is present meaning there is a correlation of sequential lagged values of a regressor.

The study approximated both long run/static and short run/dynamic panel models as specified in statistical panel models equations above. Specified long-run models were estimated by the aid of the random or fixed-effects models and the short-run models were estimated by the aid of the system generalized method of moments estimator

(Verbeek, 2004). The system GMM estimator can be defined as a statistical technique whereas observed economic data is combined with the data in population moment environments to construct estimates relating to not-known parameters of the current economic model. Roodman (2006) explained that if data exhibits a larger number of countries in relation to the period of time, the estimator of GMM-difference as Arellano and Bond (1991) proposed and the GMM-system estimator as proposed by Blundell and Bond (1998) and Arellano and Bover (1995) applies better. Typically, as stated by Eberhardt (2012), these estimators come to perspective to analyze micro panel datasets. The reason for employing GMM was mainly the dynamism of the short-run or dynamic specifications. GMM estimators have also been found to exhibit consistency and efficiency.

3.9.3 Pre-Estimation and Post-Estimation Diagnostic Tests

According to Wooldridge (2012), models of fixed effects or random effects are applied when observing samples with similar individual characteristics over different period of time. Pooled OLS is applied when selecting a different sample for each period of the panel data. The study, therefore, employed FEM or REM to estimate the model in the long run. To determine the suitability of assumptions of normality that are pre-estimated of the model of one-way error component and the acceptable level of multi-collinearity, Bera-Jarque normality test suggested by Galvao *et al.* (2013) and correlation analysis was used respectively. Likelihood Ratio (LR) was used as a test of Heteroskedasticity. To determine the extent of estimates reliability, various post estimation diagnostics were elaborated. The fixed and random effect model involved F-statistic interpretation, R-square estimates, pair-wise correlation, and Hausman test. The GMM specification for short-run model involved the elaboration of diagnostic tests of autocorrelation by Arrelano and Bond as well as Sargan test for identification problem validity in system-GMM. Detailed in the following paragraphs are the pre and post estimation diagnostics tests that were applied in the study.

Panel Hausman Test

Hausman test was important in differentiating between two specification long-run models namely fixed effects FEM and random effects REM. The Hausman test was employed to test which model between FEM and REM was better and that fits the data best. The null hypothesis of the test was that regressors and individual heterogeneity are strictly exogenous. Considering the assumptions to be made of the distribution of random and fixed effects model and behaviour of individual-specific effects/heterogeneity, the null hypothesis signifies consistency of specifications of FEM over REM. If p-value>0.05, use random-effects model (Wooldridge, 2012).

Panel Unit Root Test

Taking into consideration that unbalanced panel data had cross-sections and as well time series, it was important to account for time series stationarity because estimating data that was time-series held the assumption there was stationarity of variables. According to the conclusion by Gujarati, (2003) if models are estimated having not taken into account the nature of data of non-stationarity would henceforth result in spurious findings. In the current study, Levin-Lin-Chu test was adopted. The benefit of this test of unit root is that it permitted for unbalanced panels which had gaps. It also performed tests of Phillips-Perron or Dickey-Fuller for every panel, and four distinct tests are reported. The test had a null hypothesis that there was unit root in all panels. An alternative hypothesis was that one or some of the panels did not have unit roots (Choi, 2001). If the researcher found that any or all of the variables had a unit root, the variable was differenced, and the panel model equations were run using the differenced variable.

Correlation Analysis and Multi-collinearity

The correlation matrix applied in the study was used as a diagnostic test to pre-estimate for multi-collinearity and indicates the correlations and the corresponding significance that exists between various variables. The matrix of correlation indicates preceding insight concerning the direction and strength of the relationship of the variables. According to Wooldridge (2012), multi-collinearity problem occurs when

there is a high correlation between two or more independent variables. This problem arising from multi-collinearity can cause outcomes that are less accurate in the analysis. Sometimes coefficients can exhibit high standard errors and maybe even signs that are incorrect or magnitudes that are implausibly large. A majority of empirical studies holds varying arguments towards this problem of multi-collinearity.

According to Malhotra (2007), the problem of multi-collinearity is present when the coefficient of correlation between the variables is greater than 0.75. Recommendation by Cooper and Schindler (2013) was that when the coefficient of correlation amongst the study explanatory variables goes above 0.8, it should be accounted for by correcting it. According to Hair et al. (2011) argument, the coefficient of correlation which falls above 0.9, sometimes leads to the problem of multi-collinearity. Coefficient of correlation matrix was used to elaborate on the correlation existing between various explanatory variables in this study.

According to Cooper and Schindler (2013), pair-wise correlation coefficients that are below 0.8 imply that problems arising from the presence of multi-collinearity have less severity and normally ought not to be corrected. Correlation coefficients, however, that is higher than 0.8, normally points out that there is a prevalence of higher degree of multi-collinearity amongst the regressors and this calls for action to remedy the overall situation. The unbalanced panel data model was employed to control for multi-collinearity. If the assumption is violated, the variables causing multi-collinearity was subsequently to be omitted.

Bera-Jarque Normality Tests

The tests of significance which include t-tests and the standard errors draw their argument on the important assumption of CLRM which states that the error term is normally distributed, and its variance is constant. The study first established a priori that component models of one-way error and that are in the panel data sets are normally distributed and have a constant variance. Bera-Jarque normality test extension by Galvao, *et al.* (2013) was used, which is a standard test and can be undertaken post or pre estimation of the model. This test had a null hypothesis indicating that components relating to the error term were normally distributed.

Rejecting the null hypothesis implied that model's t-tests and standard errors could not be used to estimate the significance of coefficients in the models. If p value< 5% then the null hypothesis was rejected, and data was not normally distributed. The researcher, therefore, transformed the variables into their natural logs and adopted robust standard errors while estimating the model.

Likelihood Ratio (LR) Test of Heteroskedasticity.

As one of the assumptions held by CLRM, Heteroskedasticity ought to be checked for in the collected data and if found to exist, be taken care of by proper accounting for it. CLRM holds the assumption that the error term has a variance that is constant meaning it is homoskedastic. Heteroskedasticity is said to exist in the data if the variance of the error term is found not to be constant. If a model of regression is run having not accounted for heteroskedasticity, it would lead to parameter estimates that though unbiased, have invalid or biased standard errors.

Panel level heteroskedasticity was checked by the use of the test proposed by Poi and Wiggins (2001) called Likelihood Ratio or LR test. The test held a null hypothesis that stated that constant variance of the error term is observed. Following the rejection of the null hypothesis, the author concluded that there was a heteroskedasticity attribute in the data being studied, and this was properly accounted for in STATA using robust standard errors while estimating the regression model.

F and Wald Test

The F test together with Wald test were post estimation diagnostic tests that estimated whether, in the model of fixed and random effects, coefficients of variables that are independent were deemed jointly significant in determining variations observed in the explained variable. The tests held first, that all coefficients jointly equated to zero as the null hypothesis and indicating that at least one of the coefficients did not equate to zero as the alternative hypothesis. In the event of null hypothesis was rejected, the implication was that explanatory variables were deemed jointly significant in the explanation of variations observed in the dependent variable.

R-square Estimate/Goodness of fit

It is a property of panel data that variations observed in a variable can be explained by individual changes over time and changes between any two individuals. Within R Square explained what length of the variance between separate panel units a model accounted for thus explained per cent of variations in the ROA and ROE were due to differences within individual banks over time. The between R square explained how much of the variance within the panel units the model accounted for thus it was the variations in the dependent variables due to variations between individuals. It explained per cent of the variations in the ROA and ROE were as a result of differences between the banks. The overall R square was a weighted average of within and between R square. It is a percentage change in ROE and ROA that was accounted for by the variables to be considered in the model. The other percentage change was as a result of other variables that were not addressed by the model.

Test for Autocorrelation

The correlation of error terms in different periods is known as the autocorrelation and consequently, standard errors affects the efficiency of estimators since they are distorted (Woodridge, 2013). The null hypothesis was rejected if the p-value was less than 0.05. Serial correlation is where error term in time series data or cross-sections observations transfer from one period to another correlating with each other between periods. All processes exhibiting unit root seem to be with serial correlation, but not every time series that is deemed serially correlated do not have a unit root.

Autocorrelation was tested using Wooldridge F-test and the null hypothesis was that there was no serial correlation against the alternative of the presence of serial correlation. The test had a null hypothesis of no serial correlation in both cases. Rejecting the null hypothesis implied the presence of a given order of serial correlation while the failure of rejection of the null hypothesis implied the absence of serial order correlation. Based on deductions, appropriate selection of instruments from the second or first lag and differences was made (Roodman, 2006).

Granger causality

Granger causality is a test used to examine whether there is a nexus between two study variables (Granger, 1988). In the current study, granger causality assumes the reverse effect between bank portfolio diversification and financial performance of Kenyan commercial banks. The null hypothesis was tested at 5% level of significance and if the p-value were greater than 0.05 then banks' portfolio diversification does not granger cause performance of Kenyan commercial banks.

Sargan Test for the Identification Problem Validity in system-GMM

Notwithstanding a variety of strengths that are attributed to analysis of dynamic data, autocorrelation existence or serial correlation presence and instruments number over-identification seems to be the common difficult situation connected with GMM estimator. The problems restrain the efficiency of outcomes as derived from GMM estimators (Hayakawa, 2014). As it was inferred by Hayakawa (2014), there exist two huge determinants of behavior of finite sample by the estimator; versus, the numbers of conditional moments and robustness of identifying the instruments. Sargan test was adopted to examine the possibilities of the model under estimation. The null hypothesis stated that underlying conditions for the model were satisfied against an alternative of their non-satisfaction. Findings revealed that the model was correctly identified if its p-value was less than 0.05.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter introduced, interpreted, and discussed panel data gathered from annual financial statements, KNBS reports, and the CBK's annual banking supervision report. For data analysis, descriptive statistics, diagnostic tests, and regression analysis were used. Figures and tables were used to present the results of the study. The data was collected from 43 commercial banks and was unbalanced. Natural logarithms of total assets were used to measure bank scale, while HHI was used to calculate banking portfolio diversification.

4.2 Descriptive Statistics

Descriptive statistics considered in the study included measures of tendency, mean and dispersion, standard deviation, minimum and maximum. Distribution was measured using skewness and kurtosis and normality was measured using the test by Jarque Berra.

4.2.1 Descriptive Statistics for Commercial Banks in Kenya

Central tendency and dispersion were used as descriptive statistics indicators throughout the analysis. Mean and median were included in the former, while standard deviation, minimum, maximum skewness, and kurtosis were included in the latter. The Jarque-Bera test was used to determine normality. As shown in Table 4.1, the average performance on ROE of banking institutions in Kenya was 16.27% with a maximum of 49.40% and minimum of -26.20%. Banking ROE varied with standard deviations of 14.71%; it was not normally distributed because Jarque-Berra p value < 0.05. Average ROA for banking system in Kenya was 2%, with minimum of -17% and maximum of 7.70%. ROA was not normally distributed since Jarque-Berra coefficient had p value <0.05, this presented ample proof to warrant non-acceptance of null hypothesis which stated that the data was normally distributed. Average sectoral credit diversification was 0.63, which indicated low levels of credit

diversification amongst commercial banks. There were wide variations in extent of credit sectoral diversification with a minimum of 0.10, which indicated high levels of diversification and a maximum of 0.96 which showed high concentration of sectoral credit amongst commercial banks.

Regarding income streams diversification amongst banks in Kenya, the average was 0.67, which indicated low diversification on alternative streams of income amongst banks. There were wide variations in income sectoral diversification with minimum of 0.29 and maximum of 0.93. Average deposits portfolio diversification was 0.65, which indicated low diversification of deposits portfolio diversification amongst banks in Kenya. Investment portfolio diversification averaged at 0.66, the minimum was IPD was 0.25 and maximum 0.92. This shows that some banks were highly concentrated on their investment choice and others highly diversified. Since their respective Jarque-Berra coefficients were less than 0.05, none of the banks' portfolio diversification was normally distributed. The average bank size was 9.86 with minimum of 2.23 and maximum of 14.86. There were lean variations on commercial banks size as stipulated by standard deviation of 1.51.

Referring to Muigai and Muriithi (2017) suggestions, the scrutiny adopted a skewness of zero (0) for normal distributions bearing symmetrical distributions, and a typical value implies values ranging from -3 to +3. A negative value indicates that the skewness is to the left, whereas a positive number indicates that the skewness is to the right. As a result, kurtosis is a measurement of the density of a distribution's tails. When the kurtosis equals three and the skewness equals zero, the distribution is considered normal. When kurtosis is greater than three, the distribution is thicker or has heavier tails than a normal distribution. (Curran, West & Finch, 1996). Kurtosis was lowest at 2.33 and highest at 13.86. This outcome suggested that every components kurtosis was not symmetric to that of normal distribution. The kurtosis was also higher than the prescribed value of three, meaning that the data was not normally distributed. Furthermore, elements of the error term were either more or less peaked than a typical distribution would show. Since all of the kurtosis coefficient indices were above three, ROA, ROE, and bank size exhibited leptokurtic kurtosis in nature, as shown in the table. Since all of the kurtosis coefficient indices

were below three, the bank portfolio diversification variables had a platykurtic kurtosis. It is convenient to assume the error terms disturbances or residuals are normally distributed with zero mean and constant variance but Greene, (2012) made clarity that, while normality allows for some exact statistical results and is useful in the construction of confidence intervals and test statistics, it is not necessary or a conformity to obtain the majority of the results in multiple regression analysis.

The probability value was 0.000 for all the components in the series, indicating that the model used in the study was well-fitting and that every variable examined was expected to have a significant impact on the financial performance of the Kenyan banking industry. The finding supported inferences by Acharya et al., (2006); Calmes and Theore, (2013); Teimet, Ochieng and Anywa (2011) who indicated five years trends of diversification on all banks in Kenya that was not normal and some banks were highly concentrated on their diversification choice and others highly diversified. Kurtosis that was not symmetrical to that of a normal distribution was validated by the study conducted byGithira, Muturi, and Nasieku (2019) that reported non-normality of firms' financial features and stock return of listed non-financial enterprises in East Africa securities markets.

Table 4.1: Descriptive Statistics for Commercial Banks in Kenya

			HHI	**HHI**	**HHI**	**HHI**	
	ROE	**ROA**	**SCD**	**ISD**	**DPD**	**IPD**	**Bank Size**
Mean	16.27	2.00	0.63	0.67	0.65	0.66	9.86
Median	17.19	2.49	0.70	0.69	0.71	0.73	9.66
Maximum	49.40	7.70	0.96	0.93	0.96	0.92	14.86
Minimum	-26.20	-17.00	0.10	0.29	0.26	0.25	2.23
Std. Dev.	14.71	3.52	0.20	0.16	0.16	0.16	1.51
Skewness	-0.56	-2.73	-0.73	-0.52	-0.75	-0.75	-0.30
Kurtosis	3.11	13.86	2.33	2.42	2.50	2.37	5.32
Jarque-Bera	30.80	3531.84	62.48	33.58	59.97	63.81	138.15
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	9338.83	1150.31	362.93	385.97	374.41	376.40	5661.34
Sum Sq. Dev.	124064.40	7084.77	22.40	14.10	15.32	15.56	1311.88
Observations	574	574	574	574	574	574	574

4.2.2 Descriptive Statistics for Sectoral Credit Diversification

Firstly, the study scrutinized effects of sectoral credit diversification on financial performance of commercial banks in Kenya. Sectoral credit diversification was classified into household, primary, secondary and tertiary sectoral credit. Household sector comprised Personal credits allocation, Primary sector comprised of allocations of credit to Agriculture, Mining and Quarrying, Secondary sector comprised of allocations of credit to Manufacturing, Building, construction, Real Estate Energy and water, Tertiary sector comprised allocations of credit to Trade and Financial Services, Tourism, Restaurant and Hotels, Transport and Communication. As displayed in Table 4.2, the mean household credit was 10.17, with maximum of 38.91 and minimum of 1.07. Primary sector had an average of 11.98 with maximum of 32.00 and standard deviation of 6.74. Secondary sector had an average of 8.38 with minimum of 1.09. Tertiary sector had an average of 13.81 which was the highest followed by primary sector and the least was secondary. None of sectoral credit was normally distributed amongst commercial banks. There were wide variations of credit allocations to the various sectors of the economy as observed by minimum, maximum and standard deviations.

The study used a skewness of zero (0) for normal distributions with symmetrical distributions, and a typical value suggests values between -3 and +3 (Muigai & Muriithi, 2017). Skewness to the left is represented by a negative value, whereas skewness to the right is represented by a positive value. The heaviness of a distribution's tails is measured by kurtosis. If kurtosis equates to three and skewness is equal to zero, then distribution is normal. When kurtosis exceeds three, then the distribution is thicker or heavier tails than the normal (Curran, West & Finch, 1996). The error term's elements were either more or less peaked than those exhibited by a normal distribution. As seen in the table, all of the variables in nature displayed leptokurtic kurtosis because all of the kurtosis coefficient indexes were positive. The probability values for all the components in the series were 0.000, indicating that the model used in the study was well-fitting and that every variable examined was expected to have a significant impact on the financial performance of the Kenyan banking industry. The researcher employed a larger sample and transformed the

variables to natural logarithm. The findings cemented Mulwa (2018); Meressa (2017); Yudistira and Anggono, (2013); Acharya et al. (2006) whose observation was sectoral lending diversification increases return of banks and it also produces endogenous risky loans.

Table 4.2: Descriptive Statistics Sectoral Credit Diversification

	Household credit	Primary sector	Secondary sector	Tertiary sector
Mean	10.17	11.98	8.38	13.81
Median	8.06	8.97	8.22	10.60
Maximum	38.91	32.00	31.43	38.19
Minimum	1.07	1.04	1.09	1.03
Std. Dev.	6.05	6.74	3.06	7.28
Skewness	1.55	0.72	2.51	0.72
Kurtosis	5.50	2.67	20.31	2.84
Jarque-Bera	378.36	52.32	7766.70	50.44
Probability	0.00	0.00	0.00	0.00
Sum	5837.16	6874.78	4812.76	7926.47
Sum Sq. Dev.	20995.54	26023.12	5350.72	30390.75
Observations	574	574	574	574

4.2.3 Descriptive Statistics for Income Streams Diversification

Secondly, the study scrutinized effects of income streams diversification on financial performance of commercial banks in Kenya. Income streams diversification was operationalized as interest income, fees and commission, trading income, and other income streams. As displayed in Table 4.3, mean interest income was 9.75, with minimum of 2 maximum of 31.52. The average trading income was 7.73, with minimum of 2.01 and maximum of 28.89. Fees and commissions averaged at 8.42, with standard deviation of 5.79. Other income averaged at 7.42 which had the least average and minimum of 1.10. Owing availability of information sought, 574 observations were generated for income streams variables. None of income streams diversification variables had Jarque-Berra coefficient greater than 0.05, hence all were not normally distributed hence justifying use of either FGLS or robust standard errors. Furthermore, elements of the error term were either more or less peaked than

a normal distribution would show. Because all of the kurtosis coefficient indexes were positive, all of the variables displayed leptokurtic kurtosis in nature, as seen in the table. The probabaility values exhibited by each and every component in the series was zero depicting that model adopted in this study was best fitting and expectation was that all variables relating to income stream quantified was anticipated to significantly impact financial performance in the context of Kenyan banking sector. The finding supporting findings by Calmes and Theore (2013); Teimet, Ochieng and Anywa (2011) who indicated five years trends of income streams diversification on all commercial banks in Kenya that was not normal and significantly had an impact on financial performance observed in the banking industry.

Table 4.3: Descriptive Statistics for Income Streams Diversification

	Interest income	**Trading income**	**Fees & commission**	**Other income**
Mean	9.75	7.73	8.42	7.42
Median	7.59	5.86	6.05	5.69
Maximum	31.52	28.89	29.76	29.62
Minimum	2.00	2.01	2.07	1.10
Std. Dev.	3.39	5.02	5.79	6.12
Skewness	3.11	0.91	1.35	1.19
Kurtosis	19.22	2.97	4.11	3.79
Jarque-Bera	7220.68	78.93	204.55	150.92
Probability	0.00	0.00	0.00	0.00
Sum	4450.96	4438.16	4830.25	4835.74
Sum Sq. Dev.	6591.90	14454.06	19230.93	21433.09
Observations	574	574	574	574

4.2.4 Descriptive Statistics for Deposits Portfolio Diversification

Thirdly, the study determined effects of deposits portfolio diversification on commercial banking performance in Kenya. Deposits portfolio diversification was operationalized as savings, demand, call and fixed deposits. As shown in Table 4.4, average savings was 9.24, followed by 9.02 for fixed deposits, 8.93 for demand deposits and 8.89 for call deposits. None of deposits portfolio components was

normally distributed as indicated by p value < 0.05 for Jarque-Berra coefficients. Savings amongst banks differed most since it had the highest standard deviations and the least variation was in calls deposits though it was the least demanded.

According to Muigai and Muriithi (2017), the scrutiny adopted a skewness of zero (0) for normal distributions bearing symmetrical distributions, and a typical value implies values ranging from -3 to +3. A negative value indicates that the skewness is to the left, whereas a positive number indicates that the skewness is to the right. As a result, kurtosis is a measurement of the density of a distribution's tails. When the kurtosis equals three and the skewness equals zero, the distribution is considered normal. When kurtosis is greater than three, the distribution is thicker or has heavier tails than a normal distribution. (Curran, West & Finch, 1996). Kurtosis relating to deposit was more than three apart from kurtosis for savings deposit which was observed as platykurtic.

Positive skewness suggested that diversity of financing had a considerable positive effect on performance, according to Mulwa (2013), and no deposit component distribution was normal. As seen in the table, all variables demonstrated leptokurtic kurtosis in nature, with the exception of saving deposits, because all of the kurtosis coefficient indexes were positive. The study observed (p-value = 0.0000 > 0.05, N=540) amongst every components in the series cementing that model directing this study was best fitting and there was expectation that components quantified to operationalize deposit portfolio was anticipated to significantly have an impact on financial performance of Kenyan banking industry.

Table 4.4: Descriptive Statistics for Deposits Portfolio Diversification

	Savings	Demand	Call	Fixed
Mean	9.24	8.93	8.89	9.02
Median	7.56	8.77	8.68	7.78
Maximum	26.57	21.48	19.93	25.87
Minimum	2.24	1.40	2.03	1.10
Std. Dev.	5.25	3.38	2.95	4.39
Skewness	0.78	1.07	0.90	1.38
Kurtosis	2.69	5.43	5.27	4.73
Jarque-Bera	60.31	250.07	200.53	254.63
Probability	0.00	0.00	0.00	0.00
Sum	5301.91	5124.85	5101.69	5175.87
Sum Sq. Dev.	15820.98	6551.34	4986.01	11027.52
Observations	574	574	574	574

4.2.5 Descriptive Statistics for Investment Portfolio Diversification

The fourth objective examined effects of investment portfolio diversification on financial performance of banks in Kenya. Investment portfolio diversification was operationalized as placements, investment in government securities, shares and other investments. As shown in Table 4.5, most commercial banks had their highest investment in government securities with an average of 8.73, followed by placed 8.58, then other investment 8.45 and shares 8.24. The widest variation in banking investment was in shares which had standard deviation of 4.97 and other investment with standard deviation of 4.81. Jarque-Berra coefficients with p values less than 0.05 suggested that none of these investment kinds were regularly distributed among banks.

The probability values for all the components in the series were 0.000, indicating that the model used in the study was well-fitting and that every variable pertaining to investment avenues assessed was expected to have a significant impact on the financial performance of the Kenyan banking industry. Therefore, banks should focus its work to advance the courage to practice portfolio diversification, coming up with policies relating to marketing more so that encourage its use and establishment

of the best combination of assets that can yield an efficient portfolio. As shown in the table, kurtosis for all investment portfolio diversification factors was of a leptokurtic type in nature since all kurtosis coefficient indices were more than three. The outcome agreed with Kipleting and Bokongo (2016) who investigated the effect of investment diversification on the financial performance of commercial banks in Kenya.

Table 4.5: Descriptive Statistics for Investment Portfolio Diversification

	Placement	**Government securities**	**Shares**	**Other investment**
Mean	8.58	8.73	8.24	8.45
Median	8.42	7.68	6.54	6.81
Maximum	27.32	19.96	27.60	25.32
Minimum	2.15	2.00	1.22	2.23
Std. Dev.	2.57	3.11	4.97	4.81
Skewness	2.10	1.74	1.12	1.11
Kurtosis	13.73	7.98	3.32	3.05
Jarque-Bera	3173.16	883.36	121.77	117.44
Probability	0.00	0.00	0.00	0.00
Sum	4923.83	4668.18	4729.66	4847.59
Sum Sq. Dev.	3793.96	5539.46	14172.58	13274.47
Observations	574	574	574	574

4.3 Panel Diagnostic Tests

To reduce the risk of fitting a fictitious model and deriving erroneous findings, panel diagnostic tests were run to ensure that cardinal classical regression linear model conditions were met. They comprised, among other things, normality, unit roots for stationarity, variance inflation factors for multi-collinearity, the Woodridge test for serial correlation, and the likelihood ratio test for heteroskedasticity.

4.3.1 Panel Unit Roots for Commercial Banks in Kenya

This study tested panel unit root to infer the order in which variables adopted were integrated. The test was purposedly undertaken to determine whether the variables

are deemed stationary or non-stationary at all panel levels. The following general regression equation was adopted by the study to solve the value of ρ:

Yit= $^{\alpha}$ + ρy.it±μit Where: Y= ROE, ROA, t=1……16 years and i=1….39 commercial banking institutions

While making reference to observation by Granger and Newbold, (1974), if ρ = 1, then the observation Yit was deemed dependent on its lag value Yit-1 which therefore suggests that data was non-stationary. On the contrary, if ρ<1, this suggested that observation Yit deemed independent of its lag value Yit-1 and the implication is the variable was stationary.

This test was necessary to determine regression results are robust. LLC, ADF, Im, Pesaran, and Shin W-stat, as well as Philips Perrons, were used to test stationarity. The p-values for the Fisher tests were based on asymptotic Chi-square distribution. The LLC test is based on asymptotic normality. Stationarity was tested using both LLC and Fisher type of tests owing to their effectiveness while handling unbalanced panel data (Baltagi, 2005; Muturi & Ngumi, 2016). The strength of LLC is anchored on its ability to test individual effects heterogeneous effects without specified model respecification. ADF and PP were presented for comparative purposes, the strength of PP is anchored on it being non-parametric as compared to ADF parametric test. Moreover, the duo confirmed and or complimented LLC findings. According to this test, whenever the p-value is lower than critical value of 5% (p<0.05), it informs null hypothesis rejection. Contrary, if the P-value is above critical value of 5% (p >0.05) this informs the null hypothesis acceptance. Return on equity, return on assets, HHI sectoral credit diversification, HHI income streams diversification, HHI deposits portfolio diversification, HHI investment portfolio diversification and bank size were observed to be stationary since all p values were lower critical value of than 0.05. The findings further reported that each of the test statistics were greater than critical value of (2.132) at 0.05 level of significance. As a result, prior to constructing regression models, there was no need to lag these variables.

These findings backed up Githira, Muturi, and Nasieku (2019), who found stationarity in firm financial parameters and stock returns of listed non-financial enterprises on East African securities exchanges and concluded that the variables employed to assess the relationship did not need to be lagged. Also, the results cemented oucome by Muchiri, Muturi and Ngumi (2016) who asserted stationarity of financial composition and financial performance of listed enterprises in East African securities exchanges and similarlly concluded no need to lag the respetive variables used in the study to scrutinize the linkages. The result failed to conform to Ochieng, Olweny, Oluoch and Ochere (2019a) who reported non stationarity of study variables.

Table 4.6: Panel Unit Roots for Commercial Banks in Kenya

Variable	Method	Statistic	Prob.
ROE	Levin, Lin & Chu t*	-7.5823	0.0000
	Im, Pesaran and Shin W-stat	-3.4361	0.0003
	ADF - Fisher Chi-square	130.4180	0.0002
	PP - Fisher Chi-square	123.3010	0.0008
ROA	Levin, Lin & Chu t*	-9.4022	0.0000
	Im, Pesaran and Shin W-stat	-4.0370	0.0000
	ADF - Fisher Chi-square	134.6020	0.0001
	PP - Fisher Chi-square	115.4640	0.0038
HHI Sectoral Credit diversification	Levin, Lin & Chu t*	-6.3581	0.0000
	Im, Pesaran and Shin W-stat	-4.1273	0.0000
	ADF - Fisher Chi-square	143.8070	0.0000
	PP - Fisher Chi-square	209.1060	0.0000
HHI Income streams diversification	Levin, Lin & Chu t*	9.3102	0.0000
	Im, Pesaran and Shin W-stat	-4.1157	0.0000
	ADF - Fisher Chi-square	132.3910	0.0001
	PP - Fisher Chi-square	238.4330	0.0000
HHI deposit diversification	Levin, Lin & Chu t*	-7.0598	0.0000
	Im, Pesaran and Shin W-stat	-5.2582	0.0000
	ADF - Fisher Chi-square	160.8770	0.0000
	PP - Fisher Chi-square	218.9390	0.0000
HHI Investment portfolio diversification	Levin, Lin & Chu t*	-6.6592	0.0000
	Im, Pesaran and Shin W-stat	-5.1638	0.0000
	ADF - Fisher Chi-square	154.6590	0.0000
	PP - Fisher Chi-square	248.3370	0.0000

4.3.2 Panel Unit Roots for Sectoral Credit Diversification

As depicted by Table 4.7, household credit, primary sector credit, secondary sector credit and tertiary sector credit all p values were lower critical value of than 0.05. The findings further reported that each of the test statistics was greater than critical value of (2.132) at 0.05 level of significance. This brought forth adequate justification for rejecting H_0 that stated that credit sectoral diversification was not stationary against an alternative that it was stationary. As a result, prior to building a regression model, there is no need to lag household credit, primary sector, secondary sector, or tertiary sector. These findings corroborated those of Wanjau, Muturi, and Ngumi (2018), who found that corporate transparency and financial performance of listed businesses in East Africa securities exchanges variables were stationary, implying that lagging was unnecessary.

Table 4.7: Panel Unit Roots for Sectoral Credit Diversification

Variable	Method	Statistic	Prob.
Household Credit	Levin, Lin & Chu t*	-15.4927	0.0000
	Im, Pesaran and Shin W-stat	-5.5276	0.0000
	ADF - Fisher Chi-square	154.2310	0.0000
	PP - Fisher Chi-square	258.3030	0.0000
Primary sector	Levin, Lin & Chu t*	-10.9958	0.0000
	Im, Pesaran and Shin W-stat	-6.1152	0.0000
	ADF - Fisher Chi-square	177.6440	0.0000
	PP - Fisher Chi-square	242.6940	0.0000
Secondary sector	Levin, Lin & Chu t*	-13.6169	0.0000
	Im, Pesaran and Shin W-stat	-7.6571	0.0000
	ADF - Fisher Chi-square	175.8540	0.0000
	PP - Fisher Chi-square	251.6820	0.0000
Tertiary sector	Levin, Lin & Chu t*	-12.2948	0.0000
	Im, Pesaran and Shin W-stat	-6.9140	0.0000
	ADF - Fisher Chi-square	181.4940	0.0000
	PP - Fisher Chi-square	279.7800	0.0000

4.3.3 Panel Unit Roots for Income Streams Diversification

The null hypothesis claimed that elements of income stream diversification were not stationary, as shown in Table 4.8, as opposed to the alternative that they were stationary. The conclusions of the study showed that there was enough evidence to reject H0, and that interest income, trading income, fees and commissions, and other sources of income were stationary, hence there was no need to lag them before fitting regression models against commercial bank performance. The study results failed to agree with Ochieng, Olweny, Oluoch and Ochere (2019a) who underlined that gross portfolio flows and volatility of stock markets in Kenya was stationary at first difference.

Table 4.8: Panel Unit Roots for Income Streams Diversification

Variable	Method	Statistic	Prob.
Interest income	Levin, Lin & Chu t*	-6.0691	0.0000
	Im, Pesaran and Shin W-stat	-3.4883	0.0002
	ADF - Fisher Chi-square	131.1780	0.0001
	PP - Fisher Chi-square	214.5250	0.0000
Trading income	Levin, Lin & Chu t*	-10.4830	0.0000
	Im, Pesaran and Shin W-stat	-6.7637	0.0000
	ADF - Fisher Chi-square	194.4140	0.0000
	PP - Fisher Chi-square	280.2960	0.0000
Fees and commission	Levin, Lin & Chu t*	-6.1078	0.0000
	Im, Pesaran and Shin W-stat	-4.6693	0.0000
	ADF - Fisher Chi-square	142.7940	0.0000
	PP - Fisher Chi-square	228.2800	0.0000
Other income	Levin, Lin & Chu t*	-7.2003	0.0000
	Im, Pesaran and Shin W-stat	-4.8380	0.0000
	ADF - Fisher Chi-square	150.2580	0.0000
	PP - Fisher Chi-square	239.7090	0.0000

4.3.4 Panel Unit Roots for Deposits Portfolio Diversification

The results of the study on the test for stationarity of deposit type's diversification are shown in Table 4.9. Savings, demand, call, and fixed deposits were hypothesized

to be non-stationary, as opposed to the alternative that they were. Savings, demand, call, and fixed deposits were all found to be stationary since their respective p values were less than 0.05, providing adequate evidence to support the alternative hypothesis. As a result, there was no need to lag the variables before building regression models. These findings affirmed Githira et al. (2019) that there was stationarity of data at all levels though they din't aclaim Ochieng et al. (2019a) results of non-stationarity of study variables.

Table 4.9: Panel Unit Roots for Deposits Portfolio Diversification

Variable	Method	Statistic	Prob.
Savings	Levin, Lin & Chu t*	-5.5558	0.0000
	Im, Pesaran and Shin W-stat	-4.7385	0.0000
	ADF - Fisher Chi-square	145.5910	0.0000
	PP - Fisher Chi-square	271.1740	0.0000
Demand	Levin, Lin & Chu t*	-5.4264	0.0000
	Im, Pesaran and Shin W-stat	-2.6196	0.0044
	ADF - Fisher Chi-square	122.2510	0.0004
	PP - Fisher Chi-square	206.5440	0.0000
Call	Levin, Lin & Chu t*	-4.7724	0.0000
	Im, Pesaran and Shin W-stat	-2.2685	0.0117
	ADF - Fisher Chi-square	118.2290	0.0008
	PP - Fisher Chi-square	201.2390	0.0000
Fixed	Levin, Lin & Chu t*	-7.3199	0.0000
	Im, Pesaran and Shin W-stat	-4.2656	0.0000
	ADF - Fisher Chi-square	132.4860	0.0001
	PP - Fisher Chi-square	213.3970	0.0000

4.3.5 Panel Unit Roots for Investment Portfolio Diversification

The results of the stationarity test for investments in placement, government securities, shares, and other investments are reported in Table 4.10. It was hypothesized that investment avenues diversification was not stationary as opposed to an alternative of stationarity. Because the p values for investments in placements, government securities, shares, and other investments were less than 0.05, this was adequate evidence for rejecting H0 and concluding that they were stationary. As a result, there was no need to lag these variables before building regression models to

investigate their impact on commercial banks' ROE and ROA in Kenya. These findings affirmed Githira et al. (2019) though they refuted Ochieng et al. (2019a).

Table 4.10: Panel Unit Roots for Investment Portfolio Diversification

Variable	Method	Statistic	Prob.
Placements	Levin, Lin & Chu t*	-9.1874	0.0000
	Im, Pesaran and Shin W-stat	-3.3356	0.0004
	ADF - Fisher Chi-square	111.2550	0.0005
	PP - Fisher Chi-square	186.0610	0.0000
Government securities	Levin, Lin & Chu t*	-9.9315	0.0000
	Im, Pesaran and Shin W-stat	-5.1623	0.0000
	ADF - Fisher Chi-square	140.9530	0.0000
	PP - Fisher Chi-square	225.9590	0.0000
Shares	Levin, Lin & Chu t*	-0.3476	0.0002
	Im, Pesaran and Shin W-stat	-3.5687	0.0002
	ADF - Fisher Chi-square	125.4660	0.0003
	PP - Fisher Chi-square	231.5510	0.0000
Other Investment	Levin, Lin & Chu t*	-8.1397	0.0000
	Im, Pesaran and Shin W-stat	-3.2938	0.0005
	ADF - Fisher Chi-square	117.1580	0.0027
	PP - Fisher Chi-square	261.3270	0.0000

4.4 Multi-collinearity Test

Classical regression modeling is based on the premise that independent variables are not collinear. The usage of variance inflation factors and tolerance limits was used to investigate multi-collinearity. If VIF was less than 10 or tolerance limits were more than 0.1, there was no collinearity. This was in line with Baltagi, (2005) recommendations.

4.4.1 Multi-collinearity Test for Commercial Banks in Kenya

When the variables were predicting either ROE or ROA, there was no collinearity between HHI sectoral credit diversification, HHI revenue streams diversification, HHI deposits portfolio diversification, and HHI investment avenues diversification, as shown in Table 4.11. Hence, all of them were jointly fitted in the model to

scrutinize the linkage between portfolio diversification and banking institutions' performance in Kenya. These findings concurred with Githira et al. (2019). A VIF value of 1 indicates that there was limited collinearity between the independent variables, but a number between 1 and 5 indicates moderate collinearity, and a number greater than 5 indicates that the independent variables were strongly multi-correlated. Therefore, we conclude that there is moderate multi-collinearity among the variables since the mean VIF for both models are close to 1.

Table 4.11: Multi-collinearity Test for Commercial Banks in Kenya

		Collinearity Statistics	
Dependent Variable		**Tolerance**	**VIF**
ROE	HHI Credit Diversification	0.395	2.53
	HHI Income Diversification	0.631	1.585
	HHI Deposit Diversification	0.378	2.648
	HHI Investment Portfolio	0.411	2.435
ROA	HHI Credit Diversification	0.395	2.53
	HHI Income Diversification	0.631	1.585
	HHI Deposit Diversification	0.378	2.648
	HHI Investment Portfolio	0.411	2.435

4.4.2 Multi-collinearity Test for Sectoral Credit Diversification

As indicated in Table 4.12, it supported that no collinearity amongst household credit, primary sector credit, secondary sector credit and tertiary sector credit when they were predicting ROE and ROA was detected. Consequently, they were jointly fitted in the model to pursue implications of sectoral credit diversification on banking performance in Kenya. These findings concurred with Mulwa (2018) who investigated sectoral credit and financial performance of commercial banks in East Africa and found absence of multicollinearity amongst independent variables. Sporta (2018) found that a VIF with a value of 1 indicates that there was low collinearity between the independent variables, a value between 1 and 5 indicates moderate collinearity, and a value greater than 5 indicates that the independent variables were significantly multi-correlated. Therefore, we conclude that there is moderate multi-collinearity among the variables since the mean VIF for the model was close to 1.

Table 4.12: Multi-collinearity Test for Sectoral Credit Diversification

Dependent Variable		Collinearity Statistics	
		Tolerance	VIF
ROE	Household Credit	0.519	1.925
	Primary sector	0.325	3.074
	Secondary sector	0.705	1.419
	Tertiary sector	0.373	2.682
ROA	Household Credit	0.519	1.925
	Primary sector	0.325	3.074
	Secondary sector	0.705	1.419
	Tertiary sector	0.373	2.682

4.4.3 Multi-collinearity Test for Income Streams Diversification

When estimating ROE and ROA, the results in Table 4.13 demonstrated no collinearity between interest income stream, trading income stream, fees and commission stream, and other income streams. All tolerance limits were greater than 0.1, and VIF was less than 10. Therefore, using VIF it was concluded that there is moderate multi-collinearity among the variables since the mean VIF for the model was close to 1. This indicated that there was no multi-collinearity, so they were combined in the model to investigate the impact of income stream diversification on banking performance in Kenya. These findings also concurred with Sporta (2018) and Muriithi (2016).

Table 4.13: Multi-collinearity Test for Income Streams Diversification

Dependent Variable		Collinearity Statistics	
		Tolerance	VIF
ROE	Interest Income	0.822	1.217
	Trading income	0.645	1.549
	Fees and Commission	0.373	2.679
	Other Income	0.4	2.501
ROA	Interest Income	0.822	1.217
	Trading income	0.645	1.549
	Fees and Commission	0.373	2.679
	Other Income	0.4	2.501

4.4.4 Multi-collinearity Test for Deposits Portfolio Diversification

When it came to deposits portfolio diversification forecasting ROE and ROA, the results in Table 4.14 demonstrated that there was no collinearity between savings, demand, call, and fixed deposits. All tolerance limits were greater than 0.1, and VIF was less than 10. This indicated that there was no multi-collinearity, thus they were combined in the model to examine the impact of deposit diversification on banking performance in Kenya. VIF values were observed to be less than 10. All the tolerance values were observed to be below one. The finding, therefore, did not warrant further investigation. These findings also concurred with Githira et al. (2019) and Sporta (2018).

Table 4.14: Multi-collinearity Test for Deposits Portfolio Diversification

Dependent Variable		Collinearity Statistics	
		Tolerance	VIF
ROE	Savings	0.657	1.521
	Demand	0.37	2.706
	Call	0.363	2.758
	Fixed	0.552	1.813
ROA	Savings	0.657	1.521
	Demand	0.37	2.706
	Call	0.363	2.758
	Fixed	0.552	1.813

4.4.5 Multi-collinearity Test for Investment Portfolio Diversification

When forecasting ROE and ROA, the results in Table 4.15 demonstrated no collinearity between placement, government securities, shares, and other income. As a result, they were combined in the model to examine the impact of investment avenue diversification on Kenyan banking performance. VIF values were observed to be less than 10. All the tolerance values were observed to be below 1. As a result, it was determined that none of the investment portfolio diversification factors were collinear. Sporta (2018) and Muriithi (2016), who reported no multi-collinearity among the study variables, agreed with these findings.

Table 4.15: Multi-collinearity Test for Investment Portfolio Diversification

Dependent Variable		Collinearity Statistics	
		Tolerance	VIF
ROE	Placement	0.666	1.502
	Government securities	0.559	1.789
	Shares	0.382	2.619
	Other Investment	0.356	2.808
ROA	Placement	0.666	1.502
	Government securities	0.559	1.789
	Shares	0.382	2.619
	Other Investment	0.356	2.808

4.5 Panel Heteroskedasticity Test

The error terms' variance is assumed to be uniform in regression analysis. The probability ratio test suggested by Poi and Wiggins, (2001) was used to test this. Its null hypothesis indicated that the data was homoskedastic, as opposed to a heteroskedastic alternative. Heteroscedasticity was deemed to exist when 'prop>chi2' was less than 5 percent significance level else the data was homoscedasticity. Although, heteroskedasticity does not yield biased findings they are inefficient due to lack of minimum variation as stipulated by best linear unbiased estimates (BLUE). Further, it decreases t statistics and maximizes possibilities of rejecting hypothesis and does not satisfy uniformity of error terms.

4.5.1 Panel Heteroskedasticity Test for Commercial Banks in Kenya

The study's findings, as shown in Table 4.16, showed that there was sufficient evidence to reject H0 and infer that there was no uniformity of variance across the error terms, and that the best model to fit was a fixed generalized least squares model or a fit regression model with robust standard errors. In both models, the data for Kenyan commercial banks showed a p-value of 0.0000. As a result, the researcher used regression models with robust standard errors to investigate the impact of bank portfolio diversifications on banking performance in Kenya. The findings further reported that each of the test Chi Square were greater than critical value of (9.49) at

0.05 level of significance and 4 degrees of freedom. The null hypothesis of constant variance was rejected in the presence of heteroscedasticity. Muigai (2016) confirmed heteroscedasticity subsists when 'prop>chi2' is under 5 percent significance level contrary to this, it is homoscedasticity. Instead of using the least ordinary square approach or the generalized least squares (GLS) estimate method, the violations of the essential regression assumptions required to be rectified using robust standard errors.

Table 4.16: Panel Heteroskedasticity Test for Commercial Banks in Kenya

Dependent Variable	Model	Chi Square	P value
ROE	Without Moderation	278.28	0.0000
	With Moderation	205.61	0.0000
ROA	Without Moderation	1754.65	0.0000
	With Moderation	2573.24	0.0000

4.5.2 Panel Heteroskedasticity Test for Sectoral Credit Diversification

The study's findings, as illustrated in Table 4.17, showed that (p-value=0.000<0.05) there was sufficient evidence to reject H0 and infer that there was no uniformity of variance across the error terms, and that the best fitting model was a fixed generalized least squares model or a fit regression model with robust standard errors. As a result, the researcher used regression models with robust standard errors to investigate the impact of sectoral credit diversifications on banking performance in Kenya. These findings backed up Muigai's (2016) assertion that heteroscedasticity exists when the null hypothesis of constant variance was rejected. Heteroscedasticity does exist when 'prop>chi2' is under 5 percent significance level else homoscedasticity. Instead of using the least ordinary square approach or the generalized least squares (GLS) estimate method, the violations of the essential regression assumptions required to be rectified using robust standard errors.

Table 4.17: Panel Heteroskedasticity Test for Sectoral Credit Diversification

Dependent Variable	Chi Square	P value
ROE	9034.34	0.000
ROA	8970.92	0.000

4.5.3 Panel Heteroskedasticity Test for Income Streams Diversification

When the significance level of ‘prop>chi2' is under 5 percent, heteroscedasticity does exist; otherwise, homoscedasticity is infered. The study's findings, as shown in Table 4.18, showed that there was sufficient evidence to reject H0 and infer that there was no uniformity of variance across the error terms, and that the best model to fit was a fixed generalized least squares model or a fit regression model with robust standard errors. Hence, regression models with robust standard errors were adopted by the researcher to look into the association of income streams diversifications with banking performance in Kenya. This finding is also consistent with Muigai (2016), who indicated that when heteroscedasticity was present, the null hypothesis of constant variance was rejected. The violations of the fundamental regression assumptions had to be corrected by applying robust standard errors instead of the least ordinary square method or generalized least squares (GLS) estimation method.

Table 4.18: Panel Heteroskedasticity Test for Income Streams Diversification

Dependent Variable	Chi Square	P value
ROE	2324.79	0.000
ROA	4219.76	0.000

4.5.4 Panel Heteroskedasticity Test for Deposits Portfolio Diversification

The study's findings, as shown in Table 4.19, showed that there was enough evidence to reject H0 and infer that there was no uniformity of variance across the error terms, and that the best model to fit was a fixed generalized least squares model or a fit

regression model with robust standard errors. As a result, the researcher used regression models with robust standard errors to examine the relationship between deposit portfolio diversification and banking performance in Kenya. This finding is also consistent with Muigai (2016), who indicated that when heteroscedasticity was present, the null hypothesis of constant variance was rejected. Heteroscedasticity exists when 'prop>chi2' is less than 5 percent significance level else homoscedasticity. Instead of using the least ordinary square approach or the generalized least squares (GLS) estimate method, the violations of the essential regression assumptions required to be rectified using robust standard errors.

Table 4.19: Panel Heteroskedasticity Test for Deposits Portfolio Diversification

Dependent Variable	Chi Square	P value
ROE	1830.75	0.0000
ROA	8810.10	0.0000

4.5.5 Panel Heteroskedasticity Test for Investments Portfolio Diversification

The study's findings, as shown in Table 4.20, showed that there was sufficient evidence to reject H0 and infer that there was no uniformity of variance across the error terms, and that the best model to fit was a fixed generalized least squares model or a fit regression model with robust standard errors. As a result, the researcher used regression models with robust standard errors to investigate the impact of investment portfolio diversifications on banking performance in Kenya. This finding corroborated Muigai's (2016) findings, which showed that when heteroscedasticity was present, the null hypothesis of constant variance was rejected. Heteroscedasticity exists when 'prop>chi2' is less than 5 percent significance level else homoscedasticity. The violations of the fundamental regression assumptions had to be corrected by applying robust standard errors instead of the least ordinary square method or generalized least squares (GLS) estimation method.

Table 4.20: Panel Heteroskedasticity Test for Investment Portfolio Diversification

Dependent Variable	Chi Square	P value
ROE	741.34	0.0000
ROA	8561.47	0.0000

4.6 Panel Serial Autocorrelation Test

Furthermore, standard regression analysis implies that the error terms do not have serial autocorrelation. Existence of serial correlation brings forth small standard errors and large coefficient of determination (Wooldridge, 2012). The null hypothesis that there is no serial correlation was examined using Woodridge serial correlation tests, as opposed to the alternative of serial correlation. If the p-value is above than critical value of 0.05, serial correlation exists; else, no serial correlation exists. The adoption of a fixed generalized least squares model or regressions with robust standard errors reduces the presence of serial correlation.

4.6.1 Panel Serial Autocorrelation Test for Commercial Banks in Kenya

As shown in Table 4.21, the p values were 0.0000 which was under 0.05 outlining that there was sufficient confirmation to deduce non-acceptance of H_0 and infer the absence of serial correlation across the error terms, and the most appropriate model to fit was a fixed generalized least squares model or a fit regression model with robust standard errors. The findings further reported that each of the test Chi Square were greater than critical value of (9.49) at 0.05 level of significance. As a result, the researcher used regression models with robust standard errors to examine the impact of bank portfolio diversifications on banking performance in Kenya.

Table 4.21: Panel Serial Autocorrelation Test for Commercial Banks in Kenya

Dependent Variable	Model	Chi Square	P value
ROE	Without Moderation	85.63	0.0000
	With Moderation	175.26	0.0000
ROA	Without Moderation	78.96	0.0000
	With Moderation	125.63	0.0000

4.6.2 Panel Serial Autocorrelation Test for Sectoral Credit Diversification

As shown in Table 4.22, there was enough confirmation to deduce non-acceptance of H0 and infer absence of serial correlation across the error terms, and the most appropriate model to fit was a fixed generalized least squares model or a fit regression model with robust standard errors. Hence, regression models having robust standard errors were adopted by the researcher to scrutinize effect of sectoral credit diversifications and banking performance in Kenya.

Table 4.22: Panel Serial Autocorrelation Test for Sectoral Credit Diversification

Dependent Variable	Chi Square	P value
ROE	95.63	0.0000
ROA	87.56	0.0000

4.6.3 Panel Serial Autocorrelation Test for Income Streams Diversification

As shown in Table 4.23, there was sufficient confirmation to deduce non-acceptance of H0 and infer absence of serial correlation across the error terms, and the most appropriate model to fit was a fixed generalized least squares model or a fit regression model with robust standard errors. As a result, the researcher used regression models with robust standard errors to examine the impact of income stream diversifications and banking performance in Kenya.

Table 4.23: Panel Serial Autocorrelation Test for Income Streams Diversification

Dependent Variable	Chi Square	P value
ROE	75.62	0.000
ROA	79.65	0.000

4.6.4 Panel Serial Autocorrelation Test for Deposits Portfolio Diversification

As shown in Table 4.24, there was sufficient confirmation to deduce non-acceptance of H0 and infer absence of serial correlation across the error terms, and the most appropriate model to fit was a fixed generalized least squares model or a fit regression model with robust standard errors. As a result, the researcher used regression models with robust standard errors to examine the influence of deposit portfolio diversifications on banking performance in Kenya.

Table 4.24: Panel Serial Autocorrelation Test for Deposits Portfolio Diversification

Dependent Variable	Chi Square	P value
ROE	87.32	0.000
ROA	79.68	0.00

4.6.5 Panel Heteroskedasticity Test for Investments Portfolio Diversification

The study's findings, as shown in Table 4.25, showed that there was sufficient evidence to infer non-acceptance of H0 and the absence of serial correlation across the error terms, and that the best model to fit was a fixed generalized least squares model or a fit regression model with robust standard errors. As a result, the researcher used regression models with robust standard errors to examine the impact of investment portfolio diversifications and banking performance in Kenya.

Table 4.25: Panel Heteroskedasticity Test for Investment Portfolio Diversification

Dependent Variable	Chi Square	P value
ROE	102.36	0.000
ROA	115.63	0.000

4.7 Panel Granger Causality Test

The study used Granger causality to assess causation between independent and dependent variables. The H0 was the absence of causality against the presence of causality alternative. If the p value was less than 0.05, the H0 hypothesis was rejected, and it was concluded that there was bidirectional or unidirectional causality.

4.7.1 Panel Granger Causality Test for Commercial Banks in Kenya

As depicted in Table 4.26, there was no causality between return on assets and return on equity. There was unidirectional causality from sectoral credit diversification and ROE and bidirectional causality between investment streams diversification and ROE. There was unidirectional causality from HHI DPD to ROE. Bank size had unidirectional causality with banking portfolio diversifications. The results were in conformity with Teimet et al., (2019) paper that examined banks size effect on the commercial banks' profitability and in addition, scrutinized whether there is existed an equilibrium\ disequilibrium association amongst the two variables and reported a bidirectional causality that existed between the variables under study. Zhongming, Frimpong and Guoping (2019) found contradictory granger causality test findings that there existed no casual association both unidirectional and bidirectional between some financial risk indicators and some variables revealed that there is unidirectional causality flowing from the variables of financial risk. This suggests that some indicators of financial risk strongly granger cause performance of banks and some don't at all.

The study's granger causality conclusion agreed with Olarewaju and Adeyemi (2015), who observed that the liquidity levels of specific banks should have a major impact on present profitability levels and vice versa. The findings indicated that there was a bidirectional causal relationship between deposit money bank liquidity and levels of profitability metrics. F-statistics that corresponded to the null hypothesis of no causal relationship (both unidirectional and bidirectional) and others that F-statistics that matched to the alternative hypotheses of causal relationship were discovered in the study. As a result, a causality test is required, as it is dependent on the variables employed in the banking industry.

Table 4.26: Panel Granger Causality Test for Commercial Banks in Kenya

Null Hypothesis:	F-Statistic	Prob.	Conclusion
ROA does not Granger Cause ROE	1.92	0.15	
ROE does not Granger Cause ROA	1.58	0.21	
HHI SCD does not Granger Cause ROE	1.89	0.15	
ROE does not Granger Cause HHI SCD	18.09	0.00	Unidirectional
HHI_ISD does not Granger Cause ROE	12.57	0.00	
ROE does not Granger Cause HHI_ISD	15.08	0.00	Bidirectional
HHI DPD does not Granger Cause ROE	0.73	0.48	
ROE does not Granger Cause HHI DPD	24.25	0.00	Unidirectional
HHI IPD does not Granger Cause ROE	3.56	0.03	
ROE does not Granger Cause HHI IPD	16.80	0.00	Bidirectional
Bank size does not Granger Cause ROE	1.86	0.16	
ROE does not Granger Cause bank size	1.27	0.28	
HHI SCD does not Granger Cause ROA	1.08	0.34	
ROA does not Granger Cause HHI SCD	11.50	0.00	Unidirectional
HHI_ISD does not Granger Cause ROA	0.40	0.67	
ROA does not Granger Cause HHI_ISD	14.53	0.00	Unidirectional
HHI DPD does not Granger Cause ROA	0.66	0.52	
ROA does not Granger Cause HHI DPD	11.28	0.00	Unidirectional
HHI IPD does not Granger Cause ROA	1.54	0.22	
ROA does not Granger Cause HHI IPD	11.22	0.00	Unidirectional
Bank size does not Granger Cause ROA	2.09	0.12	
ROA does not Granger Cause bank size	0.54	0.58	
HHI ISD does not Granger Cause HHI SCD	0.69	0.50	
HHI SCD does not Granger Cause HHI	11.12	0.00	Unidirectional
HHI DPD does not Granger Cause HHI SCD	1.21	0.30	
HHI SCD does not Granger Cause HHI ISD	13.69	0.00	Unidirectional
HHI IPD does not Granger Cause HHI SCD	2.87	0.06	
HHI SCD does not Granger Cause HHI IPD	22.88	0.00	Unidirectional
Bank size does not Granger Cause HHI SCD	5.47	0.00	Unidirectional
HHI SCD does not Granger Cause bank size	0.95	0.39	
HHI SCD does not Granger Cause HHI ISD	7.43	0.00	Unidirectional
HHI IPD does not Granger Cause HHI DPD	3.36	0.04	Unidirectional
HHI IPD does not Granger Cause HHI ISD	7.68	0.00	Unidirectional
HHI ISD does not Granger Cause HHI IPD	2.55	0.08	
Bank size does not Granger Cause HHI ISD	2.93	0.05	Unidirectional
HHI ISD does not Granger Cause bank size	0.59	0.56	
HHI IPD does not Granger Cause HHI DPD	6.51	0.00	Unidirectional
HHI DPD does not Granger Cause HHI IPD	9.99	0.00	
Bank size does not Granger Cause HHI DPD	7.97	0.00	Bidirectional
HHI DPD does not Granger Cause bank size	0.19	0.82	
Bank size does not Granger Cause HHI IPD	5.35	0.00	Unidirectional
HHI IPD does not Granger Cause bank size	0.51	0.60	

4.7.2 Panel Granger Causality Test for Sectoral Credit Diversification

As depicted in Table 4.27, there was no causality between ROA and ROE. There was unidirectional causality between household credit and ROE running from household credit to ROE meaning there were no robust bidirectional casualty between household credit and ROE of banks in Kenya. There was bidirectional causality between primary credit sector and ROE and only unidirectional casualties are established by robust results. There was bidirectional causality between tertiary sector and ROE as evidenced by the robust results. There was bidirectional causality running between household credit sector, primary credit sector, secondary credit sector and tertiary credit sector and was evidenced by results that were statistically significant. Household credit sector, primary credit sector and secondary credit sector had unidirectional causality with ROA. This meant that meaning there were no robust bidirectional casualty between Household credit sector, primary credit sector and secondary credit sector and ROA of banks in Kenya.

These findings countered those of Olarewaju and Adeyemi (2015), who found contradictory findings that there was no casual association both unidirectional and bidirectional relationship between liquidity and profitability of some banks in Nigeria. The study agreed with some of the study findings that banks' liquidity, as measured by the loan deposit ratio, should have a major impact on present levels of profitability, as measured by return on equity or return on assets, and vice versa. The findings indicated that there was a bidirectional as well as a unidirectional causal relationship between deposit money bank sectoral credit factors and profitability metrics.

Table 4.27: Panel Granger Causality Test for Sectoral Credit Diversification

Null Hypothesis:	F-Statistic	Prob	Conclusion
ROA does not Granger Cause ROE	1.919	0.148	
ROE does not Granger Cause ROA	1.578	0.207	No causality
Household credit does not Granger Cause ROE	0.393	0.676	
ROE does not Granger Cause household credit	17.746	0.000	Unidirectional
Primary sector does not Granger Cause ROE	3.977	0.019	Bidirectional
ROE does not Granger Cause primary sector	29.945	0.000	
Secondary sector does not Granger Cause ROE	0.189	0.828	
ROE does not Granger Cause secondary sector	14.565	0.000	Unidirectional
Tertiary sector does not Granger Cause ROE	4.226	0.015	
ROE does not Granger Cause tertiary sector	31.447	0.000	Bidirectional
Household credit does not Granger Cause ROA	0.055	0.947	
ROA does not Granger Cause household credit	9.472	0.000	Unidirectional
Primary sector does not Granger Cause ROA	0.322	0.725	
ROA does not Granger Cause primary sector	12.091	0.000	Unidirectional
Secondary sector does not Granger Cause ROA	0.008	0.992	
ROA does not Granger Cause secondary sector	14.469	0.000	Unidirectional
Tertiary sector does not Granger Cause ROA	3.440	0.033	
ROA does not Granger Cause tertiary sector	12.852	0.000	
Primary sector does not Granger Cause household credit	4.161	0.016	
Household credit does not Granger Cause primary sector	3.729	0.025	
Secondary sector does not Granger Cause household credit	9.713	0.000	
Household credit does not Granger Cause secondary sector	4.492	0.012	
Tertiary sector does not Granger Cause household credit	6.705	0.001	
Household credit does not Granger Cause tertiary sector	7.565	0.001	
Secondary sector does not Granger Cause primary sector	7.289	0.001	
Primary sector does not Granger Cause secondary sector	6.679	0.001	
Tertiary sector does not Granger Cause primary sector	4.555	0.011	
Primary sector does not Granger Cause tertiary sector	8.299	0.000	
Tertiary sector does not Granger Cause secondary sector	6.838	0.001	
Secondary sector does not Granger Cause tertiary sector	9.034	0.000	

Bidirectional

4.7.3 Panel Granger Causality Test for Income Streams Diversification

As depicted in Table 4.28, there was unidirectional causality from interest income to ROE, trading income to ROE, fees and commission to ROE, other income to ROE; meaning there were no robust bidirectional casualty running from interest income to ROE, trading income to ROE, fees and commission to ROE, other income to ROE of banks in Kenya. Also, there was unidirectional causality from interest income, trading income, fees and commission and other income to ROA meaning there were no robust bidirectional casualty running from interest income, trading income, fees and commission and other income to ROA. There was bidirectional causality from trading income to interest income and other income to fees and commission as evidenced by robust results that were statistically significant and thus conclusion reached that income stream diversification plausibly related with the profitability of commercial banks in Kenya.

These results contradicted some granger causality test findings in the study by Zhongming, Frimpong and Guoping (2019) that found there existed no casual association both unidirectional and bidirectional between some of the financial risk indicators and agreed with the findings that revealed existence of unidirectional causality flowing from some variables of financial risk. The results were in conformity with Teimet et al., (2019) paper that examined banks size effect on the commercial banks' profitability and in addition, scrutinized whether there is existed an equilibrium\disequilibrium association amongst the two variables and reported a bidirectional causality that existed between the variables under study.

Table 4.28: Panel Granger Causality Test for Income Streams Diversification

Null Hypothesis:	F-Statistic	Prob	Conclusion
ROA does not Granger Cause ROE	1.919	0.148	
ROE does not Granger Cause ROA	1.578	0.207	No causality
Interest income does not Granger Cause ROE	0.080	0.923	
ROE does not Granger Cause interest income	12.449	0.000	Unidirectional
Trading income does not Granger Cause ROE	0.549	0.578	
ROE does not Granger Cause trading income	30.336	0.000	Unidirectional
Fees and commission does not Granger Cause ROE	0.156	0.856	
ROE does not Granger Cause fees and commission	19.754	0.000	Unidirectional
Other income does not Granger Cause ROE	0.062	0.940	
ROE does not Granger Cause other income	17.537	0.000	Unidirectional
Interest income does not Granger Cause ROA	0.852	0.427	
ROA does not Granger Cause interest income	11.274	0.000	Unidirectional
Trading income does not Granger Cause ROA	0.275	0.760	
ROA does not Granger Cause trading income	10.905	0.000	Unidirectional
Fees commission does not Granger Cause ROA	0.030	0.971	
ROA does not Granger Cause fees commission	7.020	0.001	Unidirectional
Other income does not Granger Cause ROA	0.334	0.716	
ROA does not Granger Cause other income	7.002	0.001	Unidirectional
Trading income does not Granger Cause interest income	6.166	0.002	
Interest income does not Granger Cause trading income	4.078	0.018	Bidirectional
Fees and commission does not Granger Cause interest income	10.900	0.000	Unidirectional
Interest income does not Granger Cause fees and commission	1.211	0.299	
Other income does not Granger Cause interest income	11.934	0.000	Unidirectional
Interest income does not Granger Cause other income	1.568	0.210	
Fees and commission does not Granger Cause trading income	9.365	0.000	Unidirectional
Trading income does not Granger Cause fees and commission	1.097	0.335	
Other income does not Granger Cause trading income	10.560	0.000	Unidirectional
Trading income does not Granger Cause other income	2.220	0.110	
Other income does not Granger Cause fees and commission	8.702	0.000	Bidirectional
Fees and commission does not Granger Cause other income	3.330	0.037	

4.7.4 Panel Granger Causality Test for Deposits Portfolio Diversification

As depicted in Table 4.29, there was unidirectional causality from savings to ROE, call deposits to ROE, fixed deposits to ROE. There was unidirectional causality from Savings, demand, calls and fixed deposits to ROA. Calls deposits have bidirectional causality with fixed deposits while the other deposits had unidirectional causality. These results contradicted findings by Zhongming, Frimpong and Guoping (2019) study that found there existed no casual association both unidirectional and bidirectional between some financial risk indicators and agreed with the findings that revealed existence of unidirectional causality flowing from some variables of financial risk.

The analysis agreed with Olarewaju and Adeyemi (2015), who showed that levels of causality linked to banks' liquidity, as measured by the loan deposit ratio, should have a considerable impact on present levels of profitability, as measured by return on equity or return on assets, and vice versa. The study's findings revealed a bidirectional and unidirectional causal relationship between deposit money bank liquidity and profitability levels. As a result, causality is reliant on the variables employed, necessitating the usage of causality tests.

Table 4.29: Panel Granger Causality Test for Deposits Portfolio Diversification

Null Hypothesis:	F-Statistic	Prob.	Conclusion
ROA does not Granger Cause ROE	1.919	0.148	
ROE does not Granger Cause ROA	1.578	0.207	No causality
Savings does not Granger Cause ROE	0.540	0.583	
ROE does not Granger Cause savings	13.937	0.000	Unidirectional
Demand does not Granger Cause ROE	0.434	0.648	
ROE does not Granger Cause demand	6.927	0.001	Unidirectional
Call does not Granger Cause ROE	0.424	0.655	
ROE does not Granger Cause call	13.654	0.000	Unidirectional
Fixed does not Granger Cause ROE	0.228	0.796	
ROE does not Granger Cause fixed	11.455	0.000	Unidirectional
Savings does not Granger Cause ROA	2.364	0.095	
ROA does not Granger Cause savings	6.937	0.001	Unidirectional
Demand does not Granger Cause ROA	1.416	0.244	
ROA does not Granger Cause demand	4.477	0.012	Unidirectional
Call does not Granger Cause ROA	0.743	0.476	
ROA does not Granger Cause call	6.934	0.001	Unidirectional
Fixed does not Granger Cause ROA	0.990	0.372	
ROA does not Granger Cause fixed	3.502	0.031	Unidirectional
Demand does not Granger Cause savings	9.565	0.000	Unidirectional
SAVINGS does not Granger Cause demand	2.295	0.102	
CALL does not Granger Cause savings	7.130	0.001	Unidirectional
Savings does not Granger Cause call	3.885	0.021	
Fixed does not Granger Cause savings	3.881	0.021	Unidirectional
Savings does not Granger Cause fixed	4.057	0.018	Unidirectional
Call does not Granger Cause demand	0.401	0.670	
Demand does not Granger Cause call	8.368	0.000	Unidirectional
Fixed does not Granger Cause demand	1.501	0.224	
Demand does not Granger Cause fixed	7.229	0.001	Unidirectional
Fixed does not Granger Cause call	3.373	0.035	
Call does not Granger Cause fixed	3.704	0.025	Bidirectional

4.7.5 Panel Granger Causality Test for Investment Portfolio Diversification

As depicted in Table 4.30, there was no causality between ROA and ROE. There was unidirectional causality between investment in placement, government securities, shares, other investment and return on equity respectively. The results meant that there was no robust bidirectional casualty between investment in placement, government securities, shares, other investment and return on equity respectively. Also, there was unidirectional causality from investment in placements, government securities, shares, other investment and return on Assets respectively. The results meant that there was no robust bidirectional casualty from investment in placements, government securities, shares, other investment and return on Assets respectively. There was statistically significant bidirectional causality between placement and government securities investment and shares as evidence by the robust results. Also, government securities, other investment and shares had bidirectional causality which was as well statistically significant.

These results went against Zhongming, Frimpong and Guoping (2019) who found there existed no casual association both unidirectional and bidirectional between some financial risk indicators and agreed with the findings that revealed existence of unidirectional causality flowing from some variables of financial risk. The analysis agreed with Olarewaju and Adeyemi (2015), who predicted that priori causality levels linked to banks' liquidity, as measured by the loan deposit ratio, would have a considerable impact on present levels of profitability, as measured by return on equity or return on assets, and vice versa. The findings indicated that there was a unidirectional causal relationship between deposit money bank liquidity and profitability levels. F-statistics that corresponded to the null hypothesis of no causal relationship (both unidirectional and bidirectional) and others that F-statistics that matched to the alternative hypotheses of causal relationship were discovered in the study (both unidirectional and bidirectional). As a result, causation is reliant on the dependent and independent variables employed in the banking industry, necessitating the usage of causality tests.

Table 4.30: Panel Granger Causality Test for Investment Portfolio Diversification

Null Hypothesis:	F-Statistic	Prob	Conclusion
ROA does not Granger Cause ROE	1.919	0.148	
ROE does not Granger Cause ROA	1.578	0.207	No causality
Placement does not Granger Cause ROE	0.367	0.693	
ROE does not Granger Cause placement	25.980	0.000	Unidirectional
Government securities does not Granger Cause ROE	0.116	0.890	
ROE does not Granger Cause government securities	22.182	0.000	Unidirectional
Shares does not Granger Cause ROE	0.753	0.471	
ROE does not Granger Cause SHARES	37.671	0.000	Unidirectional
Other investment does not Granger Cause ROE	0.183	0.833	
ROE does not Granger Cause other investment	26.416	0.000	Unidirectional
Placement does not Granger Cause ROA	0.713	0.491	
ROA does not Granger Cause placement	12.712	0.000	Unidirectional
Government securities does not Granger Cause ROA	0.719	0.488	
ROA does not Granger Cause government securities	13.838	0.000	Unidirectional
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Shares does not Granger Cause ROA	1.406	0.246	
ROA does not Granger Cause shares	15.259	0.000	Unidirectional
Other investment does not Granger Cause ROA	0.847	0.429	
ROA does not Granger Cause other investment	9.240	0.000	Unidirectional
Government securities does not Granger Cause placement	7.571	0.001	
Placement does not Granger Cause government securities	3.384	0.035	Bidirectional
Shares does not Granger Cause placement	14.758	0.000	
Placement does not Granger Cause shares	5.319	0.005	Bidirectional
Other investment does not Granger Cause placement	6.668	0.001	
Placement does not Granger Cause other investment	2.782	0.063	
Shares does not Granger Cause government securities	13.394	0.000	Unidirectional
Government securities does not Granger Cause shares	8.873	0.000	
Other investment does not Granger Cause government securities	13.654	0.000	
Government securities does not Granger Cause other investment	7.336	0.001	
Other investment does not Granger Cause shares	14.291	0.000	
Shares does not Granger Cause other investment	3.313	0.037	**Bidirectional**

4.8 Panel Hausman Test

The Hausman test was used to help choose between FEM and REM models. The H_0 indicated that the REM model should be used to investigate the impacts of bank portfolio diversification on banking performance in Kenya, as opposed to the FEM model. If the p value is less than 0.05, the FEM model should be used; otherwise, the REM model should be fitted. The Hausman test determines whether or not the unique errors are correlated with the regressors; the null hypothesis is that they are not. The fixed effects model looked to be more judicious in this case because the sample size was about equal to the population size. However, the study was cautious that the use of the random effects model assumes exogeneity of all regressors with the random individual effects. Contrary to this, the fixed model allows for endogeneity of all the regressors with the case of individual effects (Baltagi, 2005). To ensure the validity and reliability of the estimated model parameters, the study used the Hausman test to select the right model for research variables, either fixed effects or random effects.

4.8.1 Panel Hausman Test for Model without Moderation

The Hausman test was used to determine whether the fixed effects or random effects model for absolute variables was the best fit. Table 4.31 shows that the p value for the study was 0.000 and 0.002, which was less than 0.05. The Chi-Sq. Statistic for ROE and ROA was 61.150 and 16.731 which was greater than the critical value of 9.49 at significant level of 0.05 and 4 degrees of freedom. This indicated that there was sufficient evidence to allow non-adoption of the H0, implying that the most appropriate model to be fitted was FEM. As a result, the influence of banking portfolio diversification on ROE and ROA was investigated using a FEM regression model. These findings differed from those of Githira and Nasieku (2015), who fitted random effects on firms listed on East African securities exchanges, and they agreed with those of Ndili and Muturi (2015), who fitted fixed effects on their examination of the role of financing decisions on financial performance of listed companies on the Nairobi Securities Exchange.

Table 4.31: Panel Hausman Test for Model without Moderation

Dependent Variable	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
ROE			61.150	4	0.000
	Variable	Fixed	Random	Var (Diff.)	Prob.
	HHI SCD	16.467	20.533	0.723	0.000
	HHI ISD	11.019	13.202	1.044	0.033
	HHI DPD	20.513	22.609	0.759	0.016
	HHI IPD	12.018	14.504	0.394	0.000
ROA	**Test Summary**		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
			16.731	4	0.002
	Variable	Fixed	Random	Var (Diff.)	Prob.
	HHI SCD	4.642	4.981	0.024	0.027
	HHI ISD	1.937	2.469	0.035	0.005
	HHI DPD	3.101	3.159	0.024	0.707
	HHI IPD	2.010	2.311	0.013	0.008

4.8.2 Panel Hausman Test for Model with Moderation

The Hausman test was used to determine whether to use the fixed effects or random effects model for moderated variables, as shown in Table 4.32. The p values were 0.000 and 0.023, respectively, which were less than 0.05. This meant that there was enough data to rule out H0, so we concluded that the FEM model was the best fit. Consequently, FEM regression model was adopted to examine moderating effect of bank size on the effect of banking portfolio diversification on ROE and ROA of banks in Kenya. The chi-square value for ROE decreased from 61.150 to 44.876 in the moderated variables which were all greater than critical value of 9.49, while the p-value remained 0.0000. The chi-square value for ROE increased from 16.731 to 19.278 while the p-value for ROA increased from 0.002 to 0.023. This implies that the independent variables were affected by the moderating variable bank size. This finding mirror Mule, Mukras and Nzioka (2015) who fitted fexed effects and found firm size had a positive and significant effect on financial performance of a firm.

Table 4.32: Panel Hausman Test for Model with Moderation

Dependent variable	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
ROE			44.876	9	0.000
	Variable	Fixed	Random	Var(Diff.)	Prob.
	HHI SCD	17.114	12.595	19.663	0.308
	HHI ISD	30.470	7.831	24.020	0.000
	HHI DPD	8.799	23.297	-32.485	0.011
	HHI IPD	49.241	52.147	-16.940	0.480
	Bank size	3.720	2.495	-0.241	0.013
	HHI SCD * BS	3.569	3.379	-0.184	0.658
	HHI ISD*BS	2.957	4.578	-0.336	0.005
	HHI DPD*BS	4.083	1.980	0.208	0.000
	HHI IPD*BS	3.583	3.599	-0.176	0.970
ROA	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
			19.278	9	0.023
	Variable	Fixed	Random	Var(Diff.)	Prob.
	HHI SCD	9.616	10.560	-0.665	0.247
	HHI ISD	7.642	10.795	-0.880	0.001
	HHI DPD	5.096	6.229	-1.160	0.293
	HHI IPD	8.571	9.680	-0.576	0.144
	Bank size	1.043	1.277	-0.009	0.011
	HHI SCD * BS	0.539	0.623	-0.006	0.286
	HHI ISD*BS	0.842	0.955	-0.012	0.304
	HHI DPD*BS	0.652	0.917	-0.008	0.002
	HHI IPD*BS	0.641	0.723	-0.006	0.291

4.8.3 Panel Hausman Test for Sectoral Credit Diversification

The p value was 0.000 and 0.0001, which was less than 0.05, as shown in Table 4.33. Chi Square was 88.0683 for ROE and 23.21922 for ROA which was greater than critical value of 9.49 at 4 Chi-square degrees of freedom. This means that there is enough evidence to rule out H0 and accept alternative hypothesis and thus we conclude that FEM is the best model to describe the data. As a result, FEM regressions were used to investigate the impact of sectoral credit diversification on banking institutions' ROE and ROA in Kenya.

Table 4.33: Panel Hausman Test for Sectoral Credit Diversification

Dependent	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
ROE			88.0683	4	.0000
	Variable	Fixed	Random	Var(Diff.)	Prob.
	Household credit	0.39214	0.364986	0.000249	0.0855
	Primary sector	0.297189	0.411454	0.000553	0.0000
	Secondary sector	0.631471	0.865257	0.001355	0.0000
	Tertiary sector	0.328622	0.43924	0.000295	0.0000
ROA	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
			23.21922	4	0.0001
	Variable	Fixed	Random	Var(Diff.)	Prob.
	Household credit	0.063222	0.061334	0.000007	0.4797
	Primary sector	0.050101	0.057222	0.000016	0.0794
	Secondary sector	0.215177	0.244877	0.000042	0.0000
	Tertiary sector	0.050261	0.059274	0.000009	0.0023

4.8.4 Panel Hausman Test for Income Streams Diversification

Table 4.34 summarizes the research findings. The p value for ROE was 0.000, which was less than 0.05. The Chi-Sq. Statistic for ROE was 31.597 which was greater than the critical value of 9.49 at significant level of 0.05 and 4 degrees of freedom. This indicated that there was sufficient evidence to exclude H0, and we concluded that FEM was the best model to match the data. The 0.05 p value for ROA indicated acceptance of H0, and The Chi-Sq. Statistic was 9.247 which was lower than the critical value of 9.49 at significant level of 0.05 and 4 degrees of freedom. so, REM was the best model to fit.

Table 4.34: Panel Hausman Test for Income Streams Diversification

Dependent	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
ROE			31.597	4	0.000
	Variable	Fixed	Random	Var (Diff.)	Prob.
	Interest income	0.786	0.877	0.001	0.015
	Trading income	0.493	0.547	0.000	0.000
	Fees& commission	0.626	0.657	0.000	0.019
	Other income	0.464	0.515	0.000	0.001
ROA	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
			9.247	4	0.05
	Variable	Fixed	Random	Var(Diff.)	Prob.
	Interest income	0.186	0.202	0.000	0.059
	Trading income	0.048	0.054	0.000	0.020
	Fees& commission	0.100	0.103	0.000	0.333
	Other income	0.066	0.071	0.000	0.129

4.8.5 Panel Hausman Test for Deposits Portfolio Diversification

The p value was 0.000 and 0.007, which was less than 0.05, as shown in Table 4.35. This meant that there was enough data to rule out H_0. As a result, FEM was used to investigate the impact of deposit portfolio diversification on bank ROE and ROA in Kenya.

Table 4.35: Panel Hausman Test for Deposits Portfolio Diversification

Dependent	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
ROE			34.224	4	0.000
	Variable	Fixed	Random	Var(Diff.)	Prob.
	Savings	0.548	0.649	0.000	0.000
	Demand	1.103	1.158	0.001	0.095
	Call	0.467	0.596	0.001	0.001
	Fixed	0.534	0.563	0.000	0.109
ROA	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
			13.963	4	0.007
	Variable	Fixed	Random	Var (Diff.)	Prob.
	Savings	0.034	0.047	0.000	0.003
	Demand	0.205	0.220	0.000	0.035
	Call	0.113	0.129	0.000	0.051
	Fixed	0.108	0.110	0.000	0.497

4.8.6 Panel Hausman Test for Investment Portfolio Diversification

The p value was 0.000 and 0.009, which was less than 0.05, as indicated in Table 4.36. Chi Square was 59.844 and 13.651 which is greater than critical value of 9.49. This means that there is enough evidence to rule out H0, and we conclude that FEM is the best model to describe the data. As a result, FEMs were used to investigate the impact of investment portfolio diversification on commercial banks' ROE and ROA in Kenya.

Table 4.36: Panel Hausman Test for Investment Portfolio

Dependent	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
ROE			59.844	4	0.000
	Variable	Fixed	Random	Var (Diff.)	Prob.
	Placement	0.295	0.561	0.002	0.000
	Government securities	0.681	0.797	0.001	0.003
	Shares	0.493	0.579	0.000	0.000
	Other investment	0.546	0.609	0.001	0.013
ROA	Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
			13.651	4	0.009
	Variable	Fixed	Random	Var (Diff.)	Prob.
	Placement	0.086	0.110	0.000	0.003
	Government securities	0.193	0.205	0.000	0.057
	Shares	0.098	0.104	0.000	0.073
	Other investment	0.123	0.126	0.000	0.378

4.9 Correlation Analysis

To assess the strength of the influence of bank portfolio diversification on banking performance in Kenya, the Pearson correlation coefficient was used. It was chosen since all of the variables were on the same scale. This was in line with Wanjau et al., (2018), Githira et al., (2019), and Ochieng et al., (2019), who used it to assess the relationship between financial transparency and financial performance, the impact of firm financial characteristics on stock return, and the effects of equity portfolio flows on stock market volatility, respectively. It was also in tandem with Saunders et al., (2014) who asserted that correlation analysis depicts strength of linkages that are observed to subsist between independent and dependent variables.

4.9.1 Correlation Analysis of Commercial Banks in Kenya

As shown in Table 4.37, there was a substantial positive relationship between credit sectoral diversification and ROE and ROE (correlation coefficient = 0.762, N=574, p-value<0.05) and ROA (correlation coefficient = 0.673, N=574, p-value <0.05). Secondly, there was significantly positive association of income streams diversification with ROE (correlation coefficient = 0.585, N=574, p-value<0.05) and ROA (correlation coefficient = 0.548, N=574, p-value <0.05). Thirdly, there was significantly positive association of deposits portfolio diversification and ROE (correlation coefficient = 0.757, N=574, p-value <0.05) and ROA (correlation coefficient = 0.631, N=574, p-value <0.05). Fourthly, there was significantly positive association of investment portfolio diversification with ROE (correlation coefficient = 0.714, N=574, p-value<0.05) and ROA (correlation coefficient = 0.624, N=574, p-value <0.05). Because none of the bank portfolio attributes had a correlation coefficient larger than 0.8, there was no collinearity. Model rectification was not required for cases with and without moderation, and none of the variables were deleted because they were not highly associated.

These findings corroborated those of Oyedijo (2012), Landi & Venturelli (2012), and Mulwa and Kosgei (2016), who found a positive and substantial relationship between banking portfolio diversification and banking performance in various economic settings. Kazan and Uludag (2014) reported positive effect of credit sectoral diversification and banking performance. Ebrahim and Hasan (2008) reported positive significant effect of income streams, sectoral diversification and banking performance. Kiweu (2012) reported positive effect of deposits diversification and banking performance and Kipleting and Bokongo (2016) documented positive effect of investment diversification and banking performance. These findings were in line with modern portfolio diversification theory, which advocated diversification through the use of several securities in order to maximize investment returns. These data also corroborate the financial intermediation and delegated monitoring theory, which claims that financial institution diversification is a precondition to the emergence of these intermediaries and positively affect their performance through cost savings.

Table 4.37: Correlation Analysis of Commercial Banks in Kenya

		ROE	ROA	HHI SCD	HHI ISD	HHI DPD	HHI IPD	Bank Size
	Pearson							
ROE	Correlation	1						
	Pearson	.787*						
ROA	Correlation	*	1					
	Sig. (2-tailed)	0.000						
	N	574	574					
	Pearson	.762*	.673*					
HHISCD	Correlation	*	*	1				
	Sig. (2-tailed)	0.000	0.000					
	N	574	574	574				
	Pearson	.585*	.548*					
HHIISD	Correlation	*	*	.508**	1			
	Sig. (2-tailed)	0.000	0.000	0.000				
	N	574	574	574	574			
	Pearson	.757*	.631*					
HHIDPD	Correlation	*	*	.317**	.556**	1		
	Sig. (2-tailed)	0.000	0.000	0.000	0.000			
	N	574	574	574	574	574		
	Pearson	.714*	.624*					
HHIPD	Correlation	*	*	.398**	.559**	.370**	1	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		
	N	574	574	574	574	574	574	
Bank	Pearson	.520*	.425*					
size	Correlation	*	*	.400**	.242**	.389**	.300**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	
	N	574	574	574	574	574	574	574

** Correlation is significant at the 0.01 level (2-tailed).

4.9.2 Correlation Analysis of Sectoral Credit Diversification

Household credit, primary credit, secondary credit, and tertiary credit all had a positive and significant effect on ROE, as shown in Table 4.38 (correlation coefficient = 0.597, 0.708, 0.573, 0.698, N=574, p-value <0.05) and ROA (correlation coefficient = 0.465, 0.549, 0.556, 0.537, N=574, p-value <0.05). There was no collinearity among sectoral credits because none of the independent variables had a correlation coefficient greater than 0.8. ROE and ROA had a strong correlation of 0.787 however, multicollinearity was mitigated as they were not factored into the same multiple regression equations as measures of dependent variable. These findings backed up the findings of Kazan and Uludag (2014) and Turkmen and Yigit (2012), who found a positive and significant influence of sectoral credit on banking performance diversification. As in line with Meressa (2017), the findings of the analysis clearly determined that variables that are dependent that included ROA and ROE were significantly explained by diversification scale by banks. Tertiary and secondary sector, wholesale, trade and Construction are sectors that drive the economy and that bank commercially and preeminently lend for most years. The findings also reflected Mulwa (2018) who found that diversification of sectoral credit extended by banks depicted a highly positively and significantly correlated association with ROA pointing out to the potential diversification premium on a banking institutions' financial performance. These findings, however, contradicted the findings of Chen et al., (2014), who concluded that diversification of sectoral loans negatively impacted banking financial performance.

Table 4.38: Correlation Analysis of Sectoral Credit Diversification

		ROE	ROA	Household Credit	Primary sector	Secondary sector	Tertiary sector
ROE	Pearson Correlation	1					
ROA	Pearson Correlation	.787**	1				
	Sig. (2-tailed)	0.000					
	N	574	574				
Household Credit	Pearson Correlation	.597**	.465**	1			
	Sig. (2-tailed)	0.000	0.000				
	N	574	574	574			
Primary sector	Pearson Correlation	.708**	.549**	.663**	1		
	Sig. (2-tailed)	0.000	0.000	0.000			
	N	574	574	574	574		
Secondary sector	Pearson Correlation	.573**	.556**	.437**	.528**	1	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
	N	574	574	574	574	574	
Tertiary sector	Pearson Correlation	.698**	.537**	.630**	.576**	.459**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	574	574	574	574	574	574

** Correlation is significant at the 0.01 level (2-tailed).

4.9.3 Correlation Analysis of Income Streams Diversification

As depicted in Table 4.39, interest income stream, trading income stream, fees and commissions stream and other streams of income had a significantly positive effect on ROE (correlation coefficient =0.532, 0.645, 0.728, 0.708, N=574, p-value<0.05) and ROA (correlation coefficient = 0.456, 0.447, 0.506, 0.488, N=574, p-value <0.05). This was as evidenced by positive coefficients and p value that was less than 0.05. Because none of the independent variables had a correlation coefficient greater than 0.8, there was no collinearity. ROE and ROA had a strong correlation of 0.787 however, multicollinearity was mitigated as they were not factored into the same multiple regression equations as measures of dependent variable. These findings echoed those of Ebrahim and Hasan (2008), who found a positive relationship

between income diversification and banking performance. Also, they agreed with Kiweu (2012) who found significant contribution of income streams diversification and banking performance in Kenya. The finding was refuted by a study by Elsas, Hackethal, Holzhauser, (2010) who indicated that this effect on financial performance does not necessarily depend on whether diversification was reached by means of organic growth but agreed with the recommendation that diversification of revenue that includes fees and commissions stream, trading income stream, rental income stream, and other incomes streams contributes positively to profitability of bank and is connected with a higher market valuation.

Table 4.39: Correlation Analysis of Income Streams Diversification

		ROE	**ROA**	**Interest Income**	**Trading income**	**Fees & Commission**	**Other Income**
ROE	Pearson Correlation	1					
ROA	Pearson Correlation	.787**	1				
	Sig. (2-tailed)	0.000					
	N	574	574				
Interest Income	Pearson Correlation	.532**	.456**	1			
	Sig. (2-tailed)	0.000	0.000				
	N	574	574	574			
Trading income	Pearson Correlation	.645**	.447**	.368**	1		
	Sig. (2-tailed)	0.000	0.000	0.000			
	N	574	574	574	574		
Fees & Commission	Pearson Correlation	.728**	.506**	.370**	.555**	1	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
	N	574	574	574	574	574	
Other Income	Pearson Correlation	.703**	.488**	.341**	.516**	.566**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	574	574	574	574	574	574

** Correlation is significant at the 0.01 level (2-tailed).

4.9.4 Correlation Analysis of Deposit Portfolio Diversification

Findings shown in Table 4.40, revealed a positive and significant effect of savings, demands, call, and fixed deposits on ROE (correlation coefficient = 0.657, 0.688, 0.675, 0.636, N=574, p-value <0.05) and ROA (correlation coefficient = 0.462,0.578, 0.556, 0.496, N=574, p-value <0.05). Because none of the independent variables had a correlation coefficient greater than 0.8, there was no collinearity. ROE and ROA had a strong correlation of 0.787 however, multicollinearity was mitigated as they were not factored into the same multiple regression equations as measures of dependent variable. These findings were in line with those of Nafula (2013), who found a significant link between deposit diversification and banking performance in Kenya. Also, they agreed with Mulwa (2013) who deducted significant relationship between deposit diversification and banking performance in Kenya. Results of the analysis indicated that lagged deposits of commercial bank influence profitability of banks significantly in Kenyan context. Several policy implications basing on the findings can be highlighted that aim at encouraging growth of deposits by banks for advantages of mobilization of local deposit. Policies that aim at enhancing growth promote growth of banks deposits are essential. These findings agreed with Lomuto (2008). Mulwa (2013) used a regression model to determine the relation between the variety of financing and SACCO financial performance, and his findings revealed that diversification of deposits as a source of funds for SACCOs correlates with their overall financial health and performance, hence concurring with the finding. Olarewaju, Migiro, and Sibanda (2017) indicated that deposit diversification (HHIde), which had a negative link with ROA which was contrary to the findings of this study though it was stated that deposit diversification should not be neglected by banks while aligning their strategies.

Table 4.40: Correlation Analysis of Deposit Portfolio Diversification

		ROE	ROA	Savings	Demand	Call	Fixed
ROE	Pearson Correlation	1					
ROA	Pearson Correlation	.787**	1				
	Sig. (2-tailed)	0.000					
	N	574	574				
Savings	Pearson Correlation	.657**	.462**	1			
	Sig. (2-tailed)	0.000	0.000				
	N	574	574	574			
Demand	Pearson Correlation	.688**	.578**	.469**	1		
	Sig. (2-tailed)	0.000	0.000	0.000			
	N	574	574	574	574		
Call	Pearson Correlation	.675**	.556**	.489**	.777**	1	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
	N	574	574	574	574	574	
Fixed	Pearson Correlation	.636**	.496**	.541**	.578**	.581**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	574	574	574	574	574	574

** Correlation is significant at the 0.01 level (2-tailed).

4.9.5 Correlation Analysis of Investment Portfolio Diversification

Table 4.41 shows that there was a positive significant link between placements, government securities, shares, and other investments, as well as ROE. There was positive and significant efficacy of placements on ROE (correlation coefficient = 0.560, p value <0.05) and ROA (correlation coefficient = 0.501, N=574, p value <0.05). Secondly, there was positive and significant effect of government securities on ROE (correlation coefficient = 0.597, N=574, p value <0.05) and ROA (correlation coefficient = 0.552, p value <0.05). Thirdly, there was positive and significant effect of shares on ROE (correlation coefficient = 0.665, p value <0.05) and on ROA (correlation coefficient =0.568, N=574, p value <0.05). fourthly, there was positively significant effect of other investments on ROE (correlation coefficient = 0.667, N=574, p-value <0.05) and ROA correlation coefficient = 0.574, N=574, p-value <0.05). ROE and ROA had a positive and strong correlation coefficient of 0.787 however, multicollinearity was mitigated as they were not factored into the same multiple regression equations as measures of dependent variable.

These results mirrored Rop et al. (2016) who reported significant relationship between investment portfolio diversification and banking performance. Also, Mulwa et al. (2015) supported significant correlation of investment portfolio diversification with banking performance in Kenya. This was as indicated by positive coefficients and p value that was less than 0.05. There was no collinearity because none of the independent variables had correlation coefficient above 0.8. Since the values representing probability for the components outlined in the series equated to 0.000, the model used in the study therefore, was well-fitting and that every variable related to the investment portfolio measured was expected to have a significant impact on the financial performance of the Kenyan banking industry.

Table 4.41: Correlation Analysis of Investment Portfolio Diversification

		ROE	ROA	Placement	Government securities	Shares	Other Investment
ROE	Pearson Correlation	1					
ROA	Pearson Correlation	.787**	1				
	Sig. (2-tailed)	0.000					
	N	574	574				
Placement	Pearson Correlation	.560**	.501**	1			
	Sig. (2-tailed)	0.000	0.000				
	N	574	574	574			
Government securities	Pearson Correlation	.597**	.552**	.500**	1		
	Sig. (2-tailed)	0.000	0.000	0.000			
	N	574	574	574	574		
Shares	Pearson Correlation	.665**	.568**	.509**	.574**	1	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
	N	574	574	574	574	574	
Other Investment	Pearson Correlation	.667**	.574**	.508**	.619**	.569**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	574	574	574	574	574	574

** Correlation is significant at the 0.01 level (2-tailed).

4.10 Hypothesis Testing

Testing of the study hypothesis was carried out specifically by ascertainment of statistical significance of explanatory variables coefficientslong run and short run models. While undertaking significance test of the explanatory variables, the study tested the null hypotheses as enumerated in the first chapter by ascertaining its falsity or truth.

4.10.1 Hypothesis One

To begin, the study hypothesis indicated that sectoral credit had no substantial impact on banking's ROE and ROA in Kenya. The hypothesis was tested using panel regression analysis with FEM for static model and the results are summarized in Table 4.42. Sectoral credit had a significant impact on bank ROE in Kenya, according to the study (F= 41.2632, p-value 0.05). The coefficient of determination (R squared) of 0.7655 indicated that household, primary, secondary, and tertiary sectoral credit accounted for 76.55 percent of changes in ROE, while other factors not considered in the generated model accounted for the remaining percentage.

The influence of household credit on ROE was significant (= 0.3921, p value 0.05). This states that increasing household credit by one unit raises ROE by 0.3921 units while keeping primary, secondary, and tertiary sectors credit constant. Second, primary sector credit had a substantial favorable impact on ROE ($\beta = 0.2972$, p value <0.05). While holding household, secondary, and tertiary sectoral credits constant, unit adjustment in primary sector credit raises ROE by 0.2972 units. Thirdly, secondary sector credit had a favorable impact on ROE (p value 0.05 = 0.6315). This stipulates that unit increment in secondary sector credit increases ROE by 0.6315 while holding constant household credit, primary sector credit and tertiary sector credit. Finally, tertiary sector credit had positive significant effect on ROE (β = 0.3286, p value <0.05). This implies that increasing tertiary sector credit by 0.3286 units while keeping household credit, primary sector credit, and secondary sector credit constant increases ROE by 0.3286 units. Secondary sector therefore had the

highest impact on ROE followed by household credit and tertiary sector. Primary sector credit had the least impact on ROE.

ROE = -1.1101 + 0.3921**Household credit* + 0.2972**Primary sector* + 0.6315* *Secondary sector* + 0.3286* *Tertiary sector* 4.1.

Table 4.42: Fixed Effects Model on Effect of Sectoral Credit Diversification on ROE

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-1.1101	1.2458	-0.8911	0.3733
Household credit	0.3921	0.0766	5.1223	0.0000
Primary sector	0.2972	0.0902	3.2960	0.0010
Secondary sector	0.6315	0.1353	4.6659	0.0000
Tertiary sector	0.3286	0.0758	4.3339	0.0000
R-squared	0.7655	Mean dependent var		16.2697
Adjusted R-squared	0.7469	S.D. dependent var		14.7145
S.E. of regression	7.4025	Akaike info criterion		6.9135
Sum squared residuals	29097.4300	Schwarz criterion		7.2395
Log likelihood	-1941.1680	Hannan-Quinn criterion.		7.0407
F-statistic	41.2632	Durbin-Watson stat		2.4571
Prob(F-statistic)	0.0000			

According to Table 4.43, sectoral credit had a substantial impact on bank financial performance (ROA) in Kenya (F= 29.6219, p value 0.05). The coefficient of determination (R squared) of 0.7009 indicated that household, primary, secondary, and tertiary sectoral credits accounted for 70.09 percent of changes in ROA, while other factors not considered in the resulting model accounted for the remaining percentage.

Household credit had a significant favorable influence on ROA (p value 0.05 = 0.0632). This shows that increasing household credit by one unit enhances ROA by 0.0632 units while keeping primary, secondary, and tertiary sectoral credit constant. Second, primary sector credit had a significant positive influence on ROA (p value 0.05, = 0.0501). This stipulates that unit change in primary sector credit increases

ROA by 0.0501 units while holding constant household, secondary and tertiary sectoral credit. Thirdly, secondary sector credit had positive effect on ROA of commercial banks in Kenya (β = 0.2152 p value <0.05). This states that increasing secondary sector credit by one unit enhances ROA by 0.2152 while keeping household, primary, and tertiary sectoral credit constant. Finally, tertiary sector credit had a significant positive effect on ROE (β = 0.0503, p value <0.05). This stipulates that unit change in tertiary sector credit increase ROE by 0.0503 units while holding constant household, primary and secondary sectoral credit. The F statistic in the static model is 29.62, which is far higher than the value regarded critical of one percent level of significance, indicating that, in the long term, sectoral credit allocation has a considerable impact on bank ROA in Kenya.

ROA = -1.7372 + 0.0632**Household credit* + 0.0501**Primary sector* + 0.2152* *Secondary sector* + 0.0503* *Tertiary sector*……..…....4.3.

Table 4.43: Fixed Effects on Effect of Sectoral Credit Diversification on ROA

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-1.7372	0.3362	-5.1670	0.0000
Household credit	0.0632	0.0207	3.0600	0.0023
Primary sector	0.0501	0.0243	2.0589	0.0400
Secondary sector	0.2152	0.0365	5.8913	0.0000
Tertiary sector	0.0503	0.0205	2.4561	0.0144
R-squared	0.7009	Mean dependent var		2.0040
Adjusted R-squared	0.6772	S.D. dependent var		3.5163
S.E. of regression	1.9978	Akaike info criterion		4.2939
Sum squared residuals	2119.2990	Schwarz criterion		4.6200
Log likelihood	-1189.3530	Hannan-Quinn criterion.		4.4211
F-statistic	29.6219	Durbin-Watson stat		1.9803
Prob(F-statistic)	0.0000			

Dynamic panel modeling was adopted to examine short run effects on the effect of sectoral credit on ROE of banks in Kenya. As highlighted in Table 4.44, there was significant effect of sectoral credit diversification on financial performance (Wald Chi square = 248.24, p value < 0.05). There was positive and significant effect of

lagged return on ROE, household credit, primary sector, secondary credit and tertiary credit on ROE. The number of instruments was 123 which were far below the number of observations which were 534 and that the Sargan test of problem of identification validity was passed indicates there was efficiency of system GMM estimate in acting as the basis upon which the study recommendations were inferred after the study was concluded. Secondary sector has the highest effect on ROE followed by household or personal credit. Credit to tertiary sector bears the least influence on ROE. A unit increment of Credit to secondary sector led to 0.4932 increases in ROE of banks in Kenya.

ROE = -4.4520 + 0.3714*ROE_{t-1} + 0.4431**Household Credit* + 0.2579 * *Primary sector* + 0.4932 * *Secondary sector*+ 0.2170**Tertiary Sector* …….4.3

Table 4.44: Dynamic Panel Model on Effect of Sectoral Credit Diversification on ROE

Arellano-Bond dynamic panel-data estimation			**Number of obs**	=	**574**
Group variable: id			Number of groups	=	39
Time variable: year					
			Obs per group	min =	9
				avg =	14.717949
				max=	16
Number of instruments	=	123	Wald chi2 (5)	=	248.24
			Prob > chi2	=	0.0000

One step results

Roe	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
roe						
L1.	.3714337	.0425772	8.72	0.000	.287984	.4548834
household_credit	.4431013	.0837528	5.29	0.000	.2789488	.6072537
primary_credit	.2579078	.0992151	2.60	0.009	.0634498	.4523658
Secondary_credit	.4931936	.1612986	3.06	0.002	.1770541	.809333
Tertiary_credit	.2170111	.0816879	2.66	0.008	.0569058	.3771164
_cons	-4.4520310	1.6568780	-2.69	0.007	-7.699452	-1.204610

Adoption of Sargan test in the study enabled the determination of the likelihood of model under estimation. The H_0 in the test outlined that model's underlying conditions were met as opposed to an alternative of their non-satisfaction. Outcome of the study as highlighted in Table 4.45 disclosed that the model was correctly identified since its p value of 0.000 was lower than 0.05 which was the critical value for this test. The model therefore was deemed to give more robust outcome.

Table 4.45: Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	203.4992
Prob > chi2	=	0.0000

As illustrated in Table 4.46, there was significant effect of sectoral credit diversification on ROA (Wald Chi square = 197.18, p value < 0.05). There was positive and significant effect of lagged return on return on assets, household credit, primary sector, secondary credit (Coefficients = 0.5144558, 0.0659527, 0.0466201, 0.1259104, p-value <0.05) on ROA of commercial banking institutions in Kenya. There was positive and insignificant effect of tertiary credit (coefficient = 0.0142245, p value <0.05) with ROA of commercial banking institutions in Kenya

ROA = -1.5127 + 0.5144*ROA_{t-1} + 0.0659**Household Credit* + 0.0466 **Primary sector* + 0.1259 * *Secondary sector* + 0.0142**Tertiary Sector* …….4.4

Table 4.46: Dynamic Panel Model on Effect of Sectoral Credit Diversification on ROA

Arellano-Bond dynamic panel-data estimation				**Number of obs**	=	**574**
Group variable: id				Number of groups	=	39
Time variable: year						
				Obs per group	min =	9
					avg =	14.717949
					max =	16
Number of instruments	=	123		Wald chi2 (5)	=	197.18
				Prob > chi2	=	0.0000
One step results						

roa	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
roa						
L1.	.5144558	.0482495	10.66	0.000	.4198885	.6090231
household_credit	.0659527	.0209033	3.16	0.002	.0249831	.1069224
primary_credit	.0466201	.0241171	1.93	0.053	-.0006484	.0938887
Secondary_credit	.1259104	.0400915	3.14	0.002	.0473325	.2044883
tertiary_credit	.0142245	.0195289	0.73	0.466	-.0240516	.0525005
_cons	-1.5126930	.3808455	-3.97	0.000	-2.2591370	-.7662501

Adaption of Sargan test in the study enabled the determination of the likelihood of model under estimation. The H0 in the test outlined that model's underlying conditions were met as opposed to an alternative of their non-satisfaction. Outcome as highlighted in Table 4.47 disclosed that the model was correctly identified since its p value was lower than 0.05 which was the critical value.

Table 4.47: Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	235.8133
Prob > chi2	=	0.0000

The static model findings agreed with Chen et al., (2013) who indicated that sectoral diversification has a positive association with return and similarly lowers risk. The

statistic derived by Durbin-Watson (D) was made use of to assess for serial correlations among errors providing figures that were near to two for each and every model whereby it implied that error terms were deemed independent over all study observations. This was in line with Chen et al., (2013). The performance of a bank concerns other firms and sectors in the economy. The study also was in agreement with Turkmen and Yigit, (2012) who highlighted that focusing or diversifying portfolios of credit determines levels of risk banks are willing to take on. Losses incurred in one sector or will be compensated by the earnings acquired from other sectoral allocation. It is, therefore, paramount for banks to model strategic resolutions for a bank, taking into account risk as well as return preferences

Regarding the model of dynamic panel, lagged return on return on assets and return on equity were employed and according to Wooldridge (2012), the need for dynamic panel analysis is as a result of lagged residuals auto regression which may suggest non-existence or existence of autocorrelation. Ordinary Least Squares was not appropriate in situations where the problem of multi-collinearity is present meaning there is a correlation of sequential lagged values of a regressor. The results were consistent with Yudistira and Anggono, (2013) findings that can be useful to banks when making decisions on the distribution of credit. The analysis agreed with the findings that tertiary sector including Oil and Gas, Electricity and Water Sector, Building Sector, Transport, Warehousing, and Communication, Business Services, and Consumer Loans classifications have an effect that is significant and that has a strong relation with commercial bank's operating profit.

In terms of significance, the findings contradicted with Meressa (2017) study that investigated distribution of sub-sectoral loan and advances and their linkage with operating profit of banks using a short run unbalanced panel. It was deduced that sectoral allocation of credit to trade in domestic market and service, sector of manufacturing, and category of import and export has statistically positive and significant linkage with operating profit. Sectoral allocation to secondary sector building and construction and transportation had a positive relationship that is statistically insignificant with income from interest. Banks' allocation of credit to

sector classified as agricultural revealed a negative linkage that is statistically insignificant with operating profit.

4.10.2 Hypothesis Two

The second hypothesis claimed that income streams have no bearing on commercial banks' financial performance in Kenya. As demonstrated in Table 4.48, income streams had a substantial impact on commercial banks' ROE in Kenya (F= 56.9384, p value 0.05). Interest income, fees and commissions, trading income, and other income streams accounted for 81.83 percent of changes in ROE, according to the coefficient of determination of 0.8183. Other attributes not included in the model accounted for the rest. Interest income had positive significant effect on ROE of banks in Kenya (β = 0.7865, p value <0.05). This means that while keeping interest income, trading income, fees and commissions, and other income same, a rise in interest income raised ROE by 0.7865 per unit.

Second, trading income had a substantial positive impact on ROE (β =0.4932, p = 0.05). This suggests that increasing trading income by one unit raised ROE by 0.4932 while keeping interest, fees and commissions, and other income constant. Thirdly, fees and commission had positive and significant effect on ROE (β=0.6263, p value <0.05). This indicated that unit increase in fees and commission increases ROE by 0.6263 units while holding interest income, trading income and other income constant. Finally, there was positive and significant effect of other income on ROE (β=0.4644, p value <0.05). This demonstrates that increasing other income by one unit raised ROE by 0.4644 while keeping other variables constant. Interest income had the greatest impact on ROE, followed by fees and commissions, trading income, and other earnings, according to the data.

ROE = -2.8243 + 0.7865**Interest income* + 0.4932**Trading income* + 0.6263**Fees and Commission* + 0.4644 * *Other income* ……...…….4.5

Table 4.48: Fixed Effects on Effect of Income Streams Diversification on ROE

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-2.8243	1.0350	-2.7288	0.0066
Interest income	0.7865	0.1170	6.7241	0.0000
Trading income	0.4932	0.0743	6.6371	0.0000
Fees and commission	0.6263	0.0831	7.5350	0.0000
Other income	0.4644	0.0786	5.9090	0.0000
R-squared	0.8183	Mean dependent var		16.2697
Adjusted R-squared	0.8039	S.D. dependent var		14.7145
S.E. of regression	6.5156	Akaike info criterion		6.6582
Sum squared residuals	22542.410	Schwarz criterion		6.9843
Log likelihood	-1867.911	Hannan-Quinn criterion.		6.7854
F-statistic	56.9384	Durbin-Watson stat		1.4481
Prob(F-statistic)	0.0000			

As shown in Table 4.49, income streams had a substantial impact on ROA (F= 40.2951, p value 0.05). Interest income, trading income, fees and commissions, and other income sources accounted for 22.07 percent of changes in ROA, according to the coefficient of determination of 0.2207. The remainder was accounted for by other attributes excluded from the model. Interest income had a positive and significant effect on ROA ($\beta = 0.2017$, p value <0.05). This means that while keeping interest income, trading income, fees and commissions, and other income constant, a rise in interest income increased ROE by 0.2017. Second, trading income showed a considerable positive effect on ROA (p value 0.05, $\beta =0.0545$). This denoted that unit increment in trading income increased ROA by 0.0545 while holding constant interest income, fees and commission and other income. Thirdly, fees and commission had positive and significant effect on ROA ($\beta=0.1028$, p value <0.05). This means that increasing fees and commissions by one unit raises ROA by 0.1028 units while keeping interest, trading, and other income constant. Finally, other income had a positive and substantial impact on ROA ($\beta =0.0708$, p value <0.05). This supports that unit increase in other income increased ROA by 0.0708 while holding constant interest income, trading income and fees and commission.

ROE = -1.4455 + 0.2017**Interest income* + 0.0545**Trading income* + 0.1028**Fees and Commission*+ 0.0708 * *Other income* ……..…….4.6

Table 4.49: Random Effects on Effect of Income Streams Diversification on ROA

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-1.4455	0.4335	-3.3347	0.0009
Interest income	0.2017	0.0353	5.7068	0.0000
Trading income	0.0545	0.0229	2.3775	0.0178
Fees and commission	0.1028	0.0257	4.0041	0.0001
Other income	0.0708	0.0242	2.9304	0.0035
R-squared	0.2207	Mean dependent var		0.5318
Adjusted R-squared	0.2153	S.D. dependent var		2.2944
S.E. of regression	2.0330	Sum squared residuals		2351.8350
F-statistic	40.2951	Durbin-Watson stat		1.8269
Prob(F-statistic)	0.0000			

Dynamic panel modeling was adopted to examine short run effects on the effect of income streams diversification on ROA and ROE of banks of Kenya. As shown in Table 4.50, there was significant effect of income streams diversification on ROE of banks in Kenya (Wald Chi square = 380.90, p value < 0.05). There was significant effect that was positive of lagged return on ROE, interest income, trading income, fees and commission and other incomes on ROE of banks.

The number of instruments (117) is fairly low as compared to the number of observations (574), confirming that there is no instrument proliferation problem. The sargan test is significant, showing the instrument set is valid and exogenous. These results of the diagnostic tests of system GMM in the models validates the models, and the conclusions derived on the basis of system GMM estimations. The time variable in years is included to control for economic cycles. The number of groups represented 39 banks that were analyzed in this study. The minimum was (9) and maximum was (16) with an average of (14.72) observed groups. Interest income has

the biggest impact followed by fees and commissions and trading income. According to this model, other incomes had the lowest impact on ROE of commercial banks in Kenyan financial sector.

ROE = -1.7024 + 0.1477*ROE_{t-1} + 0.5778**Interest income* + 0.4104 * *Trading income* + 0.5411 * *Fees and Commission* + 0.4047**Other income* …….4.7

Table 4.50: Dynamic Panel Model on Effect of Income Streams Diversification on ROE

Arellano-Bond dynamic panel-data estimation			**Number of obs**		**=**	**574**
Group variable: id			Number of groups		=	39
Time variable: year						
			Obs per group		min =	9
					avg =	14.717949
					max =	16
Number of instruments =	123		Wald chi2 (5)		=	380.90
			Prob > chi2		=	0.0000
One step results						
roe	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
roe						
L1.	.1477377	.4769150	3.10	0.002	.0542641	.2412113
interest_income	.5777650	.1256555	4.60	0.000	.3314848	.8240452
trading_income	.4104997	.0761901	5.39	0.000	.2611699	.5598294
fees_commissions	.5410790	.0868685	6.23	0.000	.3708199	.7113381
other_income	.4047023	.0809904	5.00	0.000	.2459639	.5634406
_cons	-1.7023510	1.2193650	-1.40	0.163	-4.092262	.6875594

Sargan test was adopted to examine the possibilities of model under estimation. The null hypothesis stated that underlying conditions for the model were satisfied against an alternative of their non-satisfaction. Findings shown in Table 4.51 revealed that the model was correctly identified since its p value was less than 0.05.

Table 4.51: Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	162.2197
Prob > chi2	=	0.0000

As shown in Table 4.52, there was significant effect of income streams diversification on ROA (Wald Chi square = 206.55, p value < 0.05). There was significant effect that was positive of lagged return on ROA, interest income, trading income, fees and commission (coeeficient= .5283636, .0770540, .0639610, .0741570 and p value < 0.05) on ROA of banks. Other incomes had non-significant effect that was positive (coefficient= 0.0423893 and p value = 0.079 > 0.05) of lagged return on ROA of commercial banking firms in Kenyan financial system.

ROA = -1.1459 + 0.5283*ROA_{t-1} + 0.0771**Interest income* + 0.0640 * *Trading income* + 0.0742 * *Fees and Commission* + 0.0424**Other income* …….4.8

The number of instruments (123) is fairly low as compared to the number of observations (574), confirming that there is no instrument proliferation problem. The sargan test is significant, showing the instrument set is valid and exogenous. These results of the diagnostic tests of system GMM in the models validate the models, and conclusions made on the basis of system GMM estimations. The time variable in years is included to control for economic cycles. The number of groups represented 39 banks that were analyzed in this study. The minimum was (9) and maximum was (16) with an average of (14.72) observed groups.

Table 4.52: Dynamic Panel Model on Effect of Income Streams Diversification on ROA

Arellano-Bond dynamic panel-data estimation				**Number of obs**	**=**	**574**
Group variable: id				Number of groups	=	39
Time variable: year						
				Obs per group	min =	9
					avg =	14.717949
					max =	16
Number of instruments	=	123		Wald chi2(5)	=	206.55
				Prob > chi2	=	0.0000
One step results						

roa	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
roa						
L1.	.5283636	.0476834	11.08	0.000	.4349058	.6218214
interest_income	.0770540	.0376624	2.05	0.041	.0032372	.1508709
trading_income	.0639610	.0224301	2.85	0.004	.0199988	.1079231
fees_commissions	.0741570	.0255842	2.90	0.004	.0240128	.1243011
other_income	.0423893	.0241130	1.76	0.079	-.0048714	.0896500
_cons	-1.1459080	.3346126	-3.42	0.001	-1.8017370	-.4900797

Sargan test was adopted to examine the possibilities of model under estimation. The H0 stated that underlying conditions for the model were satisfied against an alternative of their non-satisfaction. Findings shown in Table 4.53 revealed that the model was correctly identified since its p value was less than 0.05. The model thus exhibited robustness of identifying the instruments.

Table 4.53: Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	237.8499
Prob > chi2	=	0.0000

The positive direction of influence in both static model and dynamic panel model of income streams diversification variables as well as their significance, resonates to results insinuated by the study of Turkmen and Yigit (2012); Ebrahim and Hasan (2008); Kiweu (2012); Mulwa et al. (2015). They indicated that diversification lowers systematic risk, reduces volatility in earnings, and henceforth lowers costs associated with agency; but the finding is in contrary to the findings of Mishra and Sahoo (2012) where the researcher claimed that diversification undertaken by banks has failed in value creation and banks practicing greater income streams diversification tend to undergo fluctuating financial performance as a result of absence in determination of the optimum level and lack of capacity to capture the optimal and viable avenues of diversification.

4.10.3 Hypothesis Three

The third hypothesis claimed that the deposit portfolio of Kenyan commercial banks had no meaningful impact on their financial performance. As demonstrated in Table 4.54, the deposits portfolio had a substantial impact on ROE (F= 47.5139, p value <0.05). Savings, demand, call, and fixed deposits accounted for 78.98 percent of changes in ROE, according to the coefficient of determination of 0.7898. The remainder was accounted for by other attributes excluded from the model. Savings deposits had positive significant effect on ROE (β = 0.5482, p value <0.05). This means that while keeping demand, call, and fixed deposits constant, unit increments in savings deposits raised ROE by 0.5482. Second, demand had a substantial positive effect on ROE (β =1.1026, $p < 0.05$). This means that increasing demand deposits by one unit increased ROE by 1.1026 while keeping savings, calls, and fixed deposits constant. Thirdly, call deposits had significant effect that was positive on ROE (β=0.4672, p value <0.05). This indicates that unit increment in call deposits increases ROE by 0.4672 units while holding savings, demand and fixed deposits constant. Finally, there was significant effect that was positive of fixed deposits on ROE (β=0.5340, p value <0.05). This stipulates that unit increment in fixed deposits increased ROE by 0.5340 units while holding constant savings, demand and calls deposits constant.

ROE = -7.6062 + 0.5482**Savings* + 1.1026**Demand* + 0.4672**Call* + 0.5340 * *Fixed* …….4.9

Table 4.54: Fixed Effects on Effect of Deposits Portfolio Diversification ROE

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-7.6062	1.3585	-5.5989	0.0000
Savings	0.5482	0.0803	6.8264	0.0000
Demand	1.1026	0.1605	6.8695	0.0000
Call	0.4672	0.1848	2.5283	0.0118
Fixed	0.5340	0.0990	5.3937	0.0000
R-squared	0.7898	Mean dependent var		16.2697
Adjusted R-squared	0.7732	S.D. dependent var		14.7145
S.E. of regression	7.0074	Akaike info criterion		6.8038
Sum squared residuals	26074.010	Schwarz criterion		7.1298
Log likelihood	-1909.6810	Hannan-Quinn criterion.		6.9310
F-statistic	47.5139	Durbin-Watson stat		2.1899
Prob(F-statistic)	0.0000			

The FEM model on the effect of deposit diversification on ROA is shown in Table 4.55. The analyses revealed that the deposit portfolio had a substantial impact on ROA (F= 28.5853, p value <0.05). Savings, demand, call, and fixed deposits accounted for 69.33 percent of increases in ROA, according to a coefficient of determination of 0.6933. The remainder was accounted for by other attributes excluded from the model. Savings deposits had positive non-significant effect on ROA of banksin Kenya (β = 0.0341, p value <0.05). This indicates that unit increments in savings deposits increased ROA by 0.0341 while holding demand, call and fixed deposits constant.

Second, demand had a substantial positive effect on ROA (β = 0.2046, p < 0.05). This meant that increasing demand deposits by one unit raised ROA by 0.2046 while keeping savings, calls, and fixed deposits constant. Thirdly, call deposits had a substantial beneficial influence on ROA (β = 0.1128, p value <0.05). This indicated that unit increment in call deposits increases ROA by 0.1128 units while holding savings, demand and fixed deposits constant. Finally, there was significant effect that

was positive of fixed deposits on ROA (β=0.1079, p value <0.05). This meant that increasing fixed deposits by one unit raised ROE by 0.1079 units while keeping savings, demand, and call deposits constant. Demand deposits, followed by call and fixed deposits, had the greatest impact on ROA. Savings deposits had the lowest and non significant effect because interest is payable on all savings deposits thus minimizing the returns derived from this deposits type.

ROA = -2.1128 + 0.0341**Savings* + 0.2046**Demand* + 0.1128**Call* + 0.1079**Fixed* …4.10

Table 4.55: Fixed Effects on Effect of Deposits Portfolio Diversification on ROA

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-2.1128	0.3921	-5.3877	0.0000
Savings	0.0341	0.0232	1.4706	0.1420
Demand	0.2046	0.0463	4.4149	0.0000
Call	0.1128	0.0533	2.1152	0.0349
Fixed	0.1079	0.0286	3.7746	0.0002
R-squared	0.6933	Mean dependent var		2.0040
Adjusted R-squared	0.6691	S.D. dependent var		3.5163
S.E. of regression	2.0227	Akaike info criterion		4.3187
Sum squared residuals	2172.5860	Schwarz criterion		4.6448
Log likelihood	-1196.4800	Hannan-Quinn criterion.		4.4459
F-statistic	28.5853	Durbin-Watson stat		1.7984
Prob(F-statistic)	0.0000			

As revealed in Table 4.56, there was significant effect of deposits portfolio diversification on financial performance of banks in Kenya (Wald Chi square = 329.82, p value < 0.05). There was significant effect that was positive of lagged return on ROE, savings, demand, call and fixed deposits on ROE. Positive Coefficients of 0.5612, 0.9180, 0.04314, and 0.3605 on savings, demand, call and fixed deposits was observed in relation to return on equity.

ROE = -8.2062 + 0.2474**ROE*$_{t-1}$ + 0.5612**Savings* + 0.9180 * *Demand*+ 0.4314 * *Call* + 0.3605**fixed* ……..4.11

Table 4.56: Dynamic Panel Model on Effect of Deposits Portfolio Diversification on ROE

Arellano-Bond dynamic panel-data estimation				**Number of obs**		**574**
Group variable: id				Number of groups	=	39
Time variable: year						
				Obs per group	min =	9
					avg =	14.717949
					max =	16
Number of instruments	=	123		Wald chi2 (5)	=	329.82
				Prob > chi2	=	0.0000
One step results						

roe	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
roe						
L1.	.2474928	.0483179	5.12	0.000	.1527914	.3421941
Savings	.5611881	.0805092	6.97	0.000	.4033929	.7189834
Demand	.9180322	.1758853	5.22	0.000	.5733032	1.2627610
Call	.4313731	.1947279	2.22	0.027	.0497134	.8130324
Fixed	.3604546	.1030550	3.50	0.000	.1584705	.5624386
_cons	-8.2062150	1.5097020	-5.44	0.000	-11.1651800	-5.2472540

Sargan test was adopted to examine the possibilities of model under estimation. The null hypothesis stated that underlying conditions for the model were satisfied against an alternative of their non-satisfaction. Findings shown in Table 4.57 revealed that the model was correctly identified since its p value was less than 0.05.

Table 4.57: Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	194.2658
Prob > chi2	=	0.0000

As revealed in Table 4.58, there was significant effect of deposits portfolio diversification on financial performance of banks in Kenya (Wald Chi square =

228.28, p value < 0.05). There was significant effect that was positive of lagged return on ROA, savings, demand, fixed deposits on ROA. There was non-significant effect that was positive of call deposits on ROA of banks in Kenya.

ROA = -2.3763 + 0.5542*ROA_{t-1} + 0.0498**Savings* + 0.1891 * *Demand* + 0.0591 * *Call* + 0.0636**fixed* …….4.12

Table 4.58: Dynamic Panel Model on Deposits Portfolio Diversification and ROA

Arellano-Bond dynamic panel-data estimation			**Number of obs**	=	**574**
Group variable: id			Number of groups	=	39
Time variable: year					
			Obs per group	min =	9
				avg =	14.717949
				max =	16
Number of instruments =	123		Wald chi2 (5)	=	228.28
			Prob > chi2	=	0.0000
One step results					
roa	Coef.	Std. Err.	z	P>| z |	[95% Conf. Interval]
roa					
L1.	.5542088	.0463433	11.96	0.000	.4633775 .6450400
savings	.0498238	.0227775	2.19	0.029	.0051807 .0944669
demand	.1891295	.0491855	3.85	0.000	.0927277 .2855313
call	.0591408	.0545080	1.08	0.278	-.0476929 .1659745
fixed	.0636112	.0292052	2.18	0.029	.0063700 .1208523
_cons	-2.3760570	.3976996	-5.97	0.000	-3.1555340 -1.5965800

Sargan test was adopted to examine the possibilities of model under estimation. The H0 stated that underlying conditions for the model were satisfied against an alternative of their non-satisfaction. Findings shown in Table 4.59 revealed that the model was correctly identified since its p value was less than 0.05.

Table 4.59: Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	258.0345
Prob > chi2	=	0.0000

In both dynamic panel models with ROE and ROA representing performance of banks, the number of instruments (123) is fairly low when it was compared to the number of observations (574), confirming that there is no problem emanating from instrument proliferation. The Sargan test that was significant shown that the instrument set was valid and more so exogenous. These results of the diagnostic tests of system GMM in the models thus validated the models, and as well validated final conclusions and observations made on the basis of system GMM estimations. The time variable in years is included to control for cycles that occurred in the economy. The number of groups represented 39 banks that were analyzed in this study. The minimum was (9) and maximum was (16) with an average of (14.72) observed groups.

The findings in the current study conformed with studies done by Baele et al. (2007); Mulwa (2013); Oyewobi et al. (2013); Mulwa (2015) where diversity of financing among them call, savings, demand and fixed deposits had an effect that was significantly positive on performance. Deposits and loans portfolio of the banks, if not properly managed, will make impossible for the achievement of expected performance. The study therefore supports Odhiambo, (2008) who stated that portfolio in this sense means mix of deposits by term structure and costs while the mix of credits granted is by term structure and lending rates. These mixes will translate into the risks being undertaken by banks and how these risks will affect performance. Olarewaju, Migiro, and Sibanda (2017) found that branch network count and levels of income nationally as well as stability were the significant factors in the banking industry to determine deposits which in turn significantly influence the performance of financial institutions negatively.

However, there was contradiction with the discussion paper by Nafula (2003) presented in KIPPRA where the results of this study suggested that the customer deposits variable enters the equation negatively with very significant coefficients in all the regressions. The study finding did not conform to Gul et al (2011) study that stated that deposits among them demand, savings and fixed deposits, however, portrayed a negative relationship with return on capital employed. Furthermore, the depicted negative observations of diversification deposit and performance of banks can be attributable to the instability seen in the economy and challenges encountered with most of the nations used for studies during the scoped duration of time since the large part of deposits in banks is from customers and levels of diversity by banks is relatively low to invite the hit as a result of competitiveness that will propel banks to leap from economies of scale and wider scope from the deposits by customers.

4.10.4 Hypothesis Four

According to the fourth hypothesis, the investment portfolio has no substantial impact on the financial performance of Kenyan commercial banks. As shown in Table 4.60, the deposits portfolio had a substantial impact on bank ROE in Kenya ($F= 36.6883$, p value <0.05). With a coefficient of determination of 0.7437, placement, government securities, shares, and other investments accounted for 74.37 percent of variations in ROE. Other attributes not included in the model accounted for the rest. Placements component of investment had positive insignificant effect on ROE ($\beta = 0.2947$, p value > 0.05). This indicates that unit increment in placement increased ROE by 0.2947 while holding investment in government securities, shares and other sectors constant. Secondly, government securities had positive significant effect on ROE ($\beta= 0.6809$, p value <0.05). This meant that increasing investment in government securities by one unit raised ROE by 0.6809 while keeping investment in other sectors, such as placement, same. Thirdly, investing in stocks had a substantial positive influence on ROE ($\beta =0.4934$, p value <0.05). This indicated that unit increment in shares investment increases ROE by 0.4934 units while holding government securities, placement and other sectors investment constant. Ultimately, there was significant effect that was positive of other investment on ROE ($\beta=0.5465$, p value <0.05). This implied that increasing other investment by one unit raised ROE

by 0.5465 units while keeping placement, government securities, and other investments same.

ROE = -0.4769 + 0.2947**Placement* + 0.6809**Government Securities* + 0.4934**Shares* + 0.5465 * *Other Investment*……..…….…….4.13

Table 4.60: Fixed Effects on Effect of Investment Portfolio Diversification on ROE

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-0.4769	1.6060	-0.2969	0.7666
Placement	0.2947	0.1800	1.6372	0.1022
Government securities	0.6809	0.1579	4.3128	0.0000
Shares	0.4934	0.1136	4.3447	0.0000
Other investment	0.5465	0.1236	4.4201	0.0000
R-squared	0.7437	Mean dependent var		16.2697
Adjusted R-squared	0.7234	S.D. dependent var		14.7145
S.E. of regression	7.7382	Akaike info criterion		7.0022
Sum squared residuals	31795.9000	Schwarz criterion		7.3282
Log likelihood	-1966.6220	Hannan-Quinn criterion		7.1293
F-statistic	36.6883	Durbin-Watson stat		1.3090
Prob(F-statistic)	0.0000			

As shown in Table 4.61, the deposits portfolio had a substantial impact on ROA (F= 32.0142, p value <0.05). With a coefficient of determination of 0.7169, placement, government securities, shares, and other investments accounted for 71.69 percent of changes in ROA. The remainder was accounted for by other attributes excluded from the model. Placement investment had positive non-significant effect on ROA (β = 0.0858, p value >0.05). This means that by increasing placement by one unit, ROA grew by 0.0858 while keeping investments in government securities, shares, and other sectors constant. Second, government securities had a large favorable impact on ROA (β= 0.1925, p value <0.05). This indicated that unit increase in investment in government securities increased ROA by 0.1925 while holding constant investment in placement, shares and other sectors constant. Thirdly, investment in

shares had significant effect that was positive on ROA (β=0.0981, p value <0.05). This means that increasing the number of units invested in shares enhances ROA by 0.0981 units while keeping the number of units invested in government securities, placement, and other sectors same. Finally, there was a strong positive effect of other investments on ROE (β= 0.1226, p value <0.05). This meant that adding 0.1226 units to other investments raised ROE by 0.1226 units while keeping placement, government securities, and other investments same.

ROA = -2.1416 + 0.0858**Placement* + 0.1925**Government securities*+ 0.0981**Shares* + 0.1226 * *Other Investment*…….……...….4.14

Table 4.61: Fixed Effects on Effect of Investment Portfolio Diversification on ROA

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-2.1416	0.4034	-5.3096	0.0000
Placement	0.0858	0.0452	1.8983	0.0582
Government securities	0.1925	0.0397	4.8546	0.0000
Shares	0.0981	0.0285	3.4383	0.0006
Other investment	0.1226	0.0311	3.9495	0.0001
R-squared	0.7169	Mean dependent var		2.0040
Adjusted R-squared	0.6945	S.D. dependent var		3.5163
S.E. of regression	1.9435	Akaike info criterion		4.2389
Sum squared residuals	2005.7680	Schwarz criterion		4.5649
Log likelihood	-1173.5520	Hannan-Quinn criterion		4.3660
F-statistic	32.0142	Durbin-Watson stat		1.9868
Prob(F-statistic)	0.0000			

This study adpoted dynamic panel model to investigate short run effects. As depicted in Table 4.62, there was significant short run effect of investment portfolio diversification on financial performance of banks in Kenya (Wald Chi square = 142.56, p value < 0.05). There was significant effect that was positive of lagged return on ROE, investment on placement, and government securities on ROE. Shares had insignificant effect on ROE.

ROE = 1.8834 + 0.2784*ROE_{t-1} + 0.4794**Placement* + 0.4528 * *Government Securities* + 0.1982 * *Shares* + 0.5004**Other Investment* …….……4.15

Table 4.62: Dynamic Panel Model on Effect of Investment Portfolio Diversification on ROE

Arellano-Bond dynamic panel-data estimation			**Number of obs**		**=**	**574**
Group variable: id			Number of groups		=	39
Time variable: year						
			Obs per group	min	=	9
				avg	=	14.717949
				max	=	16
Number of instruments =	123		Wald chi2 (5)		=	142.56
			Prob > chi2		=	0.0000
One step results						
roe	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
roe						
L1.	.2784004	.0587291	4.74	0.000	.1632935	.3935074
placement	.4793593	.1822704	2.62	0.009	.1212669	.8374518
government_securities	.4527582	.1721922	2.63	0.009	.1152676	.7902488
shares	.1981910	.1160096	1.71	0.088	-.0291837	.4255657
other_investment	.5004262	.1287249	3.89	0.000	.2481299	.7527224
_cons	-1.8833850	1.8415650	-1.02	0.306	-5.4927860	1.7260170

Sargan test was adopted to examine the possibilities of model under estimation. The H0 stated that underlying conditions for the model were satisfied against an alternative of their non-satisfaction. Findings shown in Table 4.63 revealed that the model was correctly identified since its p value was less than 0.05.

Table 4.63: Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	170.0850
Prob > chi2	=	0.0000

As illustrated in Table 4.64, there was significant short run effect of investment portfolio diversification on financial performance of commercial banks in Kenya (Wald Chi square = 188.94, p value < 0.05). There was positively significant effect of lagged return on ROA, investment on placement, and government securities on ROA. Shares had a positive insignificant effect on ROA. Immediate previous period return on return on asset thus was observed to significantly have an influence on current period performance. The study outcome highlighted that one unit change in prior periods' performance caused 0.5278 unit increment in the current performance of banks operating in Kenya which was significant at p value which was less than critical value of 0.05. Investments on placements in other banks and in Central bank had the highest effect on ROA with a coefficient of 0.1046. Government securities were at 0.0954, followed by other investments at 0.0763 and lastly investment in shares at 0.0402.

$$ROA = 1.7241 + 0.5278*ROA_{t-1} + 0.1046*Placement + 0.0954 * Government\ Securities + 0.0402 * Shares + 0.0763*Other\ Investment \quad \ldots\ldots\ldots\ldots 4.16$$

Table 4.64: Dynamic Panel Model on Effect of Investment Portfolio Diversification on ROA

Arellano-Bond dynamic panel-data estimation					**Number of obs**		**574**
Group variable: id					Number of groups	=	39
Time variable: year							
					Obs per group	min =	9
						avg =	14.717949
						max =	16
Number of instruments	=	123			Wald chi2(5)	=	188.94
					Prob > chi2	=	0.0000
One step results							
	roa	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
	roa						
	L1.	.5278145	.0487104	10.84	0.000	.4323438	.6232852
placement		.1045666	.0456092	2.29	0.022	.0151743	.1939590
government_securities		.0954332	.0424118	2.25	0.024	.0123076	.1785589
shares		.0401628	.0288852	1.39	0.164	-.0164511	.0967767
other_investment		.0763961	.0320501	2.38	0.017	.0135790	.1392132
_cons		-1.7240550	.4350755	-3.96	0.000	-2.5767880	-.8713231

Sargan test was adopted to examine the possibilities of model under estimation. The H0 stated that underlying conditions for the model were satisfied against an alternative of their non-satisfaction. Findings shown in Table 4.65 revealed that the model was correctly identified since its p value was less than 0.05. This outcome of the diagnostic tests of system GMM in the model validate the models, and altogether validates the conclusions made on the basis of system GMM estimations.

Table 4.65: Sargan Test for Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	248.6839
Prob > chi2	=	0.0000

In both dynamic panel models with ROE and ROA representing performance of banks, the number of instruments (123) is fairly low when it was compared to the number of observations (574), confirming that there is no problem emanating from instrument proliferation. The sargan test that was significant shown that the instrument set was valid and more so exogenous. These results of the diagnostic tests of system GMM in the models thus validated the models, and as well validated final conclusions and observations made on the basis of system GMM estimations. The time variable in years is included to control for cycles that occurred in the economy. The number of groups represented 39 banks that were analyzed in this study. The minimum was (9) and maximum was (16) with an average of (14.72) observed groups.

These findings confirmed was supported by Cernas (2011) who examined the curvilinearity and moderation in the relationship between the degree of relatedness of individual diversification actions and firm performance. The study indicated that diversification as a strategy of managing portfolio through ushering together varied assets to bring down the universal risk linked with an investment portfolio. The common benefit of diversifying any portfolio is that it brings together various investments along with a variety of categories of financial tools, by which each bear proportionate risk-return. This diversification grouping is spearheaded with the essential objective of bringing down the anticipated risk that may come to light after all resources are set up in a single investment category. Cernas (2011) further stated that the positive coefficient indicates that financial assets are easily liquidized compared to other tangible assets including real estate, commodities, are tradable on

financial markets so an increase in company's financial assets, results to increase in its net worth.

Rop et al., (2016), found that investment in insurance improve earnings of commercial banking firms significantly in the Kenyan context. González (2004), deductions inferred positive relationship subsisting between banks' equity investments, banks' margin of rates of interest and net income of banks that are not overridden by supplemental regulations by provisions and requirement of capital that banks regulator establish to control risks in banks. An effect that is positive existing between equity investments and margins of interest on banks exhibits consistency with the banks' strength as bank owners can accrue benefits in the shareholding relationship with these banking institutions.

The outcome agreed with Kipleting and Bokongo (2016) who investigated the effect of investment diversification on the financial performance of commercial banks in Kenya. The study concluded that a majority of the banks over the years had in practice employed the use of government securities and financial assets investment as an alternative to traditional services of intermediation to boost their financial performance. The positive coefficient indicates that investment on government security such as Treasury bills and bonds are considered to be significantly safer investments compared to the other asset classes given that the likelihood of a government running out of money and defaulting on its interest payments are very low since it can print more money or borrow more. This result was consistent with Kipleting and Bokongo (2016) observations.

The finding however was in contrary to the findings of Armstrong and Fic (2014); Mishra and Sahoo (2012) where the researchers claimed that diversification undertaken by banks has failed in value creation and banks practicing greater income streams diversification tends to undergo fluctuating financial performance as a result of absence in determination of the optimum level and lack of capacity to capture the optimal and viable avenues of diversification.

4.10.5 Hypothesis Five

The study's fifth goal was to see if bank size had a moderating effect on the effect of portfolio diversification on commercial banks' financial performance in Kenya. The direct effect of bank portfolio diversification on financial performance was investigated using multiple regression analysis. Furthermore, stepwise regression and marginal differentiation were used to investigate if bank size has a moderating influence on the impact of portfolio diversification on commercial bank financial performance in Kenya. Bank portfolio diversification had a considerable impact on commercial banks' ROE in Kenya, as seen in Table 4.66 (F= 51.7262, p value <0.05). The coefficient of determination of 0.8036 indicated that sectoral credit diversification, income streams diversification, deposits portfolio diversification, and investment portfolio diversification accounted for 80.36 percent of changes in ROE of commercial banks in Kenya, with the remaining percentage being accounted for by other attributes not included in the model.

There was positively significant effect of sectoral credit diversification and ROE (β = 16.4673, p value <0.05). As a result, increasing HHI SCD by one unit raised ROE by 16.4673 units while keeping HHI ISD, HHI DPD, and HHI IPD constant. Second, income stream diversification has a large positive impact on ROE (β = 11.0188, p value <0.05). While keeping HHI SCD, HHI DPD, and HHI IPD constant, a unit increase in revenue streams diversification raises ROE by 11.0188. Thirdly, deposit portfolio diversification had a favorable and considerable impact on ROE (β = 20.5128, p value <0.05). This insinuated that unit increment in deposit portfolio diversification increases ROE by 20.5128 while holding HHI SCD, HHI ISD and HHI IPD constant. Fourthly, there was positively significant effect of investment portfolio diversification on ROE (β = 12.0185, p value <0.05). This suggests that increasing investment portfolio diversification by one unit raises ROE by 12.0185 while keeping HHI SCD, HHI ISD and HHI DPD constant. According to the data, deposit portfolio diversification had the greatest impact on banking return on equity, followed by sectoral credit diversification, investment portfolio diversification, and finally income stream diversification. Durbin-Watson (D) was used to check for serial correlations among errors, yielding results close to two for each model,

implying that error components were considered independent throughout all study observations.

ROE = -22.8129 +16.4673**HHI SCD* + 11.0188**HHI ISD* + 20.5128**HHI DPD*+12.0185**HHI IPD* …….…….…….4.17.

Table 4.66: Fixed Effects on Effect of Banks Portfolio Diversification on ROE

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-22.8129	2.0679	-11.0321	0.0000
HHI SCD	16.4673	2.6786	6.1476	0.0000
HHI ISD	11.0188	2.7781	3.9662	0.0001
HHI DPD	20.5128	3.2135	6.3834	0.0000
HHI IPD	12.0185	2.8940	4.1528	0.0000
R-squared	0.8036	Mean dependent var		16.2697
Adjusted R-squared	0.7881	S.D. dependent var		14.7145
S.E. of regression	6.7742	Akaike info criterion		6.7361
Sum squared residuals	24367.7500	Schwarz criterion		7.0622
Log likelihood	-1890.2580	Hannan-Quinn criterion		6.8633
F-statistic	51.7262	Durbin-Watson stat		2.3579
Prob(F-statistic)	0.0000			

Bank portfolio diversification has a considerable impact on ROE, as seen in Table 4.67 (F= 34.8133, p value <0.05). With a coefficient of determination of 0.7336, sectoral credit diversification, income streams diversification, deposits portfolio diversification, and investment portfolio diversification accounted for 73.36 percent of changes in bank ROA in Kenya, while other attributes excluded from the model accounted for the remaining percentage.

There was positively significant effect of sectoral credit diversification and ROA (β = 4.6420, p value <0.05). Increasing HHI SCD by one unit raised ROA by 4.6420 units while keeping HHI ISD, HHI DPD, and HHI IPD same. Second, income stream diversification has a large favorable impact on ROA (β = 1.9375, p value <0.05). This implied that unit increment in income streams diversification increases ROA by

1.9375 while holding HHI SCD, HHI DPD and HHI IPD constant. Thirdly, there was positively significant effect of deposits portfolio diversification on ROA (β = 3.1007, p value <0.05). This insinuated that unit increment in deposit portfolio diversification raises ROA by 3.1007 while holding HHI SCD, HHI ISD and HHI IPD constant. Finally, there was a large favorable impact of investment portfolio diversification on ROA (β = 2.0100, p value <0.05). This revealed that unit increase in investment portfolio diversification enhances ROA by 2.0100 while holding HHI SCD, HHI ISD and HHI DPD.

ROA = -5.5745 + 4.6420**HHI SCD* + 1.9375**HHI ISD* + 3.1007**HHI DPD*+ 2.0100**HHI IPD* ……..……...……4.18.

Table 4.67: Fixed Effects on Effect of Banks Portfolio Diversification on ROA

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-5.5745	0.5755	-9.6862	0.0000
HHI SCD	4.6420	0.7455	6.2267	0.0000
HHI ISD	1.9375	0.7732	2.5058	0.0125
HHI DPD	3.1007	0.8943	3.4670	0.0006
HHI IPD	2.0100	0.8054	2.4956	0.0129
R-squared	0.7336	Mean dependent var		2.0040
Adjusted R-squared	0.7125	S.D. dependent var		3.5163
S.E. of regression	1.8853	Akaike info criterion		4.1781
Sum squared residuals	1887.4620	Schwarz criterion		4.5041
Log likelihood	-1156.1040	Hannan-Quinn criterion.		4.3052
F-statistic	34.8133	Durbin-Watson stat		1.9076
Prob(F-statistic)	0.0000			

As depicted by Table 4.68, there was significant short run effect of banks' portfolio diversification on financial performance of commercial banks in Kenya (Wald Chi square = 458.52, p value < 0.05). There was positively significant effect of lagged return on ROE, sectoral credit diversification, income streams diversification, deposit diversification and investment portfolio diversification on ROE. The outcome suggested that unit increment in HHI SCD increased ROE by 17.3056 units while

holding HHI ISD, HHI DPD and HHI IPD constant. A unit increment in income streams diversification increases ROE by 11.1601 while holding HHI SCD, HHI DPD and HHI IPD constant. A unit increment in deposit portfolio diversification increases ROE by 18.5024 while holding HHI SCD, HHI ISD and HHI IPD constant. The results also suggested that unit increase in investment portfolio diversification increases ROE by 10.4964 while holding HHI SCD, HHI ISD and HHI DPD.

$$ROE = -25.1104 + 0.2516*ROE_{t-1} + 17.3056*HHI\ SCD + 11.1601 * HHI\ ISD + 18.5024 * HHI\ DPD + 10.4964*HHI\ IPD \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4.17$$

Table 4.68: Dynamic Panel Model on Effect of Banks Portfolio Diversification on ROE

Arellano-Bond dynamic panel-data estimation				**Number of obs**	=	**574**
Group variable: id				Number of groups	=	39
Time variable: year						
				Obs per group	min =	9
					avg =	14.717949
					max =	16
Number of instruments =	123			Wald chi2(5)	=	458.52
				Prob > chi2	=	0.0000
One step results						
roe	Coef.	Std. Err.	Z	P>| z |	[95% Conf.	Interval]
roe						
L1.	-.2515846	.0378666	6.64	0.000	.1773664	.3258018
hhi_credit_diversification	17.30564	2.892808	5.98	0.000	11.63584	22.97544
hhi_income_diversification	11.1601	3.07628	3.63	0.000	5.130707	17.1895
hhi_deposit_diversification	18.50243	3.337531	5.54	0.000	11.96099	25.04387
hhi_investment_diversification	10.49635	2.935276	3.58	0.000	4.743316	16.24939
_cons	-25.11042	2.226942	-11.28	0.000	-29.47515	-20.7457

Sargan test was adopted to examine the possibilities of model under estimation. The H0 stated that underlying conditions for the model were satisfied against an

alternative of their non-satisfaction. Findings shown in Table 4.69 revealed that the model was correctly identified since its p value was less than 0.05.

Table 4.69: Sargan Test for the Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	188.0017
Prob > chi2	=	0.0000

As illustrated by Table 4.70, there was significant short run effect of banks' portfolio diversification on financial performance of banks in Kenya (Wald Chi square = 414.26, p value < 0.05). There was positively significant effect of lagged return on ROA, sectoral credit diversification, deposit diversification and investment portfolio diversification on ROA. Income streams diversification had a positive insignificant effect on ROA. It was deducted from the outcome that prior periods' performance causes a 0.4173 unit change in the current period's performance of banks. The outcome suggested that unit increment in HHI SCD increased ROA by 2.9129 units while holding HHI ISD, HHI DPD and HHI IPD constant. A unit increment in income streams diversification increases ROA by 0.9541 while holding HHI SCD, HHI DPD and HHI IPD constant. A unit increment in deposit portfolio diversification increases ROE by 2.3851 while holding HHI SCD, HHI ISD and HHI IPD constant. The results also suggested that unit increase in investment portfolio diversification increases ROE by 2.4189 while holding HHI SCD, HHI ISD and HHI DPD. The number of instruments (123) is fairly low when it was compared to the number of observations (574), confirming that there is no problem emanating from instrument proliferation. Overall 'Prob > chi2 was 0.000 which was less than critical value of 0.05 thus the variables in the model was deemed jointly significant in predicting ROA

$$ROA = -4.4552 + 0.4173*ROA_{t-1} + 2.9129*HHI\ SCD + 0.9541 * HHI\ ISD + 2.3851 * HHI\ DPD + 2.4189*HHI\ IPD \quad \ldots\ldots 4.18$$

Table 4.70: Dynamic Panel Model on Effect of Banks Portfolio Diversification on ROA

Arellano-Bond dynamic panel-data estimation			**Number of obs**		**=**	**574**
Group variable: id			Number of groups		=	39
Time variable: year						
			Obs per group		min =	9
					avg =	14.717949
					max =	16
Number of instruments =	123		Wald chi2(5)		=	414.20
			Prob > chi2		=	0.0000
One step results						
Roa	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
Roa						
L1.	.4173108	.0359061	11.62	0.000	.3469362	.4876855
hhi_credit_diversification	2.9129110	.7197679	4.05	0.000	1.5021920	4.3236300
hhi_income_diversification	.9540807	.7852021	1.22	0.000	-.5848871	2.4930490
hhi_deposit_diversification	2.3850740	.8365088	2.85	0.000	.7455465	4.0246010
hhi_investment_diversification	2.4188950	.7336035	3.30	0.000	.9810594	3.8567310
_cons	-4.4552460	.5421706	-8.22	0.000	-5.5178810	-3.3926110

Adoption of Sargan test was solely for examination of the likelihood of model under-estimation. The H0 in the test outlined that model's underlying conditions were met as opposed to an alternative of their non-satisfaction. Outcome as highlighted in Table 4.71 disclosed that the model was rightly identified since its p value was lower than 0.05 which was the critical value.

Table 4.71: Sargan Test for the Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	299.8107
Prob > chi2	=	0.0000

In both dynamic panel models with ROE and ROA representing performance of banks, the number of instruments (123) is fairly low when it was compared to the number of observations (574), confirming that there is no problem emanating from instrument proliferation. The Sargan test that was significant shown that the instrument set was valid and more so exogenous. These results of the diagnostic tests of system GMM in the models thus validated the models, and as well validated final conclusions and observations made on the basis of system GMM estimations. The time variable in years is included to control for cycles that occurred in the economy. The number of groups represented 39 banks that were analyzed in this study. The minimum was (9) and maximum was (16) with an average of (14.72) observed groups.

Regression results in Table 4.72 revealed that 81.58 percent of changes in ROE was accounted by bank portfolio diversification, bank size and moderated bank portfolio moderation while the remaining percentage was accounted for by other factors excluded in the derived model. R squared increased by 1.22 percent (0.8158-0.8036) after moderation which indicated banking size had moderating effect on the effect of banks portfolio diversification on financial performance of commercial banks in Kenya. Further, bank size had positive significant effect on banking performance in Kenya ($\beta = 3.7204$, p value <0.05).

After bank size moderation on HHI SCD*BS it had positively significant effect on ROE ($\beta = 3.5691$, p value <0.05). Secondly, there positive and non-significant moderated effect of HHI ISD*BS ($\beta = 2.9571$, p value >0.05). Thirdly, there was positively significant moderated effect of HHI DPD*BS ($\beta = 4.0829$, p value <0.05). There was positively non significant moderated effect of HHI IPD*BS ($\beta = 3.5826$, p value >0.05).

ROE = -11.8427+17.1142 **HHI SCD*+ 30.4703**HHI ISD* + 8.7986 **HHI DPD* + 49.2408**HHI IPD* + 3.7204 **Bank size* + 3.5691**HHI SCD*BS* + 2.9571 * *HHI ISD *BS* + 4.0829**HHI DPD*BS* + 3.5826**HHI IPD*BS*……..…. (4.19)

By comparing moderated and non-moderated coefficients with marginal changes in bank size on the connection of banking portfolio diversification and financial performance of Kenyan banks, the moderating effect of bank size was verified. If marginalized coefficients differ from non-moderated banking portfolio diversification coefficients, a bank size moderating impact will be evident. The equations that were used were as follows:

$$\frac{\delta ROEi,t}{\delta HHISCDi,t} = \beta_1 + \beta_6 BS = 17.1142 + 3.5691*9.86 = 52.3055$$

$$\frac{\delta ROEi,t}{\delta HHI\ ISDi,t} = \beta_2 + \beta_7 BS = 30.4703 + 2.9571*9.86 = 59.6273$$

$$\frac{\delta ROEi,t}{\delta HHI\ DPDi,t} = \beta_3 + \beta_8 BS = 8.7986 + 4.0829* 9.86 = 49.0560$$

$$\frac{\delta ROEi,t}{\delta HHI\ IPDi,t} = \beta_4 + \beta_9 BS = 49.2408 + 3.5826* 9.86 = 84.5652$$

Comparison between marginalized coefficients and those in equation 4.17 (ROE = -22.8129 +16.4673**HHI SCD* + 11.0188**HHI ISD* + 20.5128**HHI DPD* +12.0185**HHI IPD*), these coefficients differed. As a result, it was determined that bank size had a considerable moderating effect on the effect of portfolio diversification on bank ROE in Kenya.

Table 4.72: Bank Size Moderating Effect on Effect of Banks Portfolio Diversification ROE

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	11.8427	11.3509	1.0433	0.2973
HHI SCD	17.1142	17.3522	0.9863	0.3244
HHI ISD	30.4703	15.3197	1.9890	0.0472
HHI DPD	8.7986	20.3085	0.4332	0.6650
HHI IPD	49.2408	18.8819	2.6078	0.0094
Bank size	3.7204	1.1916	3.1223	0.0019
HHI SCD * BS	3.5691	1.7953	1.9880	0.0473
HHI ISD*BS	2.9571	2.0882	1.4161	0.1573
HHI DPD*BS	4.0829	1.5456	2.6416	0.0085
HHI IPD*BS	3.5826	1.8614	1.9247	0.0548
R-squared	0.8158	Mean dependent var		16.2697
Adjusted R-squared	0.7994	S.D. dependent var		14.7145
S.E. of regression	6.5911	Akaike info criterion		6.6892
Sum squared residuals	22850.5700	Schwarz criterion		7.0532
Log likelihood	-1871.8080	Hannan-Quinn criterion.		6.8312
F-statistic	49.5713	Durbin-Watson stat		1.4372
Prob(F-statistic)	0.0000			

Regression results in Table 4.73 demonstrated that 74.66 percent of changes in ROA was explained by bank portfolio diversification, bank size and moderated bank portfolio moderation while the remaining percentage was accounted for by other factors not included in the generated model. After moderation, R squared increased by 1.3 percent (0.7466 - 0.7336), indicating that banking size had a moderating influence on the effect of portfolio diversification on bank ROA in Kenya. Further, bank size had positive significant effect on banking performance (ROA) in Kenya ($\beta = 1.0428$, p value <0.05).

After bank size moderation on HHI SCD*BS it had favourable but small influence on ROA ($\beta = 0.5393$, p value >0.05). Secondly, there was positive and non-significant moderated effect of HHI ISD*BS on ROA ($\beta = 0.8419$, p value >0.05). Thirdly, there was positive and non-significant moderated effect of HHI DPD*BS on ROA ($\beta = 0.6518$, p value >0.05). Finally, there was positive and non-significant moderated effect of HHI IPD*BS ($\beta = 0.6410$, p value >0.05).

ROA = -15.3079 + 9.6156 **HHI SCD*+ 7.6419**HHI ISD* + 5.0961 **HHI DPD* + 8.5714**HHI IPD* + 1.0428 **Bank size* + 0.5393**HHI SCD*BS* + 0.8419 * *HHI ISD* **BS* + 0.6518**HHI DPD*BS* + 0.6410**HHI IPD*BS*……. (4.20)

The moderating effect of bank size on banking portfolio diversification on financial performance was validated by comparing moderated and non-moderated coefficients with marginal changes in bank size (ROA). If marginalized coefficients deviate from non-moderated banking portfolio diversification coefficients, a bank size moderating impact will be evident. The investigation used the marginalized coefficients equations shown below:

$\frac{\delta ROAi,t}{\delta HHISCDi,t} = \beta_1 + \beta_6 BS = 9.6156 + 0.5393*9.86 = 14.9331$

$\frac{\delta ROAi,t}{\delta HHI\ ISDi,t} = \beta_2 + \beta_7 BS = 7.6419 + 0.8419*9.86 = 15.9430$

$\frac{\delta ROAi,t}{\delta HHI\ DPDi,t} = \beta_3 + \beta_8 BS = 5.0961 + 0.6518* 9.86 = 11.5229$

$\frac{\delta ROAi,t}{\delta HHI\ IPDi,t} = \beta_4 + \beta_9 BS = 8.5714 + 0.6410* 9.86 = 14.8917$

Comparison between marginalized coefficients and those in equation 4.18 (ROA = -5.5745 + 4.6420**HHI SCD* + 1.9375**HHI ISD* + 3.1007**HHI DPD* + 2.0100**HHI IPD*), these coefficients differed. As a result, it was determined that bank size had a considerable moderating effect on the effect of portfolio diversification on commercial bank ROA.

Table 4.73: Bank Size Moderating Effect on Effect of Banks Portfolio Diversification on ROA

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-15.3079	3.1818	-4.8110	0.0000
HHI SCD	9.6156	4.8641	1.9768	0.0486
HHI ISD	7.6419	3.2944	2.3197	0.0357
HHI DPD	5.0961	5.6928	0.8952	0.3711
HHI IPD	8.5714	5.2929	1.6194	0.1060
Bank size	1.0428	0.3340	3.1221	0.0019
HHI SCD * BS	0.5393	0.5033	1.0717	0.2844
HHI ISD*BS	0.8419	0.5853	1.4383	0.1509
HHI DPD*BS	0.6518	0.4333	1.5044	0.1331
HHI IPD*BS	0.6410	0.5218	1.2285	0.2198
R-squared	0.7466	Mean dependent var		2.0040
Adjusted R-squared	0.7239	S.D. dependent var		3.5163
S.E. of regression	1.8476	Akaike info criterion		4.1456
Sum squared residuals	1795.5310	Schwarz criterion		4.5095
Log likelihood	-1141.7730	Hannan-Quinn criterion.		4.2875
F-statistic	32.9676	Durbin-Watson stat		1.9469
Prob(F-statistic)	0.0000			

As depicted in Table 4.74, overall, there was significant short run effect of banks' portfolio diversification on ROE of banks in Kenya and bank size moderating effect (Wald Chi square = 473.84, p value < 0.05). There was positively significant effect of lagged return on equity on ROE. There was significant effects of moderated income streams diversification, sectoral credit diversification, and negative non significant moderated effect of investment portfolio, deposit diversification diversifications on financial performance of commercial banks in Kenya. There was a negatively significant short run effect of banks' size on ROE of banks in Kenya.

ROE = -9.5389 + 0.2341*ROE_{t-1} - 10.2806**HHI SCD* -20.4181 * *HHI ISD* + 46.5967* *HHI DPD* + 22.5665**HHI IPD* -1.5715 **Bank size* + 2.878**HHI SCD*BS* + 3.1173 * *HHI ISD *BS* -2.9287**HHI DPD*BS* – 1.1575**HHI IPD*BS* ……..4.21

The influence of bank size on banking portfolio diversification on financial performance was validated by comparing moderated and non-moderated coefficients

with marginal changes in bank size. If marginalized coefficients differ from non-moderated banking portfolio diversification coefficients, a bank size moderating impact will be evident. The following equations were adopted:

$\frac{\delta ROAi,t}{\delta HHISCDi,t} = \beta_1 + \beta_6 BS = -10.2806 + 2.878*9.86 = 18.09648$

$\frac{\delta ROAi,t}{\delta HHI\ ISDi,t} = \beta_2 + \beta_7 BS = -20.4181 + 3.1173*9.86 = 10.318478$

$\frac{\delta ROAi,t}{\delta HHI\ DPDi,t} = \beta_3 + \beta_8 BS = 46.5967 - 2.9287 * 9.86 = 17.719718$

$\frac{\delta ROAi,t}{\delta HHI\ IPDi,t} = \beta_4 + \beta_9 BS = 22.5665 - 1.1575 * 9.86 = 11.15355$

Comparison between marginalized coefficients and those in equation 4.17 (ROE = 25.1104 + 0.2516*ROE_{t-1} + 17.3056**HHI SCD* + 11.1601 * *HHI ISD* + 18.5024 * *HHI DPD* + 10.4964**HHI IPD*), these coefficients were not the same. As a result, it was determined that bank size had a considerable moderating effect on the effect of portfolio diversification on commercial bank ROA in Kenya.

Table 4.74: Dynamic Panel Model on Bank Size Moderating Effect on the Effect of Banks Portfolio Diversification on ROE

Arellano-Bond dynamic panel-data estimation				**Number of obs**	=	**574**
Group variable: id				Number of groups	=	39
Time variable: year						
				Obs per group	min =	9
					avg =	14.717949
					max =	16
Number of instruments =	128			Wald chi2(5)	=	473.84
				Prob > chi2	=	0.0000

One step results

roe	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
roe						
L1.	.2341269	.0384858	6.08	0.000	.1596962	0.3095576
hhi_credit_diversification	-10.2805700	5.1462300	-2.00	0.013	-50.1584500	29.5973100
hhi_income_diversification	-20.4181100	8.1803400	-2.50	0.041	-56.0509200	15.2147000
hhi_deposit_diversification	46.5969700	23.4326800	1.99	0.047	0.6697625	92.5241800
hhi_investment_diversification	22.5664700	20.3821200	1.11	0.268	-17.3817500	62.5146900
bank_size	-1.5715240	0.6007690	-2.62	0.033	-4.7089730	1.5659260
hhi_cdbs	2.8478030	1.0704910	2.66	0.017	-1.2102850	6.9058910
hhi_isdbs	3.1773710	1.3009990	2.44	0.008	-0.3525218	6.7072640
hhi_ddbs	-2.9286550	2.3893510	-1.23	0.220	-7.6116960	1.7543870
hhi_ipdbs	-1.1574560	1.9943840	-0.58	0.562	-5.0663770	2.7514650
_cons	-9.5389330	15.5192900	-0.61	0.539	-39.9561800	20.8783200

Adaption of Sargan test in the study enabled the determination of the likelihood of model under estimation. The H0 in the test outlined that model's underlying conditions were met as opposed to an alternative of their non-satisfaction. Outcome as highlighted in Table 4.75 disclosed that the model was rightly identified since its p value was lower than 0.05 which was the critical value.

Table 4.75: Sargan Test for the Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	190.3967
Prob > chi2	=	0.0000

As shown in Table 4.74, there was significant short run joint effect of banks' portfolio diversification on ROA of banks in Kenya and bank size moderating effect (Wald Chi square = 463.29, p value < 0.05). There was positively significant effect of lagged return on assets on return on assets. There was significant positive effect of moderated sectoral credit diversification and income streams diversification on performance of banks. There was non-significant positive moderated effect of deposit diversification and investment portfolio diversification on performance of commercial banks in Kenya. There was a positively significant short run effect of Bank size on ROA.

ROA = -21.6250 + 0.3653*ROA_{t-1} + 9.5979**HHI SCD* + 7.8951* *HHI ISD* + 7.1843 * *HHI DPD* + 10.1516**HHI IPD*+ 1.8079**Bank size* + 0.2259**HHI SCD*BS* - +0.7102 * *HHI ISD *BS* –+0.4719**HHI DPD*BS* +0.7953**HHI IPD*BS* …….4.22

By comparing moderated and non-moderated coefficients with marginal changes in bank size on banking portfolio diversification on financial performance of all commercial banks in Kenya, the moderating influence of bank size was validated. If marginalized coefficients differ from non-moderated banking portfolio diversification coefficients, a bank size moderating impact will be evident. The following equations were adopted:

$\frac{\delta ROAi,t}{\delta HHISCDi,t} = \beta_1 + \beta_6 BS = 9.5979 + 0.2259*9.86 = 11.825274$

$\frac{\delta ROAi,t}{\delta HHI\ ISDi,t} = \beta_2 + \beta_7 BS = 7.8951 + 0.7102*9.86 = 14.897672$

$\frac{\delta ROAi,t}{\delta HHI\ DPDi,t} = \beta_3 + \beta_8 BS = 7.1843 + 0.4719 * 9.86 = 11.837234$

$\frac{\delta ROAi,t}{\delta HHI\ IPDi,t} = \beta_4 + \beta_9 BS = 10.1516 + 0.7953 * 9.86 = 8.07356748$

Comparison between marginalized coefficients and those in equation 4.18 (ROA = -5.5745 + 4.6420**HHI SCD* + 1.9375**HHI ISD* + 3.1007**HHI DPD* + 2.0100**HHI IPD*), these coefficients differed. As a result, it was determined that bank size had a considerable moderating influence on the impact of portfolio diversification on commercial bank ROA in Kenya. In this case, the size of the banks is used in the banking system to control risk and cost differences. The findings of this study showed that the higher a bank's total assets are, the greater the scope of diversification into potential investment areas. As a result, the relationship between bank portfolio diversification and Kenyan bank financial performance as evaluated by ROA and ROE was positively attenuated by bank size.

Table 4.76: Dynamic Panel Model on Bank Size Moderating Effect on the Effect of Banks Portfolio Diversification on ROA

Arellano-Bond dynamic panel-data estimation				**Number of obs**	=	**574**
Group variable: id				Number of groups	=	39
Time variable: year						
				Obs per group	min =	9
					avg =	14.717949
					max =	16
Number of instruments	=	128		Wald chi2(5)	=	463.29
				Prob > chi2	=	0.0000
One step results						
roe	Coef.	Std. Err.	Z	P>| z |	[95% Conf.	Interval]
roe						
L1.	.365283	0.0366145	9.98	0.000	.2935198	.4370462
hhi_credit_diversification	9.597784	4.866497	1.97	0.049	.0596244	19.13594
hhi_income_diversification	7.895052	4.013837	1.97	0.049	-.3639163	16.15402
hhi_deposit_diversification	7.184342	5.882099	1.22	0.222	-4.34436	18.71304
hhi_investment_diversification	10.15158	4.990643	2.03	0.042	.3700984	19.93306
bank_size	1.807883	.3675971	4.92	0.000	1.087406	2.52836
hhi_cdbs	.7258548	-.2962400	-2.45	0.044	-1.698467	.2467578
hhi_isdbs	.7102491	-.3200425	-2.22	0.041	-1.533517	.1130191
hhi_ddbs	.4719717	-.6005189	-0.79	0.432	-1.648967	.7050237
hhi_ipdbs	.7952752	-.4879330	-1.63	0.103	-1.751606	.161056
_cons	-21.6249800	3.5476860	-6.10	0.000	-28.57831	-14.67164

Adoption of Sargan test was solely for examination of the likelihood of model under-estimation. The H0 in the test outlined that model's underlying conditions were met as opposed to an alternative of their non-satisfaction. Outcome as highlighted in Table 4.77 disclosed that the model was rightly identified since its p value was lower than 0.05 which was the critical value.

Table 4.77: Sargan Test for the Model

Sargan test of overidentifying restrictions		
H0: overidentifying restrictions are valid		
chi2 (117)	=	294.0328
Prob > chi2	=	0.0000

In the two dynamic panel models with ROE and ROA representing performance of banks, the number of instruments (128) is fairly low when it was compared to the number of observations (574), confirming that there is no problem emanating from instrument proliferation. The Sargan test that was significant (p value=0.00; <0.05) shown that the instrument set was valid and more so exogenous. These results of the diagnostic tests of system GMM in the models thus validated the models, and as well validated final conclusions and observations made on the basis of system GMM estimations. The time variable in years is included to control for cycles that occurred in the economy. The number of groups of 39 represented number of banks that were analyzed in this study. The minimum was (9) and maximum was (16) with an average of (14.72) observed groups.

The study recognized the dynamism that subsists in the banking sector. In the current scrutiny, system Generalized Method of Moments (GMM) will be made use of to scrutinize dynamism of the models and how the performance of the immediately preceding period exerts influence on the present period financial performance. The reason being it is imagined that leaderships of banks take steps to safeguard the performance of the present period by making use of information of preceding period performances.

The positive direction and significance of influence in both static and dynamic panel models of sectoral credit, income streams, deposits types, and investment avenues diversification resonates to results depicted by the study done by Turkmen and Yigit (2012); Ebrahim and Hasan (2008); Kiweu (2012); Mulwa et al. (2015) where they indicated that diversification lowers systematic risk, reduces volatility in earnings, and henceforth lowers agency. The findings were also in agreement with Landi and Venturelli (2012) whore underlined that diversification significantly affected efficiency in terms of profits, prices and revenue growth.

The study also agreed with Olarewaju, Migiro, and Sibanda (2017) who concurred with other authors' theoretical prescriptions among them Markowitz (1952, 1959); Meressa (2017); Kazan and Uludag (2014) by stating that all these diversification avenues among them sectoral credit, assets, deposit types and income streams are

avenues in banks to make use of in order to be able to exploit new viable ventures to add to their intermediation services that are regarded as traditional in order to accrue market power and as well withstanding stringent growing competition.

This study finding is in contrary to the findings of Armstrong and Fic (2014); Mishra and Sahoo (2012) where the researchers claimed that diversification undertaken by banks has failed in value creation and banks practicing greater income streams diversification tends to undergo fluctuating financial performance as a result of absence in determination of the optimum level and lack of capacity to capture the optimal and viable avenues of diversification. It was noted that more attentiveness should be given in monitoring adopted diversifications to make sure that no avenue of diversification is neglected. Benefits that are pecuniary to managers and incentives ought to be controlled to mitigate the negative effect of managerial entrenchment and hubris to ensure that it is minimized to the lowest. In the study by Acharya et al., (2006) more robust empirical study finding that emerged was that diversifying assets of a bank does not guarantee superior results or greater performance for commercial banks.

Bank size was seen to have a positive association with banking performance which was significant (p value<0.05) and this confirmed the deductions made by Stiroh (2004); DeYoung and Rice (2004); Stiroh and Rumble (2006), Afzal and Mirza (2012). The finding mirror Mule, Mukras and Nzioka (2015) who found firm size had a positive and significant influence on financial performance of a firm. Size of the banks in many instances is made use of in banking system to control for risk and cost difference. The results displayed in this study insinuates that the larger in size or bigger the entire assets of banks, the wider the scale of diversity into viable areas of investment, the more banks explore diverse lines of business, strengthen market power and in tandem, add value for boosting benefits derived from economies of scale and scope thereby contributing to appealing and improved performance. Diversifying portfolios of banks determines levels of risk banks are willing to take on. Losses incurred in one portfolio will be compensated by the earnings acquired from other portfolio selection. It is therefore, paramount for banks managers to

model strategic resolutions for a bank, taking into account risk-return preferences moderated by size.

Nodeh et al., (2016) found that size of banks had a moderating impact that was positive on the relationship between the determinants of structures of board and firms' financial performance depicting a consistent finding with the current study. Said et al. (2008) deductions from the study indicated that size and level of liquidity in banks don't bear any influence that is significant on how banks perform in the two countries which was in contradictory with the findings depicted in the current study. Al Karim and Alam (2013) found out that size of the bank, risks from credit, and efficiency in operations and how assets are managed do have a significant and positive effect on how banking firms in Bangladeshi perform which was consistent with the findings depicted in the current study.

In general terms, the relationship that exists between bank size of commercial banks and their performance is considered to be positive (Kiyota 2011; Nodeh et al., 2016). However, some several research studies have implicated bank size impact to be non-linear with profitability increasing with commercial bank size and shrinking as a result of bureaucratic among other reasons (Said et al., 2008). Taking into consideration of the above studies, Said et al., (2008) findings are different from the suggested findings and conclusions by Al Karim and Alam (2013) and Nodeh et al., (2016).

In summary, direction of association and statistically significant effect of the banks' portfolio diversification and financial performance with respect to each null hypothesis stated in this study are summarized and presented below in Table 4.76. In general terms, the relationship that exists between banks' portfolio diversification variables commercial was considered to be positive and significant. The moderating effect of bank size on the relationship that exists between banks' portfolio diversification and performance of commercial banks was considered to be positive and significant.

Table 4.78: Summary of Statistical Hypotheses Testing Results

Null Hypothesis	Rule	P-value	Statistical Significance	Decision	Relationship
Sectoral credit has no significant effect on the financial performance of commercial banks in Kenya	Reject Ho if p-value <0.05	P<0.05	Yes	Reject	Positive
Income streams have no significant effect on the financial performance of commercial banks in Kenya	Reject Ho if p-value <0.05	P<0.05	Yes	Reject	Positive
Deposits portfolio has no significant effect on the financial performance of commercial banks in Kenya	Reject Ho if p-value <0.05	P<0.05	Yes	Reject	Positive
Investment portfolio has no significant effect on the financial performance of commercial banks in Kenya	Reject Ho if p-value <0.05	P<0.05	Yes	Reject	Positive
Bank size has no significant moderating effect on the relationship between the Banks' portfolio diversification and financial performance of commercial banks in Kenya	Reject Ho if p-value <0.05	P<0.05	Yes	Reject	Positive

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The primary findings, conclusions, and recommendations, as well as proposals for future research, will be provided in this section. The study's main goal was to look into the impact of portfolio diversification on bank financial performance in Kenya. The study also assesses the moderating effect of bank size on the relationship between banks' portfolio diversification and financial performance of commercial banks in Kenya. The study's conclusions and suggestions were consistent with the study's specific objectives. The recommendations include suggestions for management and policy measures that are based on the study's findings. Finally, the chapter summarized the thesis' contribution to the body of knowledge and suggested additional research areas to fill up knowledge gaps.

5.2 Summary of Findings

The study examined the bank's portfolio diversification on financial performance (ROE and ROA) of commercial banks in Kenya. Specifically, the study through use of unbalanced panel data examined the effect of sectoral credit, income streams, deposit types, investment avenues diversification and bank size moderating effect. Annual banking data was consolidated from annual financial statements, KNBS, CBK and Kenya Bankers association. Static and dynamic panel modeling were fitted on the data and pre and post estimation diagnostic tests reported. Data was analyzed through use of descriptive statistics, correlation analysis, static and dynamic panel regression modeling. Diagnostics test were performed prior to fitting panel data regressions.

5.2.1 Credit Sectoral Diversification and Financial Performance

The first objective of this study examined the effect of credit sectoral diversification on financial performance (ROE and ROA) of banks in Kenya. The hypothesis was tested basing it on the outcome as depicted in the models of fixed effect regression and dynamic panel. Credit sectoral diversification was classified into household, primary, secondary and tertiary sectoral credits. Tertiary sectoral credit had the highest mean followed by primary sectoral credit and secondary sectoral credit had the least mean. Sectoral credit diversification was not normally distributed. Static fixed effect regression modeling revealed positively significant effect of household credit, primary, secondary, tertiary sectoral credits and ROE and ROA of banks in Kenya. Dynamic panel regression modeling recorded a positively significant effect of past return on equity, household credit, primary sector, secondary sector, tertiary sector and return on equity of banks in Kenya. ROE was positively and significantly directed by past return on equity, household credit and secondary sector. Primary sector and tertiary had positive and non-significant short run effect on ROA of commercial banks in Kenya.

5.2.2 Income Streams Diversification and Financial Performance

The second objective of the study established the effect of income streams diversification on financial performance (ROE and ROA) of commercial banks in Kenya. The hypothesis was tested basing it on the outcome as depicted in the models of fixed effect regression and dynamic panel. The most common stream of income amongst banks was interest income stream, followed by fees and commission stream and trading income stream. Correlation analysis revealed positive and significant effect of interest income, trading income stream and fees and commissions streams on banking systems performance. Static regression modelling revealed positive and significant effect of interest income, trading income, fees and commission and ROA and ROE of banking systems respectively. Dynamic panel regression modeling as measured by system GMM in the current study recorded positive and significant effect of lagged ROE, interest income, trading income and fees and commission on ROE. Also, there was positive and significant effect of past ROA, interest income,

trading income and fees and commission and ROA of banks in Kenya. Other incomes had a positive non-significant short run effect on ROA and ROE.

5.2.3 Deposits Portfolio Diversification and Financial Performance

The third objective of the study established the effect of deposits diversification on ROE and ROA of banks in Kenya. The hypothesis was tested basing it on the outcome as depicted in the models of fixed effect regression and dynamic panel. The most common form of banks' deposit was savings, followed by fixed and the least was call deposits. Correlation analysis revealed positive and significant effect of savings, demand, call and fixed deposits on banks performance in Kenya. Static regression modeling revealed positive and significant effect of savings, demand, call and fixed deposits on ROA and ROE of banking system in Kenya respectively. Static regression modeling also revealed positive and nonsignificant effect of savings on ROA of banks in Kenya. Dynamic panel regression modeling revealed positive and significant effect of past return on equity, savings, demand, and fixed on ROE. Also, there was positive and significant effect of past ROA, savings, demand, call and fixed deposits on ROA of banks in Kenya. Call deposits had a positive and non-significant short run effect on ROA of banks.

5.2.4 Investment Portfolio Diversification and Financial Performance

The fourth objective of the study established the effect of investment portfolio diversification on financial performance of banks in Kenya. The hypothesis was tested basing it on the outcome as depicted in the models of fixed effect regression and dynamic panel. The forms of bank investment were placements, government securities, shares and other investments. Correlation analysis revealed positive and significant effect of investment in placement, government securities, shares and banks' financial performance in Kenya. Static regression modeling revealed positive and significant effect of investment in government securities, shares and other investments on ROA and ROE respectively except for placement which had a positive and non-significant influence on both ROA and ROE of banks in Kenya. Dynamic panel regression modeling revealed positive and significant effect of past ROE, investment in placement, and government securities on ROE. There was

positive and significant effect of past ROA, investment in placement, government securities and financial performance of banks in Kenya. Shares exhibited positive and nonsignificant effect on both ROE and ROA of banks in Kenya.

5.2.5 Bank Size Moderating Effect on Effect of Banks Portfolio Diversification on Financial Performance

The fifth objective of the study evaluated moderating effect of bank size on effect of banks portfolio diversification on financial performance in Kenya. The hypothesis was tested basing it on the outcome as depicted in the models of fixed effect regression and dynamic panel. Study findings revealed positive and significant effect of bank size on ROE and ROA. Correlation analysis revealed positive and significant effect of bank size on financial performance of banks in Kenya. Bank size had significant moderating effect on the effect of banks portfolio diversification on financial performance of banks in Kenya. This was documented with an R squared changes of 1.22 percent and 1.3 percent for ROE and ROA respectively. Also, bank size affected moderated credit sectoral diversification, income streams diversification, deposits portfolio diversification and investment portfolio diversification effect on banks performance in Kenya as shown y the marginalized coefficients. Bank size had positive effect on banks financial performance which was significant both in the short run and long run. The findings of this study reveal that across the sixteen performance cycles, the average total asset base of commercial banks rose. Large banks, it is stated, have all of the alternatives available to small banks, as well as the capacity to leverage economies of scale and have access to capital markets that small banks do not, resulting in better profit rates and greater penetration of their services.

5.3 Conclusion

Based on the study findings, a number of conclusions can be elicited. Overall, the study concluded that spreading a portfolio over multiple, unrelated investments reduce the risk of a sudden, unexpected outcome and in a diversified portfolio, a loss or risk in one investment is offset by gains from another investment The conclusions

are also proposed in tandem with the specific objectives as enumerated in chapter one as follows.

5.3.1 Banks' Portfolio Diversification and Financial Performance

On performance of banking in Kenya, the paper deduced a positive and significant effect of banks' portfolio diversification on banking industry ROE and ROA. The findings did thus concur with other authors' theoretical prescriptions of modern portfolio theory and financial intermediation and delegated monitoring theory. From the findings, it can also be concluded that more attentiveness should be given in monitoring adopted diversifications to make sure that no avenue of diversification is neglected.

5.3.2 Credit Sectoral Diversification and Financial Performance

From the foregoing findings it is concluded that banks in Kenya should diversify their sectoral credit so as to amplify their benefits. Development of alternative credit provision especially through use of digital platforms would optimize financial performance of banks in Kenya. Additionally, this study results were consistent with the propositions articulated by modern portfolio theory of Markowitz that an institution can enhance returns and lower risks by optimally diversifying streams of revenue. In line with these findings, this study conclusion was that banking institutions can increase their performance by undertaking non-lending ventures, which can be attributed to efficiencies in internal capital markets, economies of scale, cross-selling and cross-subsidization. Consequently, in an era characterized by interest capping, tough competition from non-banking firms and unprecedented adoption of financial innovations, bank management should contemplate income diversification to gain competitive advantage and long-term profitability.

5.3.3 Income Streams Diversification and Financial Performance

Although, there are several income streams that can be adopted by banks, diversion in generation of income from interest income amongst banks can be guaranteed through diversification to non-traditional banking such as venturing into

bancassurance, provision of financial advisory services and banking agency for financial derivatives and securities. It increases banks return and optimize risk return trade off. The positive influence in both static and dynamic panel model of income streams diversification variables and their significance conforms with empirical findings of income streams diversification and financial performance of commercial banks where they indicated that diversification lowers systematic risk, reduces volatility in earnings, and improves financial performance.

5.3.4 Deposits Portfolio Diversification and Financial Performance

From the findings that deposits diversification had positive significant contribution on financial performance of banks in Kenya. There is need for specific banks to examine its strengths and weakness on specific deposits, this would optimize returns and minimize operational costs associated with deposits. Banks should concentrate on savings and demand deposits since they had the highest contribution on performance. More efforts should be adopted to promote call deposits to make its contribution is paramount.

5.3.5 Investment Portfolio Diversification and Financial Performance

Investment portfolio diversification of banks in Kenya comprised placement, shares, government securities and other investments. It was noted that government securities had the highest positive significant contribution on financial performance. This would indicate skewed preference of government securities due to risk return trade off. Also, banks had preference for other investments as compared to placement and shares. This criterion was anchored on liquidity of other investment which was mostly short-term. Even if government securities had guaranteed return there is need to improve on portfolio mix so as to increase return though risk may escalate on other investments. Banks should increase their size as they venture into different portfolios. This would enhance their capacity to absorb shocks associated with heterogeneous investment opportunities. Incorporating traditional banking ventures with investment undertakings, like trading securities, banca-assurance and securitization, may lead to minimization of commercial banks exposures.

5.3.6 Bank Size Moderating Effect on Effect of Banks Portfolio Diversification on Financial Performance

A higher size of asset of banks is most probable to accelerate the bank to diversify into feasible investment opportunities, traverse more enhanced lines of business, increase capacity in market power and for this reason, produce increased value that boosts the firm to take advantage of economies of scale and wider scope and henceforth superior and increased financial performance. Following Modern portfolio theory, credit, revenue streams, assets, and deposit are instruments available to banks whereby they can traverse wider, newer and feasible investment scenarios in addition to the role of traditional intermediation to the level of having grounded market power that can hold out against competiveness as the industry in the region is explosively competitive, but should engage training of human aspect of capital, growth and redeployment to adequately enhance attainment in totality of the goal of diversification.

5.4 Recommendations

The results of this study have significant implications to; regulators, policy makers, general public and academicians. As a result, several recommendations can be derived from the findings of this study. The recommendations are classified into two that is, managerial recommendations and policy recommendations.

5.4.1 Managerial Recommendations

Banks in Kenya should devise measures geared towards consolidation of information and data which would aid in management and provision of credit services amongst different stakeholders. Use of data science would aid in development of loan products which are customized to clients needs and would enhance economic development and growth. Commercial banks should diversify generation of income instead of reliance on one income stream. This would minimize possibilities of financial loss amongst banks and financial institutions. Measures to maintain financial soundness of banks should be developed; this would eliminate possibilities of bank panics and banks runs amongst financial stakeholders. It is, therefore,

paramount for banks to model strategic resolutions for a bank, taking into account risk-return preferences

There is need for banks to diversify their deposits; this will be achieved through use of technologically supported devices which would support penetration of banking services to unbanked population. Since savings had the highest effect on financial performance of banks in Kenya, measures should customize amongst banks in Kenya owing to their heterogeneity of customers who may be served through alternative approaches. There is need for deposit taking banking institutions to institute managerial structure that will enhance their capability to honor their short term regular and occasional withdrawals and obligations to levels that their liquidity positions will be firm enough to significantly stimulate profitability and stability.

There is need for banking institutions to diversify their portfolio of investment. There is skewed trend amongst commercial banks with majority of them investing in government securities owing to their guaranteed return due to level of risk exposure and capping of interest rate. Securities offered by government like Treasury bills and Bonds are regarded as significantly risk averse investments when compared to various asset classes especially when considering the fact that likelihood of a government running out of resources and not honoring on its interest payments are very minimal since it can mobilize more money by printing or borrow more from investors.

Commercial banks should develop strategies to increase their asset base. Alternative valuation approaches should be developed to ensure that depleting assets are continuously excluded from future evaluation of commercial banks assets. Furthermore, commercial banks should intensify acquisition of tangible and intangible assets. Intangible assets may be acquired through development of products for propelling competitive advantages.

The study finally recommends that banking institutions should refocus its activities to further the confidence in portfolio diversification, come up with marketing blueprints that encourage its use and establish the best combination of assets that can yield an efficient portfolio. This insinuates that spreading of investments across

divergent and unrelated pools minimizes exposures to sudden, unforeseen outcome and in a diversified portfolio; a loss/risk in one investment is subsequently offset by gains from another investment. Thus, premising deductions on the outcome and study conclusions, the researcher recommends that the regulator also known as the apex bank (Central Bank of Kenya) should render close and regular supervision and keep tract of deposit money banks' soundness and levels of liquidity in an endeavor to bring stability and financial health in the banking industry of the economy and as well set a benchmark for their allocation of credit portfolio. Banks advances and loans should be intelligently collected, and provision of defaults be ensured because default can never be absolutely avoided. Banks are obligated to have proper measures to lower risk through the process of portfolio management.

5.4.2 Policy Recommendations

The study recommends that the banks should come up with policies on how to select the different product portfolios, client segments and product managers who will been trusted with the management of specific product lines. By so doing, the banks will ensure maximization of benefits from products and enhance their overall earnings. The researcher also recommends that the management of the banks should institute appropriate internal policies to ensure that there is constant review of existing products, development of new products and overall alignment of all product decisions with the expected earnings and wealth maximization objectives of the organizations.

Premising implication from results and conclusions, the researcher suggested that the top most bank which is the Central Bank of Kenya should guarantee tight supervision and keep track of deposit money banks' soundness and levels pertaining to liquidity in an endeavor to prevent downfall and make the financial sector more healthy and consequently raise their benchmark for their credit portfolio. Credit and advances should strategically be collected, and risks of defaults should be well taken care of since it's impossible to completely avoid. There should exist be proper measures set aside for risk through portfolio management. Policy makers and regulators thus

should take special care of diversification avenues by banking institutions while making future regulations and policies regarding commercial banks.

The study accepted that size presumes a considerable role in enhancement of financial performance of top, medium and small tier banks. The study articulately recommends that banking institutions should firstly develop firm-specific capabilities available in their domicile market before venturing, if ever, in markets existing globally. Also, the banks should carefully evaluate its customer base before deciding to venture in a particular place to improve their assets base. The study also recommends that policies should be set by the government to regulate where banks are set up so as to minimize overcrowding and the minimum asset base requirement through Central Banks.

Banking institutions tend to be limited to the extent they engage in non-lending ventures by the banking laws and regulations instituted by the apex bank. Precisely, banks are confined to ventures that either are complementary or subsidiary to lending, which enervate the influences of sectoral credit allocation, income streams diversification and investments portfolio diversification on financial performance. Thus, bodies involved in implementing regulations should moderate such constraints to permit banks in engaging in wide range of undertakings to leverage maximally in their cognitive capital resources towards non-lending undertakings and fundamentally enhance their financial performance and on the other hand, adequately cushion banking institutions from interest income unpredictability.

This study expounds on the knowledge of determinants of bank performance modeling and risk-taking criteria. There is a necessity for capital base strengthening more so tightening the essential requirements which are applicable in retail banking. It should be distinguished that retail lines separation from investment banks would upsurge their resilience to risk of bankruptcy and losses. Consequently, plausible government support should be rendered to retail banks, and also to investment banks, even those systemically of importance, could be placed into a more controlled system.

Overall, the study agrees with theories related to diversification in banking that advocate for existence of a number of diversification classes which encompass amongst others, geographical and international, revenue diversification; services or activities diversification, asset, deposit, sectoral loans diversifications. Banking institutions do diversify by undertaking investments in financial securities and engaging in other collaterals in addition to extending. Even so, it can be referred to as products diversification as it resembles closely to income diversification Related to this preposition, banks can diversify also their investments not only their lending facilities portfolio. Therefore, as recommended by the study, the most consequential and regular diversification avenues in banking are credit, income, assets, deposit, investments, geographical and international.

5.4 Contribution of the Thesis to Body of Knowledge

This study expounds on the knowledge of determinants of bank performance modeling and risk-taking criteria. The study solved a scientific problem by verification of how the diversification of activities in commercial banks brings positive effects such as income stabilization and risk reduction. Taking the current balance sheet position as the starting point, this thesis has constructed a multi-objective approach for attaining an optimal balance sheet whereas at the same spot bringing into consideration constraints that banks encounter. The study accepted that size presumes a considerable role in enhancement of financial performance of top, medium and small tier banks. Use of data science would aid in development of loan products which are customized to clients needs and would enhance economic development and growth.

The differentiating major aspect of this study from other prior studies in the sub Saharan African region is that this study was scoped for a period during and after the major world financial crisis of 2007-2008. The study contributes to the body of knowledge by providing a model outlining a scale of diverse opportunities for understanding the issues and constraints that influence banking sector’s performance and would help in prioritizing on the imperative wide ranging related activities mix in terms of regular diversification avenues in banking which are credit, income,

assets, deposit, making reference to new policies as a guide. The study was practical in designing remedial schemes and programs underpinning the operational diversification of banks as well as encouraging entrepreneurs to diversify more and adapt effective and efficient economies of scale streams, which in turn will enhance banks' financial stability both in short run and in the long run as a going concern.

The study contributes to the on-going discussion on the separation of retail and investment banking with a view to enhancing their profit stability. It should be distinguished that retail lines separation from investment banks would upsurge their resilience of banks to risk of bankruptcy and losses. The study thus contributes to the frontier of knowledge concerning country specific commercial banking and thus provides comparative information that can be used across countries. The dynamism that subsists in the banking sector was adequately recognized and considered in this study.

This study contributes to the methodological approaches for analyzing big data. The study employed elaborate statistical methods. System Generalized Method of Moments (GMM) was deployed to scrutinize dynamism of the models and how the performance of the immediately preceding period exerts influence on the present period financial performance. The reason being it is imagined that leaderships of banks take steps to safeguard the performance of the present period by making use of information of preceding period performances. The reason for employing system GMM was mainly the dynamism of the short-run model specifications. GMM estimators were found to exhibit robustness, consistency and efficiency in model estimation.

The study contributes to the theoretical literature by applying intensive theoretical review and analysis through comparison of the varying theories related to diversification and their development over the years. Thorough and intensive empirical literature review and analysis involved comprehensive comparison of the varying measurement embraced in global, regional and sub-Saharan African, and local perspective. Theoretical literature reviewed encompassed five theories namely; theory of financial intermediation and delegated monitoring, modern portfolio

theory, shiftability theory, transaction cost economy theory, and liability management theory.

5.5 Suggestions for Other Studies

The following studies will be recommended from study findings; follow up to examine the effect of banks portfolio diversification on financial performance of listed, foreign, local and comparative analysis of tier one, tier two and tier three commercial banks in Kenya. Secondly, there are alternative players of financial sector such as insurance and microfinance institutions and thus there is need for future empirical examination on the effect portfolio diversification on financial performance.

This study limited itself to moderating effect of bank size, alternative moderators such as ownership concentration or use of categorical variables should be examined. Future scholars should evaluate firm size moderating effect on alternative portfolio diversification strategies. There is need to evaluate effect of banks portfolio diversification on financial deepening, financial development and financial soundness of banks performance. Comparative study ought to between those banks which are listed in Africa in relation to banks listed in Asia and Europe securities exchange as secondary data is available online for listed firms.

In this study, components of bank portfolio diversification were limited to sectoral credit diversification, income streams, deposit and investments diversification. However, integrating other forms of diversification such as geographical, assets, or use of alternative measurements to confirm or refute the current findings is recommended by the study. The current study did not focus on other variables that may impact banks' financial results like cost to income, consumer price index, GDP. Future researchers therefore can include these internal and external variables.

This study can be further improved by scrutinizing empirical and theoretical associations subsisting between diversification of banks geographically, differentiation of products both vertically and horizontally with profitability and financial stability of commercial banks. Additional theories relating to diversification should be employed in upcoming researches and compare their applicability with the theories anchoring the current study.

Finally, succeeding researchers should seek to assess other measures operationalizing bank size other than market capitalization measures like total assets in determination of earning assets of banks in Kenya. It clear then that other measurements of firm size other than market capitalization does exist for example market share. This will in a big way form a very good insight in deploying more variables in operationalization of the size of firms. The outcome of this study will, therefore, offer a very superior ground for additional studies to make more informative conclusions and recommendations on the bank size efficacy.

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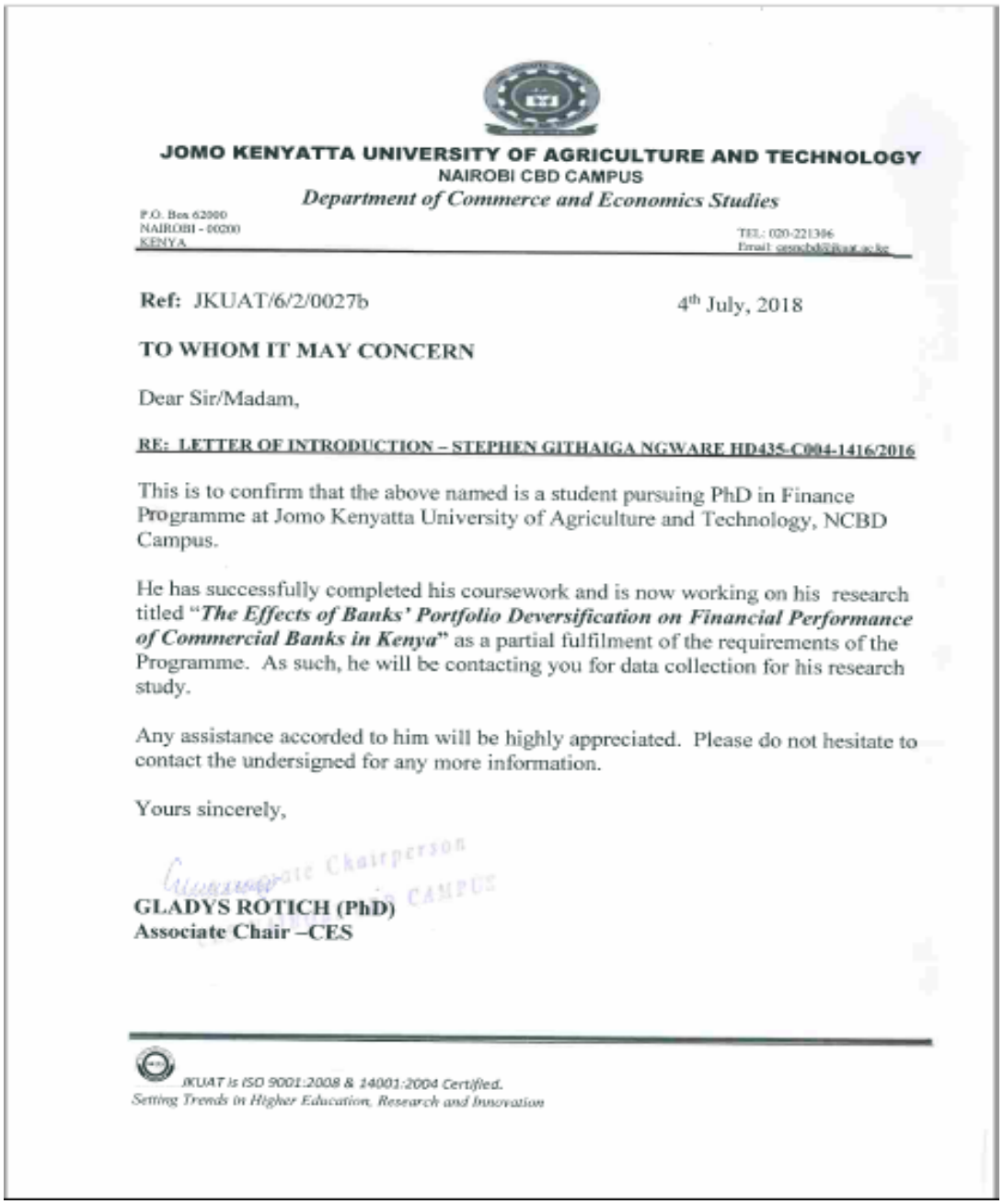
APPENDICES

Appendix I: Letter of Introduction



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Ref: JKUAT/6/2/0027b

4th July, 2018

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: LETTER OF INTRODUCTION – STEPHEN GITHAIGA NGWARE HD435-C004-1416/2016

This is to confirm that the above named is a student pursuing PhD in Finance Programme at Jomo Kenyatta University of Agriculture and Technology, NCBD Campus.

He has successfully completed his coursework and is now working on his research titled "***The Effects of Banks' Portfolio Deversification on Financial Performance of Commercial Banks in Kenya***" as a partial fulfilment of the requirements of the Programme. As such, he will be contacting you for data collection for his research study.

Any assistance accorded to him will be highly appreciated. Please do not hesitate to contact the undersigned for any more information.

Yours sincerely,

Associate Chairperson
CAMPUS

GLADYS ROTICH (PhD)
Associate Chair –CES

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Setting Trends in Higher Education, Research and Innovation

Appendix II: Letter of Data Request

STEPHEN GITHAIGA NGWARE
P O BOX 21116, 00100
NAIROBI
0723769457
sngithaiga@gmail.com
05/07/2018

DIRECTOR, BANK SUPERVISION
CENTRAL BANK OF KENYA
P.O. BOX 60000-00200,
NAIROBI

Dear Division Director:

RE: Letter of Request for Permission to Collect Data

I am requesting for secondary data to complete research entitled "Effect of Banks' Portfolio Diversification on Financial Performance of Commercial Banks in Kenya. This is purely an academic exercise conducted under the department of Commerce and Economic Studies, JKUAT Nairobi CBD campus towards meeting the requirements for my award of the degree of Doctor of Philosophy in Finance.

This study intends to examine Sectoral loans and advances, Income types, various types of deposits, various types of Investments by banks, Return on Equity, Return on Assets and Total Assets of Banks. The information that you provide will be treated with utmost confidentiality. I have attached a letter from the university certifying my candidature and a copy of the secondary data collection sheet. The findings of this study will be availed to you upon request.

I can be reached by phone number or by email as indicated above.

Thanking you in advance.

Sincerely yours,

Stephen Githaiga Ngware

PhD. Candidate

Appendix III: Study Population: List of Commercial Banks in Kenya

NAME OF THE BANK	YEAR LICENSED
1. ABC Bank (Kenya)	1984
2. Bank of Africa	1980
3. Bank of Baroda	1953
4. Bank of India	1953
5. Barclays Bank Kenya	1953
6. CfC Stanbic Holdings	1955
7. Chase Bank Kenya	1991 Acquired by SBM
8. Citibank	1974
9. Commercial Bank of Africa	1967 Merged with NIC Bank
10. Consolidated Bank of Kenya	1989
11. Cooperative Bank of Kenya	1965
12. Credit Bank	1986
13. Development Bank of Kenya	1973
14. Diamond Trust Bank	1946
15. Dubai Bank Kenya	1982
16. Eco-bank Kenya	2005
17. Equatorial Commercial Bank/Spire Bank	1995
18. Equity Bank	2004
19. Family Bank	1984
20. Fidelity Commercial Bank Limited	1992
21. First Community Bank	2008
22. Giro Commercial Bank	1992 Acquired by I&M in 2017
23. Guaranty Trust Bank Kenya	1986
24. Guardian Bank	1992
25. Gulf African Bank	2007
26. Habib Bank	1978 Acquired by Diamond Trust bank
27. Habib Bank AG Zurich	1956
28. Housing Finance Company of Kenya	2010
29. I&M Bank	1974
30. Imperial Bank Kenya	1992
31. Jamii Bora Bank	1999
32. Kenya Commercial Bank	1896
33. K-Rep Bank/Sidian Bank	1999
34. Middle East Bank Kenya	1980
35. National Bank of Kenya	1968 A subsidiary of KCB Bank
36. NIC Bank	1959 Merged with Commercial Bank of Africa
37. Oriental Commercial Bank	1991
38. Paramount Universal Bank	1993
39. Prime Bank (Kenya)	1992
40. Standard Chartered Kenya	1910
41. Transnational Bank Kenya	1985 Acquired by Access bank
42. United Bank for Africa	2009
43. Victoria Commercial Bank	1987

(Source: Central Bank of Kenya, 2019)

Appendix IV: Secondary Data Collection Instrument

Secondary data from the commercial banks in Kenya that met the selection criteria as at the end of financial year 2018 was collected in the following document check index:

Name of the Bank …….

Financial Year		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Financial Performance	ROE																
	ROA																
Income Streams Diversification	Interest Income																
	Trading income																
	Fees and Commissions																
	other income (Rent, Dividend)																
Deposit Types Diversification	Call Deposit																
	Fixed Deposit																
	Demand/transactional/current																
	savings																
Investment Avenues Diversification	Government Securities																
	Placements																
	Fixed Assets and Intagibles																
	Others																
Sectoral Credit Diversification	Personal/Household																
	Agriculture																
	Mining and Quarrying																
	Manufacturing																
	Building and construction																
	Real Estate																
	Energy and water																
	wholesale Retail & Trade																
	Financial Services																
	Tourism, Restaurant and Hotels																
	Transport and Communication																
Banks' Size	Total Assets																

Source: Central Bank of Kenya, Various Annual Reports, Author's estimates.