THE EFFECT OF INCOME DIVERSIFICATION ON THE EFFICIENCY OF COMMERCIAL BANKS LISTED AT THE NAIROBI SECURITY EXCHANGE

BY

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DECLARATION

I declare that this research project is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

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This Research Project has been submitted for examination with my approval as the University of Nairobi Supervisor.

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Much appreciation to my friends for the encouragement and support will forever remain indebted.

DEDICATION

This research project is dedicated to my father, George Kopondo, for his continued encouragement and financial support throughout the study period.

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CBK	Central Bank of Kenya
DCF	Direct Credit Facilitation
DEA	Data Environmental Analysis
DMUs	Decision Making Units
FA	Fixed Assets
HHI	Herfindahl-Hirschman Index
NPLs	Non-Performing Loans
NSE	Nairobi Securities Exchange
OEA	Other Earning Assets
ROA	Return on Assets
SPSS	Social Programme for Social Science
TD	Total Assets

ABSTRACT

Due to policies associated with financial liberalization, financial institutions have been able to register increased income from their non-traditional income sources as witnessed in majority of the banks increasing or engaging in non-intermediation activities. Most commercial banks are known to generate majority of their income from interest sources, however there has been a gradual shift in recent years, as they are now diversifying by venturing into non-interest sources of income generation. Analysis of the financial statements of these banks confirms this assertion where almost 40% of their net income can be traced from their non-interest sources. This study sought to establish the effect of income diversification on the efficiency of commercial banks listed at the Nairobi Securities Exchange. A census targeting the listed commercial banks at the NSE from 2012 to 2016 was conducted. CBK annual supervision reports NSE reports and the respective websites of the banks provided the secondary information used in the study. A descriptive research design and multiple regression model was adopted in the analysis. Herfindahl-Hirshman index was used to measure income diversification and three control variables were included, namely; size, capital adequacy and liquidity. The study found that, income diversification and efficiency of commercial banks were negatively related. Results of t-test indicated that, the effect was not statistically significant. Liquidity had a positive and insignificant effect on the efficiency. Bank size had a positive effect on efficiency. The relationship was however, statistically significant. The results further revealed that capital adequacy ratio was had a negative and insignificant effect on the efficiency of commercial banks listed in Kenya. The study highlighted the need to develop income diversification strategies specifically tailored for each commercial bank with a focus on income diversification. Also investors should not be concerned about a banks' income diversification in selecting investment opportunities as diversification of income does not result into increased efficiency. Further studies may consider income diversification strategies and their impact on Islamic banks efficiency to see whether a greater reliance on non-financing income impacts on efficiency and, if so, how this may vary between Islamic and conventional banks.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Financial institutions such as commercial banks rely on efficiency measures to analyze their strengths and weaknesses. Determinants of efficiency of banks vary amongst different countries (RBI, 2008). However, there seems to be a point of convergence with regards to determinants that drive higher efficiency between different countries. The common determinants that drive higher efficiency include introduction of progressive technologies, a favorable policy environment and diversification of income activities. The global financial crisis confirmed that banks that overly rely on traditional income generating activities in periods of volatility compromise on their efficiency (Gambacorta & Marques-Ibanez, 2011). To overcome the challenges emanating from their operating environments, banks have diversified into other activities (Tarazi, 2014).

The theories upon which the study is anchored are the Market Power Theory and Resource Based Theory and the Modern Portfolio Theory. Resources Based View by (Wernerfelt, 1984) assumes that deliberate managerial efforts are undertaken by firms which are steered towards gaining a sustainable competitive advantage (Williamson, 1991). The theory also posits that firms with superior resources are able to compete more effectively in the market. Market power theory posits that banks with larger market share which diversify their income sources don't necessarily achieve higher efficiency. Hicks (1935) suggested that, the larger the market share of a bank the less centred on efficiency the bank is, since these banks can misuse their market power by

fixing prices therefore automatically benefiting. Modern portfolio theory asserts that risk reduction can be achieved by banks through diversification of their revenue streams.

The conglomeration and the strategic focus hypothesis differ in terms of the effect of income diversification on the efficiency of banks. According to the conglomeration hypothesis banks should direct more efforts towards their core business activities if they want to improve their efficiency while the conglomeration hypothesis takes the view that diversifying of income sources by the banks gives them a larger competitive advantage in terms of improving the banks efficiency. Such change to non-interest earning activities amplifies efficiency (Meador, Ryan, & Schellhorn, 2000). However**,** the strategic focus hypothesis takes a different view. The hypothesis is of the view that diversifying income sources creates agency problems where the managers add new business segments for their own selfish gains. The hypothesis further posits that diversification costs outweigh their benefits; hence banks should not diversify (Denis, Denis, & Sarin, 1997).

1.1.1 Income Diversification

Ebrahim and Hasan (2008) defined income diversification as the growth into new income earning financial products and services other than the traditional intermediation services. This will make banks to diversify their incomes from interest income so that they can be able to sustain their businesses in the long run. Indeed, income diversification involves the combination or generation of income from distinct income generating activities (Baele, Jonghe, & Vennet, 2006). This basically involves the shift of reliance from the interest income sources

associated with traditional intermediation activities to innovative non-interest income earning activities (Doumpos, Gaganis, & Pasiouras, 2013).

The innovative non-interest income earning activities helps the firm to diversify their risk and also improve their efficiency ratio. Income diversification helps in reducing the idiosyncratic risk which is the shocks that affect the net interest margins which arises from changes in the rates of lending (Lin, Chung, & Hsiehming, 2012). Lepetit, Rous, and Tarazi (2008) found that diversification of banks into fee-based services lowered the rates of lending, concluding that income diversification influences the interest rate margins and loan pricing which curbs bank earnings volatility.

Stiroh and Rumble (2006) noted that income diversification is measured through Herfindahl-Hirschman Index (HHI) and the Entropy Index which explains the breakdown variations of net operating income into interest and non-interest income. HHI considers income diversification as a relative measure which exposes every source of income equally. It also assists in verifying and estimating the level of diversity and concentration of the sources of income in banks. The HHI measures the diversification of banks from interest income to non-interest income earning activities. A high Herfindahl -Hirschman Index (HHI) means that the bank is more focused and concentrated on a single source of income and thus becoming less diversified, while a small HHI index reflects that the bank is well diversified and focuses on both the net and non-interest income.

1.1.2 Efficiency in Banks

Efficiency is the level of performance that describes a process that makes use of the lowest amount of inputs to create the best quantity of outputs. Often, the terms

'productivity' and 'efficiency' are used in place of each other in literature. However, there is a distinction between the two terms. Productivity is measured by evaluating the performance of the labour variable, while efficiency is more extensive and it defines the joint performance of all variables in production. In banking, while productivity reviews and evaluates the output of their employees, efficiency is an indicator of the combined variables such as staff performance, capital and management (De Young &Hunter, 2002).

According to Kalluru & Bhat (2009), the efficiency of a firm is based on certain factors like Skilled and competent personnel, effective adoption and implementation of technology, well-defined procurement policies, and Income diversification of the business among many others. An understanding and analysis of banks' non-interest costs relative to the non-interest income is necessary in order to effectively evaluate the banks efficiency (Daniel, Longbrake & Murphy, 1973).

The non-parametric DEA technique that was proposed by Farrell (1957) will be used in this study. First, a group of inputs related to another group of outputs will be defined and computations will be done purely on theoretical grounds. The DEA approach compares the input and output data of decision making units (DMUs) to measure and evaluates the relative performance of DMUs. The input vectors will include; Labour, fixed capital and customer short term funds, while the outputs will include total loans and other earning assets. The efficiency scores range from 0 to 1 with efficient banks having a score equal to 1 while the inefficient banks scores will range between 0 and 1. Analyzing the efficiency of a firm using DEA is convenient for studying scope economies since DEA is based on individual firms. The limitation to this approach is that where a given input or output was not incorporated and it

becomes incorporated into the model, then the ranking will not be the same in the two different scenarios.

1.1.3 Income diversification and Efficiency

Both the Conglomeration hypothesis and the strategic focus hypothesis hold opposing views with regards to the relationship between income diversification and firm's efficiency. Conglomeration hypothesis posits that firms can take advantage of their large size to diversify their business activities in order to reduce costs and increase their revenues (Berger et al., 2000, Teece, 1980). This would result into improved financial efficiency of the firm and reduce information asymmetries in the capital market (Gertner, Scharfstein, & Stein, 1994). Whereas strategic focus hypothesis discourages against the firm venturing into other business activities outside their core businesses and core competencies, this implies that only firms which focus on core businesses and core competencies are able to attain a higher level of efficiency (John & Ofek, 1995).

The impact of diversification on bank efficiency cannot be understated. It has been argued that diversification of income sources by banks reduces their efficiency. Because, income diversification makes governance and supervision of banking operations less effective due to the complex nature of its operations (Hughes et al., 2003). Also, increased information asymmetry and agency problems resulting from increased banking activities (diversified income sources) further undermine the banks operational efficiency. Also, Prahalad and Hamel (1990) established that the diversification of banks into activities forced them to distribute and provide products, which they had little or no expertise or core competence in. This resulted into lower operational efficiency. Palich et al., (2000) agreed with the argument by stating that

the diversification of the business operations into fields which were not banks' strength or were less related to the main business activities, made operational efficiency decline. However, some studies found a positive association between income diversification and the efficiency of banks. Chronopoulos et al., (2011) found high levels of efficiency for banks absorbed into the European Union between 2001 and 2007 which had diversified their income sources. Lee et al., (2014) in his study of Asia countries for the period 1995 to 2009 also finds a positive relationship.

1.1.4 Commercial Banks Listed at Nairobi Securities Exchange

The banking sector in Kenya has undergone several changes from the early 1990's that was characterized by high level of bank failures, non-performing loans and inefficiencies to the current period that exhibits high levels of profitability, innovations like mobile and internet banking, agency banking, unsecured lending and the introduction of credit reference bureaus. The banking sector in Kenya consists of 43 commercial banks (NSE, 2016).Out of these, 11 banks are listed as per Appendix I.

Commercial banks are generating a large proportion of their net operating income from interest income (Laeven & Levine, 2007). Non-interest income in Kenyan banks is set to increase however, due to new forms of diversification such as banc-assurance and mobile banking. According to CBK report (2017), income diversification has increased due to increased use of alternative channels, internet and agency banking, different banking channels such as branch network development strategy and mobile both within the East African and the Kenyan community in the region, such as internet banking, agency, cashless cards and mobile use has also been increasing.

Despite the rosy picture indicated above, there have been concerns by banking sector stakeholders especially the corporate borrowers and the regulator the CBK that the high profits being reported by Kenyan commercial banks are not sustainable simply because the profits are being derived from high interest margins being charged and not due to the banks being efficient. Oyuke (2012) states that the Kenyan treasury ministry supported the introduction of the interest rate cap law in September 2016, to curb the high interest rate regimes after commercial banks recorded huge profit margins in a high interest rate environment, even though depositors have been left dry.

1.2 Research Problem

Existing literature on the relationship between income diversification and bank efficiency shows mixed results. Elsas et al., (2010) argued that the banking sector was truly special, because banks could venture into business activities outside their core area of specialization and still register increased efficiency. Rajan et. al., (2000) found that misallocation of capital across divisions by banks tend to be higher when banks diversify between segments. This eventually leads to higher costs of inefficient investment. The proponents of the conglomeration hypothesis point out that banks which diversify their revenue streams during period of crisis stand to benefit from improved efficiency gains in contrast to banks that rely on a single revenue stream (Calomiris, 1998). Whereas, the proponents of the strategic theory believe that only by focusing on the core businesses and core competencies will banks be able to improve on their efficiencies (Denis, Denis and Sarin (1997). The two conflicting views by the different proponents embolden the need to conduct this study.

In Kenya, three commercial banks have been placed under receivership by CBK over a period of less than one year. These include Dubai Bank Kenya, Imperial Bank Limited (IBL) and Chase Bank. This triggers concerns on income diversification by banks. This has been attributed to increased income diversification without certainty on the expected outcome (Mwakio, 2015). The National bank of Kenya recorded losses in 2015. This was attributed to inefficiencies in its operations and also due to lack of the listed commercial bank to fully diversify its income sources. The banks' heavy reliance on interest income sources affected its profits negatively, since most of its expenses originated from bad loans and interest expense. The banks interest income sources dropped by Sh0.4 billion to Sh6.4 billion, due to an increase in interest expenses which rose by 50 percent to Sh5.9 billion (CBK, 2016). Additionally, the interest rate spread surged from 10.3% to 13% between December 2010 and December 2011. The CBK attributed the increase to inefficiencies in the banking sector since the listed banks had already been given permission to diversify their income sources and still maintain their traditional intermediation business.

Elyasiani and Wang (2012) showed that income diversification could improve bank efficiency through economies of scale, through sharing of customer information and finally through diversification of the banking operations. Acharya et al., (2006) found that income diversification and operational efficiency of Italian banks were negatively correlated. Huang and Chen (2006) sought to determine the effect on efficiency as a result of the banks reliance on different non-interest incomes generating sources. The results revealed that the group of banks that had the highest or lowest rate of interest income and non-interest income from business activities had efficiency indexes that outperformed those with a middle rate of interest and non-interest incomes. Palich et

al., (2000) discovered that diversification of the business operations into fields which were not banks' strength or were less related to the main business activities, made operational efficiency decline.

In Kenya, Kiberia (2012) noted that income diversification and profitability were positively correlated and therefore assisting in reducing the profitability problem and stiff competition that banks face and thus improving their financial performance. This contradicts Kipleting (2016) who established no significant association between income diversification and banks financial performance. Kiweu (2012) agrees with Kiberia (2012), he noted that net interest earning and non-interest earning were positively correlated though the relationship was not significant.; a result that advocates that non-interest earning may not be an important factor in stabilizing the total operating income. Magambo (2013) established that asset diversification and performance of micro-finance institutions are positively correlated.

The lack of consensus among the various scholars was reason enough to conduct further examination in the area of study. In addition to the different results in the studies, majority of the documented empirical evidence regarding income diversification was on developed economies, with much less discussion and insight on the influence of diversification on the banking industry in developing economies. Moreover, none of the local studies has focussed on commercial banks listed at the NSE. The current study intends to fill this gap hence the question: what is the effect of income diversification on efficiency of commercial banks listed at the Nairobi Securities Exchange?

1.3. Research Objective

To study sought to determine the effect of Income diversification on the efficiency of commercial banks listed the Nairobi Securities Exchange.

1.4 Value of the Study

From academic point of view, this study adds to the existing financial theories and it also presents additional evidence concerning effects of diversifying income on the efficiency of the listed commercial banks. Future researchers concerned about the relationship between diversification of income and firm's performance can utilize these findings as a basis for further research on the subject matter so that they can compare and see whether the results of this study and the earlier studies correspond to the study that they will carry. This research helps in adding to the existing body of knowledge regarding this topic.

In practice, it helps in the management of these commercial banks as it will offer guidance on how banks can diversify so that they can enhance the efficiency of the organization. It promotes the interpretation of how diversification affects the efficiency of commercial banks. As a result, bank managers will be able to adopt value enhancing strategies.

The findings of this study give information and guidance to stakeholders and policy makers in the banking sector in inventing new diversification strategies which would enhance the overall financial performance of banks. The findings also serve as a guide when making policies regarding diversification of income by commercial banks.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examines theories that the study employed, empirical evidence of studies carried on effects of diversification of income on the efficiency of banks listed at the NSE and the determinants of the same. The chapter also covers summary of the literature.

2.2 Theoretical Review

The Modern Portfolio Theory, Resource based Theory and Market Power Theory will provide the theoretical underpinnings of this study.

2.2.1 Modern Portfolio Theory

The theory was developed by Markowitz (1952). The theory holds that both maximum expected returns and the variations in the minimum values should exist so as to attain an efficient portfolio. The portfolio which is efficient encompasses assets which are either risky but of high value or those that are less risky but having lower value. Therefore efficiency may be attained by avoiding those assets that are likely to result in diminished returns or those that do not perform as well as expected. This in turn leads to a scenario where there are options in the assets and resources to be used in accomplishing a particular task or else known as diversification (Brealey and Myers, 2003). The theory supports diversification of assets so as to evade both the market risk and the unique risks that affect specific type of companies.

The modern portfolio theory is hinged to this study because by diversifying their income source, banks are able to optimize the expected return of the portfolio for a certain level of risk, or subsequently reducing the risk for a certain rate of expected return, by carefully selecting the dimensions of a variety of assets. While income from intermediation activities is likely to be more stable than those from non-intermediation activities, there could also be an advantage through diversification as it would reduce bank's volatility through the subsequent share of non-interest earnings in net operating income therefore affecting the banks efficiency (Koponen, 2003). This theory indicates that where the investment diversification is well implemented as a performance improvement strategy, it may enable banks attain competitive advantage by improving the bank's efficiency. Therefore, banks reliance on non-intermediation business activities has increased as it would help them in generating trading revenue, fee revenue, and other forms of non-interest income. Portfolio risk is intended to be reduced by holding portfolio combinations that are not positively correlated.

2.2.2 Resource Based Theory

Resource Based approach was put forward by Wernerfelt (1984) and it assumes that deliberate managerial efforts are undertaken by firms so as to attain a sustainable competitive advantage over its competitors in the market. By attaining competitive advantage over their competitors, firms are able to diversify their business and enter into new markets and by diversifying their businesses, they tend to diversify their income leading to income diversification.

Barney (1991) argues that diversification based on resource capabilities can cause economies of scope by sharing core competences and activities and thus becoming a factor in sustaining competitive advantage. Uniqueness or heterogeneity of resource is regarded as an essential situation for a resource bundle in gaining competitive advantage and thus diversifying their income. The argument is that if all the firms in a given market have similar resources, then no strategy will be applicable to one firm and fail to be applied to the competing companies in the market, thus making the resource based theory a significant aspect in the diversification of income (Cool & Dierickx, 2002).

The relevance of the resource based theory to this study is that it provides a way for enhancing a firm's efficiency which results into increased competitive advantage, and also suggests diversification by building on the resource capability to enter new markets or what is known as the sequential entry strategy (Wernerfelt, 1984). Therefore, positioning of resources of a firm is not only beneficial by generating entry barriers but by also directly aiding diversification in associated activities which offers cost benefits to the business and which will finally lead to diversification of the income earned. According to the theory, firms require resources to aid in implementation of strategies which ultimately determine their level of efficiency and effectiveness (Barney, 1991).

2.2.3 Market Power Theory

Market power theory is based on Porter's (1980) view of strategically positioning the firm in its environment through a set of strategies that differentiates the position of a firm with that of its competitors. Caves (1981) and Miller (1973) noted that diversification increased opportunities for reciprocal buying and predatory pricing and

reduces competition of industries if a number of large conglomerates face one another in many markets. Montgomery (1994) named three ways in which companies can gain power in the market through diversification and these are: cross subsidizing by investing earnings from another market to reinforce predatory pricing in a different market; bilateral restraint of thorough rivalry among competitors and lastly reciprocal purchasing between components of multi-business companies that locks out small competition. Through these strategies, they overcome competition and thus earning profits which are way above the average profits that the market offers. Therefore, this theory sees diversification as a device for improving the profits and efficiency of the firm.

The relevance of the market power theory to this study is that through diversification firms are able to enter into new markets and thus gaining competitive advantage over its competitors not only as a result of their specific standing in the market but also because of their standing in other different markets. This makes the firms to have different business lines and these lines will bring income to the firm which will be diversified in nature. Gribbin (1976) argued that, for a firm to attain conglomerate power, it must firstly have supremacy in its own market. This supremacy drives the company to go into new other markets through predatory strategies aided by its resources, power and position in its present market. This will also propel the firm into new sources of income that they were not getting before and thus leading to income diversification.

2.3 Determinants of Bank Efficiency

This section discusses determinants of bank efficiency which include; size of the bank, liquidity of the firm and Asset quality.

2.3.1 Size of the Bank

Size is an important factor in determining the efficiency of a firm. Bigger firms reflect improved efficiency while smaller firms lack capacity to contend with bigger organization in this respect. Chi (2004) explained the relation and noted that the firm size drastically impacts both the efficiency and shareholders rights. Yi and Tzu (2005) noted that firm's size have no impact on financial performance of the organization. The correlation of size and efficiency are significant as an increase or a decrease in size will have a major impact on its efficiency (Vijayakumar & Tamizhselvan, 2010). As a result of having more skilled and competent staff, large banks are able to compete more effectively than small banks. This consequently means that their performance might improve in terms of profit making and cost control (Evanoff & Israilevich, 1991). Cole & Gunther (1995) supported this argument, they were of the view that larger banks were less exposed to credit risks compared to small banks due to their flexibility in the financial markets.

Similarly, Casu and Girardone (2006) posits that larger banks enjoy economies of scale, have more growth opportunities and can engage in joint production activities. As a result they achieve greater efficiency levels compared to smaller banks. Larger banks have also faced a number of criticism. They are said to be more complex hence making their management difficult. Also, too much bureaucracy in larger banks may make them less efficient and eventually result into poor performance for these banks (Delis & Papanikolaou, 2009). Berger, Hancock and Humphrey (1993) discovered that bank size and efficiency had a positive association which was significant. Suggesting that smaller banks tend to be less efficiency when compared to larger banks. The study of Isik and Hassan (2003) concluded otherwise. Larger banks and

smaller banks were found to be less efficient when compared to medium sized banks. However, the measure used was technical efficiency and not operational efficiency. Kumbhakar & Wang (2007) conclude that efficiency and the size of a bank have negative but weak relationship. These implies that smaller banks are more efficient that larger banks due to their operational advantages.

2.3.2 Firms Liquidity

The capacity of the institution to fund growths in assets and meet responsibilities as they fall due is represented by liquidity. Cash, cash payable from other banking firms plus deposits with other banks in addition to dues from central banks plus trading securities comprises of liquid assets (Oloo, 2007).It is therefore vital to the continued feasibility of any banking organization. There may be wide-spread consequences of liquidity shortfall at an individual bank, since the value of liquidity goes beyond a distinct bank. In the Kenyan case, the statutory minimum liquidity ratio is 20%. Banks have however managed to maintain a liquidity ratio well in excess of the minimum set by the regulatory authorities but as Kamau (2009) argues, there is an opportunity cost in holding high liquidity, which is characterized by loss of an opportunity to hold onto high interest generating investments.

By converting less liquid assets into more liquid liabilities banks are able to make their balance sheet more liquid. Holding other factors constant, liquid banks can be viewed as being more efficient because they can produce more output consisting of both liquid and other assets. Brissimis et al. (2008) found that liquidity risk and bank efficiency have a negative relationship while Ariff and Can (2008) findings established a positive relationship between liquidity risk and bank efficiency. Aikeli (2008) finds that excess liquidity when regressed against x-inefficiency index has a

positive significant relationship confirming the hypothesis that that accumulation of excess liquidity in banks precipitates inefficiency.

2.3.3 Asset Quality

Asset quality forecasts the degree of credit risk and among the dynamics which affects the health status of a bank. The value of assets controlled by a specific bank relies on the amount of credit risk, and the assets quality controlled through the bank also relies on liability to particular risks, tendencies on NPLs, and the cost-effectiveness of the debtors to the bank (Athanasoglou et al., 2008). Poor asset quality has been one of the major causes of bank failure in Kenya. A study by Waweru and Kalani (2008) on banking crisis in Kenya, found that non-performing loans mainly lent to insiders and politicians was the major cause of the stream of Kenyan bank failures in 1986.

Preferably, this ratio ought to be at a minimum. If the lending books are vulnerable to risk in an efficiently operated bank, this would be reflected by advanced interest margins. On the other hand, if the ratio decreases it entails that the risk is not being appropriately recompensed by margins. Impaired Loans or Loan Loss Reserves serves as a measure of asset quality for banks. The ratio of loan loss reserve to that of NPLs will be utilized as proxy for assessing the firm's efficiency. The higher the ratio is, the more enhanced the bank becomes provided and thus the more contented it will tend to feel about its efficiency. Measurement of charge-off in Net over net income prior the ratio of loan loss provision is against annual generation of income but coincides with charge-offs (Collins, 2010).

Studies done on the relationship between bank efficiency and Asset Quality produced varied outcomes. DeYoung (1997) established a negative association between asset quality and cost efficiency. He suggests that the NPLs affects the cost efficiency of both going concern banks as well as the subset of failing banks. Altunbas et al., (2000) finds a positive correlation between NPLs and banks efficiency in Japanese commercial banks.

2.4 Empirical Review

Studied done locally and internationally on the association between Income diversification and banks efficiency have yielded mixed results.

2.4.1 Global Studies

Sang (2017) sought to determine how income diversification and bank efficiency are related. 34 Vietnamese commercial banks were the focus of the study. The period covered was from 2007-2015.The 34 banks technical efficiency index was estimated using the DEA technique. Tobit regression model is applied in the analysis. The study found that income diversification has positive effect on the operational efficiency of Vietnamese banks.

Musah, Anku-tsede and Senyo (2015) investigated income diversification and financial stability association in Ghanaian banks. The period covered by the study was from 2002 to 2011. Non-interest income and profit margin were found to be positively and significantly related. This suggests that the increases in income diversification over the period under study actually contributed towards financial performance and that revenue from nontraditional activities is very relevant in ensuring profit stability

of Ghanaian banks. The results also show that in Ghana, bank's profit margins are independent of size and provisions for loan losses and inflation.

Elyasiani and Wang (2012) determined income diversification effect on US banks efficiency. The period for the study was 1997 - 2007. Data Envelopment Analysis (DEA) was employed to calculate bank efficiency. The results showed that activity diversification was negatively associated with the technical efficiency of banks. In addition, changes in diversification over time in the study did not affect the total productivity change, but had a negative impact on the change of technical efficiency. Research results indicated that diversification lowers bank efficiency.

Mercieca, Schaeck and Wolfe (2007) examined whether the change to non-interest earnings boosts performance of small credit unions in Europe. The study used 75 small banks as a sample from 1997 to 2003; the result portrayed an inverse correlation between non-interest earnings and bank performance while there is no absolute diversification gain across and within business lines. The results also showed that small banks that possess distinctive comparative advantage within their existing business lines can boost their performance by increasing their resources in those business lines.

2.4.2 Local studies

Kongiri (2012) determined whether camel variables and bank efficiency are related. 37 Kenyan commercial banks were the focus of the study. The study covered 2007 to 2011. Data was from financial statements of the banks and the CBK reports. Data analysis Descriptive statistics and multiple regressions were the data analysis techniques employed. The researchers established a negative correlation between efficiency ratio and Capital Adequacy, Earnings and Liquidity ratio while

Management quality and Asset Quality were positively correlated to the efficiency ratio.

Waithira (2014) investigated the association between microeconomic variables and banks efficiency in Kenya.44 banks were used as the population. The period of the study was from 2008-2013. The study relied on secondary information which was obtained from banks, banks financial statements, administrative report and from the CBK reports. Descriptive design was used to analyze data. SPSS (V21) was also used in the analysis. The study concludes that size, management quality and capitalization positively and significantly influenced efficiency of banks in Kenya while credit risk adversely affected the efficiency.

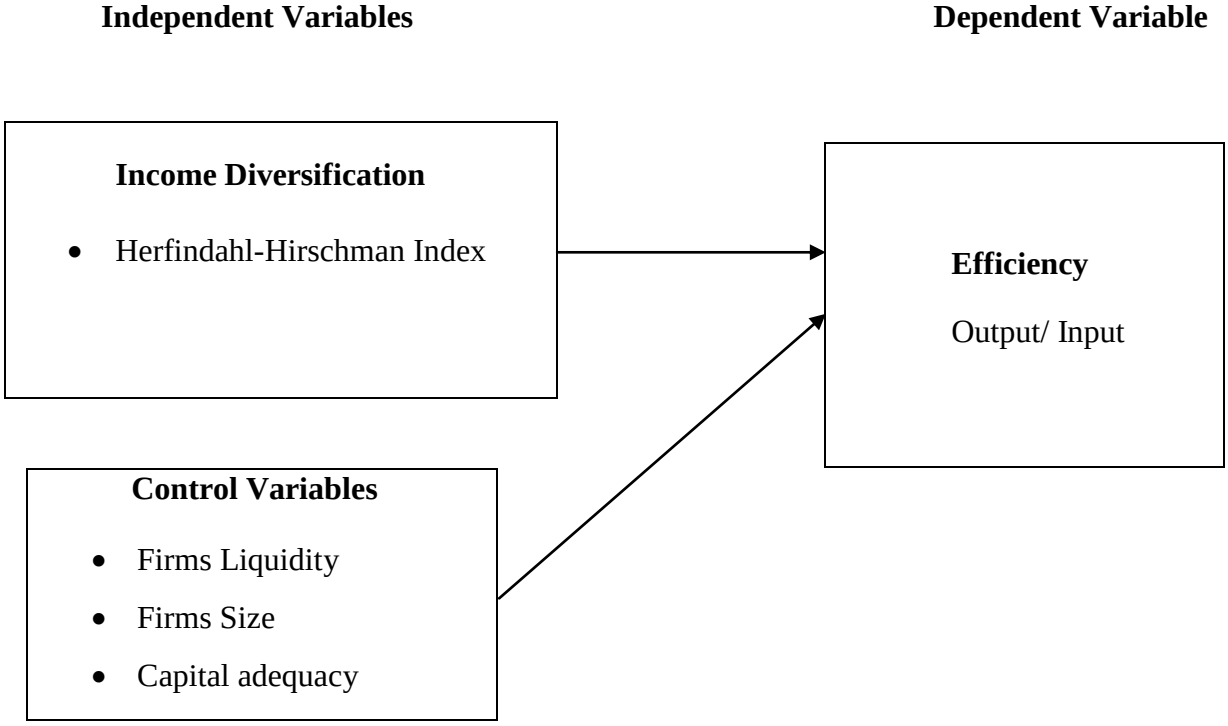
Mutega (2016) explored how asset diversification and banks financial performance are related. Descriptive research design was applied to analyze data. The population consisted of 43 banks in Kenya. 2011 to 2015 was the study period. Descriptive and inferential statistics were used in data analysis. The study found that an increase in diversification of financial assets lead to increased financial performance of banks.

Sentero (2013) investigated capital adequacy and efficiency relationship amongst banks in Kenya. 43 banks were the subject of the study. Descriptive statistics was applied to analyze data. DEA approach was also used to measure economic efficiency. The study established a significant positive relationship between capital adequacy ratio and the efficiency of banks in Kenya.

2.5 Conceptual Framework

The independent, dependent and control variables are depicted in the figure below. Herfindahl-hirschman index was used to measure income diversification, size of the firm using the natural log of total assets, liquidity as the Net liquid loans divided by total deposits, capital adequacy as total capital divided by total risk weighted assets and Efficiency is input divided by output. Input included; total deposits and other liabilities while the outputs included total loans and other earning assets.

Figure 2.1: Conceptual Framework



2.6 Summary of Literature Review

The synopsis of literature review emphasizes that different realities of Banks have been exuded in relation to Income diversification. Drawing from the empirical review of previous studies conducted locally or internationally, mixed conclusions are witnessed on the impacts of Income diversification on banks' efficiency. Moreover,

majority of the earlier studies were carried out in the USA, European and Asian banking sectors which are mostly developed economies compared to Kenya. Those studies also came up with different results and thus making this field open to more research work so that the results can be compared. This studies tried to unequivocally depict the effect of Income diversification (whether positive or negative) on the efficiency of listed banks domiciled and operating in Kenya.

Author	Focus of study	Methodology	Findings	Research Gap	Focus of the Current Study
Sang (2017)	To investigate income diversification relationship with efficiency of banks in Vietnam.	The study covered 2007 to 2015.Tobit regression and DEA model are applied in the analysis.	The study concluded that income diversification impacts positively on the operational efficiency of Vietnamese commercial banks.	Do the findings also hold true to developing countries such as Kenya?	Focus on Kenyan banks in terms of how their efficiency are impacted by income diversification
Musah, Anku-tsede and Senyo (2015)	To determine how financial stability of Ghanaian banks are affected by income diversification strategies.	The period covered by the study was from 2002 to 2011.Multiple regression was applied in the analysis	Financial stability and income diversification were found to be positively related.	Need to incorporate other variables such as banks efficiency and extend the study to developing countries such as Kenya?	Bank efficiency variable included and the current study focussed on Kenya.
Elyasiani and Wang (2012)	To establish the effect of income diversification on the efficiency of US banks.	The period covered was 1997 - 2007. Data Envelopment Analysis (DEA) was employed to calculate bank efficiency.	Research results indicated that diversification lowers bank efficiency.	Do the findings also hold true to developing countries such as Kenya?	The current study focuses on a developing country Kenya.

Author	Focus of study	Methodology	Findings	Research Gap	Focus of Study
Mercieca, Schaeck and Wolfe (2007)	Examined whether the change to non-interest earnings boosts performance of small credit unions in Europe.	The study used 75 small banks as a sample from 1997 to 2003. Multiple regression model was used in the analysis.	Non-interest earnings and bank performance were found to be inversely correlated. Also, there is no absolute diversification gain across and within business lines.	Extension of the study to other sectors such as commercial banks and do the findings hold true in other regions such as Kenya?	The banking sector was b explored in the current study with a focus on list banks in Kenya. In additi the efficiency variable effect was also studied.
Kongiri (2012)	To explore camel variables effect on efficiency of Kenyan banks	The sample included 37 banks. The period of the study was from 2007 to 2011. Multiple regression model was used in the analysis.	The researchers established a negative correlation between efficiency ratio and Capital Adequacy, Earnings and Liquidity ratio while Asset and management quality were positively correlated to the efficiency ratio.	Investigation of other factors besides Camel variables.	The current study focusse on Income diversification variables and their effect on bank efficiency in Kenya.
Waithira (2014)	To determine the impact of microeconomic variables on banks efficiency in Kenya.	The sample consisted of 44 banks. The period of the study was from 2008 - 2013.DEA and descriptive design were applied to analyze the data.	The findings were that size, management quality and capitalization positively and significantly influenced efficiency of banks, while credit risk adversely affected the efficiency of banks in Kenya.	Investigation of other factors besides micro-economic variables and their effect on bank efficiency.	The current study focusse on Income diversification variables and their effect on bank efficiency among listed commercial banks i Kenya.

Author	Focus of study	Methodology	Findings	Research Gap	Focus of Study
Mutega (2016)	Asset diversification and banks in Kenya financial performance relationship was investigated.	43 banks were used as the population. The period covered 2011 to 2015 and descriptive statistics was used in the analysis.	The study established a positive and significant association between asset diversification and financial performance.	Information lacking on the effect of other types of diversification such as income diversification.	The current study focusse on Income diversification variables and their effect on bank efficiency of liste banks in Kenya.
Sentero (2013)	To investigate the effect of capital adequacy requirements on the efficiency of banks in Kenya.	43 banks were taken as the sample. The study relied on descriptive statistics. DEA techniques was adopted to determine economic efficiency	The researcher established a positive association between capital adequacy ratio and the efficiency of banks in Kenya.	Investigation of other factors besides capital adequacy and their effect on efficiency of banks listed at the NSE.	The current study focusse on Income diversification variables and their effect on bank efficiency among listed commercial banks i Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains methods of research to be applied objectively in the study. It also shows the population of the study, the research design used, data collection method applied and the data analysis criteria employed.

3.2 Research Design

The study adopted the descriptive design which is defined as a design that is used when the researcher needs to depict specific behaviour as it occurs in the environment (Khan, 2008). Zikmund (2003) notes that, the main quality of this design is that the variables cannot be controlled by the researcher as he can only describe what is occurring or has occurred.

3.3 Population

The Population comprised of 11 listed banks listed in Kenya for the period 2012 to 2016. This period was chosen because of the quick growth of non-intermediation activities in the banking sector. Capping of interest rates in this period also encouraged banks to look at other sources of income and thus diversifying their incomes.

3.4 Data Collection

Secondary data was obtained from the listed banks financial statements, NSE website and CBK supervisory data bank. The study used the longitudinal approach to study the trend of diversification of income sources for 5 years.

3.5 Data Analysis

The collected data was sorted, cleaned and then coded into the scientific analysis instrument, SPSS version 22. The data coded was analysed by both inferential and descriptive statistics and findings presented using means, standard deviations and tables. Multiple regression model was applied in analysis. Herfindahl Hirschman Index was used to determine the diversification of income which is the independent variable. HHI is the sum of squares of exposures as a fraction of total exposures (Acharya, 2006). A Herfindahl Index close to its minimum means that banks are highly diversified across sectors (Schertler, 2006). The minimum being zero and maximum one.

3.5.1 Analytical Model

Efficiency was be measured by Output/Input

Input variables;

i) Total deposits (TD)

ii) Other Liabilities (OL)

Output variables

Direct Credit Facilitation (DCF), which includes loans and overdrafts

Other Earning Assets (OEA), which represent mainly investment in stock.

The results were subjected to test the extent of relationship using the following linear regression equation

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y = Efficiency (Output of (DCF and OEA)/ Input of (TD and OL)

β_0 = Constant, the value of Y when the value of X is zero

β_i (i= 1, 2, 3, 4) = Coefficients of determinants of efficiency.

X_1 = Herfindahl-Hirschman Index

X_2= Size of the Firm (log of total assets)

X_3= Liquidity (Net Liquid Assets / total deposits)

X_4= Capital adequacy (Total capital / Risk weighted asset)

ε = Error term

Herfindahl Hirschman Index (HHI) was computed for all the 11 banks in order to determine the banks extent of income diversification. Stiroh and Rumble (2006) used the following model.

$$HHI_{INCi} = 1 - \left\{\left(\frac{NII}{NOI}\right)^2 + \left(\frac{NONII}{NOI}\right)^2\right\}$$

Where HHI_{INCi} = level of income diversification, NII = Net interest Income, NONII= Non Interest Income, NOI =Net Operating Income. The sum of squared revenue is subtracted from 1 so that HHI level increases with level of diversification, which takes on values between 0 and 1. The HHI_{INCi}-measures shifts into non-interest income generating activities.

3.5.2 Significance Test

The statistical significance of each independent variable explaining financial performance was tested using student t-test at 5% level of significance. F-test was used to evaluate the general significance of the regression model.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter focused on analysing data collected and interpretations of the findings. Data was obtained from the financial statements of the listed commercial banks and the CBK reports. The study covered the listed commercial banks at Nairobi Securities exchange from 2012 to 2016.

4.2 Descriptive Statistics

Descriptive statistics gives a presentation of the mean, maximum and minimum values, skewness, kurtosis and standard deviation of the variables applied in this study.

Table 4.1: Descriptive Statistics

	Descriptive Statistics					
	Minimum	**Maximum**	**Mean**	**Std. Deviation**	**Skewness**	**Kurtosis**
EFFICIENCY	.36	1.00	.84	.15	-1.24	1.89
HHI	.15	.50	.40	.08	-1.41	2.04
SIZE	10.62	13.13	12.05	.57	-.50	-.04
LIQUIDITY	.21	.74	.38	.098	1.67	3.45
CAPITAL ADEQUACY	.11	.23	.16	.023	.35	.81

Source: (Research Findings, 2018)

The average efficiency is 0.84, while the minimum is 0.36 and the maximum is 1.00. Diversification of income (HHI) has an average of 0.4, a minimum of 0.15 and a maximum of 0.5. The average size of the banks is 12.05 with a minimum value of 10.62 and a maximum value of 13.13. Liquidity and capital adequacy had an average of 0.38 and 0.16 respectively.

The size of the bank and efficiency had the highest standard deviations of 12.05 and 0.84 respectively. This shows that the two variables have very high volatility; this is because bank size is dictated by the level of investment in the company while efficiency is determined by several macro and micro economic factors. This suggests that on average, investment into other non- interest sources (HHI) deviates from the mean by about 0.4. HHI also has a relatively high standard deviation because it depends on several factors such as whether the bank is foreign or locally owned and the regulatory environment (Tacneng and Tarazi, 2014) (Gilbert and Wilson, 1998). Liquidity has a standard deviation of 0.38, implying that on average, liquidity levels in the banks will deviate from the mean by about 0.38 units. Capital adequacy ratio has the smallest standard deviation of 0.16.

The findings in Table 4.1 above show that efficiency had skewness of -1.24 and kurtosis of 1.89, HHI had -1.41 and 2.04, bank size had -0.5 and -0.4, liquidity had 1.67 and 3.45 while capital adequacy ratio had 0.35 and-0.81 respectively. Data analysis proceeds if the kurtosis and skewness is in a range of +2 and -2 as this will be a sign which means the data has a regular distribution (Kothari, 2004). From the above findings, all values of Skewness and f Kurtosis are between+2 and -2 and therefore the researcher proceeded with the analysis.

4.3 Diagnostics Statistics

The Multicollinearity test is conducted to establish whether the model independent variables have similarity characteristics amongst themselves. Similarities between the variables show strong correlation. The rule is that if the VIF value is within 1-5 then, there is no Multicollinearity (Vatcheva et al., 2016).

Table 4.2: Multicollinearity Test

Coefficients[a]			
Model		**Collinearity Statistics**	
		Tolerance	**VIF**
1	HHI	.628	1.591
	SIZE	.688	1.453
	LIQUIDITY	.816	1.226
	CAPITAL ADEQUACY	.892	1.121

a. Dependent Variable: EFFICIENCY

Source: (Research Findings, 2018)

The VIF of all the independent variables is less than 10. We therefore conclude that there is no multicollinearity between the independent variables. Hence, they can together be used as determinants of efficiency in regression analysis.

Table 4.3: Collinearity Diagnostics

Collinearity Diagnostics[a]								
Model	Dimension	Eigen value	Condition Index	Variance Proportions				
				(Constant)	HHI	SIZE	LIQUIDITY	CAPITAL ADEQUACY
1	1	4.921	1.000	.00	.00	.00	.00	.00
	2	.043	10.694	.00	.01	.00	.92	.01
	3	.024	14.410	.00	.68	.00	.02	.13
	4	.011	21.038	.03	.09	.02	.06	.85
	5	.001	77.012	.96	.23	.97	.00	.01

a. Dependent Variable: EFFICIENCY

Source: (Research Findings, 2018)

4.4 Correlation Analysis

In order to find out the strength and pattern of the connection between the study variables, correlation analysis was conducted. Strength of the relationship between the variables is either weak, moderate or strong, while the direction is either positive or negative. Strength of the connection between the variables is determined by Pearson coefficient r while the p values signify whether this relation is significant.

Table 4.4: Correlation Matrix

Correlations						
		EFFICIENCY	**HHI**	**SIZE**	**LIQUIDITY**	**CAPITAL ADEQUACY**
EFFICIENCY	Pearson Correlation	1	.107	.397**	.179	.019
	Sig. (2-tailed)		.439	.003	.191	.892
HHI	Pearson Correlation	.107	1	.558**	.347**	.194
	Sig. (2-tailed)	.439		.000	.009	.156
SIZE	Pearson Correlation	.397**	.558**	1	.201	.131
	Sig. (2-tailed)	.003	.000		.142	.341
LIQUIDITY	Pearson Correlation	.179	.347**	.201	1	.315*
	Sig. (2-tailed)	.191	.009	.142		.019
CAPITAL ADEQUACY	Pearson Correlation	.019	.194	.131	.315*	1
	Sig. (2-tailed)	.892	.156	.341	.019	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Source: (Research Findings, 2018)

From the findings, the Pearson coefficient r for income diversification (HHI) was a positive value of 0.107, showing that it is positively related with efficiency of listed banks in Kenya. This relationship is insignificant (0.439 >0.05). For bank size, r

=0.397, which shows direct relationship with efficiency of listed banks at the NSE. The relationship is significant; 0.03 <0.05.This implies that an increase in banks total assets increases its efficiency. This is practically true because as the bank size increases, they are able to take advantage of their large economies of scale to increase their efficiency. Liquidity had Pearson correlation r = 0.179, showing that it is positively related with efficiency of banks. This relation is however insignificant at 5% level of significance i.e. 0.191> 0.05. Capital adequacy was also found to be positively correlated with efficiency of the listed banks though the relationship between the two variables was not significant; r=0.019, p=0.892.

4.5 Regression Analysis

A multiple regression analysis was used to find out the effect of income source diversification on the efficiency of commercial banks listed at the NSE. In addition to HHI, efficiency was also regressed against; bank size, liquidity and capital adequacy ratio. The model summary statistics obtained is as shown in table 4.5 below.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.448[a]	.201	.137	.137270	1.329

a. Predictors: (Constant), capital adequacy, bank size, liquidity, HHI

b. Dependent Variable: Efficiency

Source: (Research Findings, 2018)

From the findings, R square is 20.1% a discovery that only 20 percent of the deviations in efficiency of commercial banks at the NSE are caused by changes in HHI, size of the bank, liquidity ratio of the bank and the capital adequacy ratio of the

bank. Other variables not included in the model justify for 79.9 percent deviations in efficiency for listed banks at the NSE. Also R is 44.8% showing strong positive correlation between the study variables. A durbin-watson statistic of 1.329 indicated that the variable residuals were serially correlated since the value was less than 1.5.

Table 4.6: Regression of ANOVA Results

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	.237	4	.059	3.147	.022[b]
	Residual	.942	50	.019		
	Total	1.179	54			

a. Dependent Variable: EFFICIENCY
b. Predictors: (Constant), CAPITAL ADEQUACY, SIZE, LIQUIDITY, HHI
Source: (Research Findings, 2018)

Table 4.5 gives the analysis of variance. From the results, the independent variables have a combined effect on efficiency. This is inferred from the significance interval of 0.000 significant at 95% confidence level. The F statistic is 3.147 greater than F critical 2.7. Therefore, the independent variables being good joint predictors, the overall regression model can be used to predict efficiency given the independent variables.

Table 4.7: Regression Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.576	.439		-1.313	.195
	HHI	-.414	.306	-.216	-1.352	.183
	SIZE	.128	.040	.489	3.213	.002
	LIQUIDITY	.262	.211	.174	1.243	.220
	CAPITAL ADEQUACY	-.383	.878	-.058	.436	.665

a. Dependent Variable: EFFICIENCY
Source: (Research Findings, 2018)

From the above results, it is evident that income source diversification produced negative and insignificant values for this study (-1.352, p=0.183). Liquidity and capital adequacy produced positive and insignificant values as evidenced by (t=1.243, p=0.220 and t=0.436, p=0.305) respectively. Bank size also produced a positive but statistically significant value for this study as evidenced by (t= 3.213, p= 0.002).

The following regression equation was estimated:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

$$Y = -0.576 - 0.414 X_1 + 0.128 X_2 + 0.262 X_3 - 0.383 X_4$$

Where;

Y= Efficiency (Total loans and other assets / Total deposits + other Liabilities)

X_1 = Herfindahl-Hirschman Index

X_2= Size (Natural log of total assets)

X_3= Liquidity (Net Liquid Assets / total deposits)

X_4= Capital adequacy (Total capital / Risk weighted assets)

When all the predictor variables were held constant, efficiency of the listed banks at the NSE would be at -0.576. A unit increase in income diversification activities with other factors held constant would result into a decrease in efficiency by -0.414 units. The relationship between income diversification and efficiency of listed banks in Kenya is negative and insignificant. A unit increase in the bank size would lead to increase in efficiency of banks by 0.128 units. The relationship between bank size and efficiency was found to be significant at 5% level of significance 0.002< 0.05. A unit increase in liquidity with other factors constant would result into an increase in efficiency by 0.262 units. The relationship between liquidity and efficiency is insignificant 0.220 >0.05. A unit increase in capital adequacy ratio with other factors

constant would result into a decrease in efficiency by 0.383 units. The relationship between the capital adequacy ratio and efficiency is not statistically significant 0.665 > 0.05.

4.6 Discussions of Findings

The study sought to establish the effect of income source diversification on the efficiency of listed banks in Kenya. The independent variables included; HHI, bank size, liquidity ratio and capital adequacy ratio. The dependent variable efficiency, was measured by (Output of (DCF and OEA)/ Input of (TD and OL).The results of the regression model revealed a negative and insignificant association between income diversification as measured by HHI and efficiency of banks listed at the NSE. We can infer from this that a reduction in revenue generated by banks results into increase in their level of diversification. Consequently, the bank's exposure to risk is enhanced or increased resulting into decrease in their level of efficiency. The finding is similar to that of Stiroh and Rumble (2006) and Stolyk (2003) who found no benefit in diversification. Denis, Denis and Sarin (1997) however, found evidence of increased efficiency as a result of increased income diversification by banks.

Both regression and correlation analysis agreed on the positive and significant relationship between bank size and efficiency of banks listed at the NSE. This shows that increase in bank size improves the efficiency of the listed banks. Generally, efficiency increases with bank size, and this matches the recent findings by Chiarozza (2008). This can be argued from the point of view that bigger banks enjoy economies of scale and have capacity to diversify geographically more than smaller banks. These findings are consistent with Das, Nag and Ray (2004) who found that the bank size impacted positively on efficiency of banks in India. However, Isik and Hassan (2003)

concluded otherwise. In their study of Turkish banks they concluded that both smaller and larger banks are less efficient as compared to medium sized banks.

Also both regression and correlation analysis found that liquidity ratio had a positive and insignificant relationship with the efficiency of listed banks in Kenya. The results closely match earlier researcher's findings such as Gorton and Huang (2002) who stated that banks with higher liquidity are more efficient and less exposed to credit risks.

Results of the regression analysis also revealed that capital adequacy ratio was negatively related to efficiency of the listed banks in Kenya. Thus, the higher the capital adequacy ratio, the lower the bank efficiency. Reason being insufficient capital exposes the bank to bank failure whilst holding too much capital increases the costs of holding it. All this impacts on the efficiency of banks negatively. The findings resonate with those of Sushil and Bivab (2013) who found that capital adequacy ratio impacted negatively on the financial performance of Nepalese commercial bank and that of Gropp and Heider (2009) who clearly stated that while there is a strong link between banking regulations and supervisions and bank efficiency more demanding regulatory practices of capital requirements appear to significantly decrease the efficient operations of banks.

The model summary revealed that the independent variables: HHI, bank size, liquidity and capital adequacy ratio explained 44.78 % of the variations in efficiency of banks as depicted by the R2 value. Thus, 55.3% of the variations in efficiency of commercial banks occur as a result of other factors not discussed in the study. The model was found to be significantly fit since the p-value is 0.022. This endorses that total multiple regression model is significant statistically.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter contains a summary of the research results in view of the objectives of the research. The summarized discoveries have generated conclusions for the study. Recommendations of the study have relevant implication to policy makers. The chapter also provides shortcomings of the study and suggestions for more study.

5.2 Summary of Findings

The main goal of this study was to find out the effect of income source diversification on the efficiency of commercial banks listed at the Nairobi Security Exchange for the period 2012 to 2016. More specifically, the researcher sought to determine how income diversification, bank size, liquidity and capital adequacy affect efficiency of banks listed at the Nairobi Securities Exchange.

Correlation analysis was done for all the variables. The findings established that income diversification and efficiency had a positive and insignificant relationship. Bank size and efficiency of the listed banks were also found to be positively correlated with a statistically significant value. Efficiency of the banks and liquidity ratio were also found to be positively related with the value being insignificant. Capital adequacy ratio and efficiency of the listed commercial banks was also found to be positively correlated with the relationship being insignificant.

The co-efficient of determination R-square value was 44.78 % meaning that 48.7 percent of the efficiency variation can be expounded by the four selected independent variables while 55.3% percent in efficiency variation is associated with other factors not covered in this research. The independent variables were found to have a strong correlation with efficiency of banks at the NSE (R=0.201). ANOVA results show that the F statistic was significant at 5% level with a p=0.022. Therefore, the model was fit to explain the relationship between the selected variables.

The regression results showed that when all the selected independent variables (HHI, bank size, liquidity and capital adequacy) are rated zero, the efficiency would be -0.576. A unit increase in HHI and capital adequacy would result to decrease in the level of the listed banks efficiency by -0.441 and -0.383 respectively while a unit increase in the size of the bank and liquidity levels would cause efficiency levels of the commercial banks to increase by 0.128 and 0.262 units respectively. Analysis of model coefficients revealed that; HHI, bank size, liquidity and capital adequacy were statistically significant determinants of efficiency of banks listed at the Nairobi Security Exchange.

5.3 Conclusions

The study established that income diversification as measured using HHI affected the efficiency of the listed banks negatively. The relationship was found to be statistically insignificant. This indicates that there is no benefit, in terms of efficiency, from diversification that banks have been adopting. This further indicates that the Kenyan banking industry is not yet efficient in management and using its assets to generate earnings, as it diversifies. The study therefore concludes that income source

diversification has no statistically significant influence on the efficiency of banks listed in Kenya.

The study found that the relationship between the size of banks and efficiency of was positive and statistically significant. Similarly, Casu and Girardone (2006) posits that larger banks enjoy economies of scale, have more growth opportunities and can engage in joint production activities. As a result they achieve greater efficiency levels compared to smaller banks. Also, Cole & Gunther (1995) supported this argument, they were of the view that larger banks were less exposed to credit risks compared to small banks due to their flexibility in the financial markets. The study therefore concludes that size has a positive and significant effect on the efficiency of banks listed in Kenya.

The study established that liquidity had a positive insignificant association with the efficiency of banks listed in Kenya. We thus infer that the higher the liquidity the better the efficiency of the bank. Similarly, banks should increase the ratio of liquid assets to deposits and short term funding in order to increase their operational efficiency (Odunga, Nyangweso, Carter & Mwarumba, 2013). The study concluded that liquidity has no significant effect on the efficiency of commercial banks in Kenya.

The study also found capital adequacy ratio to be negatively related with the efficiency of listed banks. The negative relationship was however not significant. The ability of the bank to compete is impended when the capital adequacy which ultimately curtails the banks growth capabilities. The study concluded that capital adequacy ratio has no significant effect on the efficiency of banks listed in Kenya.

5.4 Limitations of the Study

The study was carried from 2012 to 2016, five years' time period due to the cost of obtaining the data and analyzing data for a longer period proved a challenge. In analyzing the effect of diversification on efficiency of listed commercial banks, an elongated duration would guarantee robustness of the results. The study was also carried on a single country due to time and resource limitations, therefore using broader sample would enable in getting wider understanding of the subject matter

The data results may also not be applicable to other financial firms as the focus in this study was on banks and this because of the differences that are found between commercial banks and other financial firms. While it can offer important insights to other financial institutions, such conclusions should be approached with care given the variations in the way banks operate and the way other financial institutions operate. To eradicate this limitation, it may be significant to carry this study on other financial firms.

This research depended on data from various sources including publications of NSE and CBK. However, there were discrepancies in data reported by these sources, but the researcher overcame this by getting an average figure whenever a discrepancy arose. The researcher foresaw a challenge of collecting data to cover all the study period where data could not be found in some years. To overcome this, diverse sources of data were identified to complete some years where data could not be present in any given source.

5.5 Recommendations

This study proposes that, banks should not commit resources in diversifying their income because diversification appears to affect their efficiency negatively. The study also recommends that the banks check on their capital adequacy ratios as they are negatively affecting their efficiency. As such, lower capital adequacy ratios would be preferred so as to attain higher efficiency levels for the listed banks at the NSE. Size of the firm and liquidity ratio indicated that a higher rate in both helped commercial banks to achieve a higher level of efficiency and thus the study recommends banks to maintain or increase on those variables so as to increase their efficiency levels even further.

Further, the study recommends that Central Bank of Kenya should offer an atmosphere where the commercial banks process is not hampered with. For example, CBK should ensure steadiness of interest rates so as to encourage lending. Through enhanced lending, commercial banks are able to gain commissions and fees as they form a significant portion of banks' non-interest earnings.

The study recommends that there should be a policy set to standardize the presentation of financial statements of commercial banks in Kenya. This will make it easier for all the parties interested in using the data from these statements.

The study also recommends that future studies should allocate more time to the data collection process and sponsors step in to support the studies. This will make it possible for researchers to study other factors that affect the efficiency of commercial banks in Kenya that the study did not address.

5.6 Suggestions for Further Research

Based on the findings, it suggested that future studies could investigate the correlation between diversification of income and efficiency using a combined methodology where data is collected from both the secondary and primary sources. This format may help to address issues that the secondary data has not accurately captured and therefore providing a better and clear idea on the issue studied. Further research may assess the impact of geographical diversification on the performance of commercial banks.

This study offers appropriate insight on the effects of diversification of income on the efficiency of the listed commercial banks which are conventional banks; future research could be carried on the effects of diversification of income on the efficiency Islamic Banks in Kenya.

This study was confined to commercial banks in Kenya yet there are many players in the financial sector. There is therefore need to study the effect of diversification of income on the efficiency of micro finance institutions, insurance companies, commercial banks and other financial institutions, and how these factors affects their operational efficiency and performance in general.

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APPENDICES

Appendix I: Listed Commercial Banks in Kenya

1. Barclays Bank (K) Limited

2. CFC Stanbic Holding Limited

3. I&M Holdings Limited

4. Diamond Trust Bank Kenya Limited

5. Housing Finance Co Limited

6. Kenya Commercial Bank Limited

7. National Bank of Kenya Limited

8. NIC Bank Limited

9. Standard Chartered Bank Limited

10. Equity Bank Limited

11. The Co-operative Bank of Kenya Limited

Source: NSE (2018)

Appendix II: Raw Data

BANK	YEAR	HHI	SIZE	LIQUIDITY	CAPITAL ADEQUACY	Efficiency
DTB	2012	0.34	11.46	0.38	0.177	0.780658
	2013	0.32	11.65	0.326	0.171	0.657576
	2014	0.31	11.86	0.356	0.168	0.878701
	2015	0.32	12.16	0.39	0.148	0.878965
	2016	0.30	12.41	0.502	0.185	1
BARCLAYS	2012	0.45	12.13	0.468	0.227	0.896931
	2013	0.44	12.24	0.42	0.157	0.780658
	2014	0.43	12.33	0.442	0.152	0.869064
	2015	0.43	12.39	0.341	0.157	0.906327
	2016	0.41	12.47	0.283	0.157	1
EQUITY	2012	0.42	12.28	0.46	0.199	0.899468
	2013	0.45	12.38	0.34	0.186	0.879701
	2014	0.46	12.53	0.304	0.148	0.963967
	2015	0.45	12.74	0.291	0.146	0.981983
	2016	0.5	12.85	0.477	0.144	1
COOPERATIVE	2012	0.45	12.2	0.358	0.203	0.896742
	2013	0.44	12.34	0.326	0.157	0.874809
	2014	0.44	12.55	0.338	0.146	0.898701
	2015	0.44	12.74	0.361	0.145	0.946317
	2016	0.5	12.77	0.332	0.162	1
KCB	2012	0.4	12.63	0.359	0.213	0.867471
	2013	0.4	12.68	0.333	0.187	0.86600
	2014	0.45	12.84	0.313	0.171	0.943998
	2015	0.43	13.06	0.3	0.141	0.963771
	2016	0.52	13.13	0.303	0.169	1
NBK	2012	47	11.11	0.3	0.194	0.713891
	2013	0.44	11.43	0.42	0.171	0.846501
	2014	0.43	11.72	0.315	0.129	0.648783

	2015	0.44	11.74	0.307	0.13	0.732533
	2016	0.39	11.65	0.297	0.113	0.764142
I & M	2012	0.45	11.42	0.3546	0.1698	0.767471
	2013	0.37	11.61	0.3402	0.1507	0.811885
	2014	0.42	11.83	0.3052	0.1577	0.923771
	2015	0.36	11.9	0.335	0.1705	0.843998
	2016	0.35	12.01	0.3726	0.1664	1
H & F	2012	0.22	10.62	0.368	0.182	0.549895
	2013	0.19	10.75	0.3312	0.138	0.584311
	2014	0.25	11.01	0.3076	0.1112	0.697893
	2015	0.27	11.14	0.2804	0.1537	0.761945
	2016	0.15	11.13	0.2105	0.1537	0.762809
CFC	2012	0.5	11.87	0.46	0.205	0.719934
	2013	0.5	12.1	0.679	0.1773	0.833814
	2014	0.5	12.11	0.414	0.1752	0.862266
	2015	0.5	12.25	0.737	0.159	0.906217
	2016	0.49	12.28	0.55	0.159	1
NIC	2012	0.44	11.53	0.3538	0.156	0.67807
	2013	0.41	11.63	0.2854	0.1482	0.719934
	2014	0.41	11.83	0.3308	0.1437	0.833814
	2015	0.4	11.96	0.298	0.1452	0.866201
	2016	0.36	11.99	0.3852	0.1722	1
STAN CHART	2012	0.44	12.18	0.39	0.16	0.701552
	2013	0.42	12.3	0.38	0.17	0.863709
	2014	0.43	12.31	0.46	0.16	0.800776
	2015	0.4	12.36	0.5374	0.1753	0.924314
	2016	0.41	12.43	0.5693	0.1751	1

Source: NSE (2018)