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Credit Risk Management and Performance of Mortgage Lending Commercial Banks in Kenya

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Abstract

In spite of Kenya's mortgage market having grown substantially, it is dominated by large mortgage lending commercial banks pointing to possible restrictions to entry or a likelihood of high risk for tier II and III commercial banks in Kenya. In 2017, Kenyan mortgage lending commercial banks recorded an average gross non-performing loan ratio of 10.3 percent against the industry recommended Central Bank of Kenya average of 4 percent. In 2018, Kenyan mortgage industry assets was approximated to be 2.5 percent relative to the country's gross domestic product with about 24,458 mortgage accounts in the industry. The sector has also recently experienced increased non-performing loans. Thus, the study sought to evaluate the influence of credit risk management on performance of Kenya's mortgage lending commercial banks with the objective of establishing influence of delinquency rates and value at risk on credit risk management of Kenya's mortgage lending commercial banks. Credit history score acted as moderating variable. Merton's Default Theory, Portfolio Theory and Theory of Information Asymmetry guided this study. A census survey of Kenya's 34 mortgage lending commercial banks was utilized. Explanatory and descriptive research designs were adopted. The researcher used secondary panel data covering the period 2012 to 2018 with a record survey sheet as the data collection tool. Data was collected from published audited reports of mortgage lending commercial banks submitted to Central Bank and analyzed using STATA subject to various diagnostic tests. Panel regression of coefficients findings indicated there was a positive and significant relationship between delinquency rate and

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performance of mortgage lending commercial banks. There was a negative and significant relationship between value at risk and performance of mortgage lending commercial banks. Credit history score had significant moderating effect on relationship between credit risk management and performance of mortgage lending commercial banks in Kenya since coefficient of determination rose after moderation.
Key Words: *Credit Risk Management, Delinquency rate, Value at Risk, Credit History Score & Mortgage*

1.1 Introduction

1.1.1 Credit Risk Management

Basel Accord III defines credit risk as the risk of loss of principal and advocates for commercial banks to make use of both financial and operating ratios in order to better evaluate and assess the financial performance of commercial banks to mitigate against the risk (Sinkey, 1975). Several researches such as Sinkey, (1975) and Altman, (1977) have since interrogated the usage of the financial and operational ratios in measuring performance. Sinkey (1975) in one of the studies in which discriminant analysis was used established that the ratios are better utilized in distinguishing commercial banks with sound credit risk management tools from those which are problematic. On the other hand, Altman, (1977) who analyzed assets and liabilities in commercial banks asserted that the ratios could be used to caution banks from a possible financial distress and aid them is formulation of strategies to counter it.

1.1.2 Delinquency Rates

Delinquency in the mortgage market is explained by an inability of the households to pay and thus defaulting on their payments (Stanga, Vlahu & Haan, 2018). In some instances, borrowers may default on a mortgage owing to a decline in the cost of housing and on weighing, the client perceives the gains of defaulting being higher than the related costs (Chatterjee *et al*. 2007). In developing counties such as Kenya, high default rate is related to issues of loss of unemployment and also the shocks that come with related costs that clients may not have been aware when they took the mortgage (Stanga, Vlahu & Haan, 2018).

In 2017, Kenya's mortgage market recorded highest, the level of growth in under performing loans rising from Kes 220 million in December 2016 compared to Kes 273 million in December 2017. Such high delinquency rates led to two financial institutions leaving the mortgage market owing to high losses (Muchira & Anyanzwa, 2018). Stanga, Vlahu and Haan (2018) indicate that high levels of delinquency were experienced in the United States owing by liquidity crisis which turned into a Global Crisis in 2008. The National treasury of Kenya in 2018 indicated that out of the Kes. 17.5 billion Mortgage assets held by Chase Bank, Kes. 4.5 Billion were non performing which was triggered by the period when the bank went through financial crisis (Guguyu, 2018).

1.1.3 Value at Risk

In the mortgage industry, value at risk is a parameter that entails quantifying the monetary risk for a given portfolio in a given period of time (Castagna & Fede, 2013). Risk could be in the form of liquidity risk, credit risk and market risk. Focus on housing and mortgage market was drawn because of the high default rates leading to very high loan to value ratios. Further, the market had been subjected to high interest rates that have led to risk of default being high. Value at risk was proposed as a mechanism which provides an analysis of various risk positions. It is a tool which provides the ability to assess risk for traders, managers and employees and thereby discouraging

organizations from taking excess risk. It provides an avenue for entities to hedge against possible risk (Jin & Ziobrowski, 2011).

1.1.4 Distance to Default

Distance to default refers to the likelihood that there will be failure to meet loan requirements detailed in a loan agreement and is normally measured by the debt service coverage ratio (Saunders & Allen, 2002). Understanding the likelihood that a loan may be defaulted is an important tool in credit risk analysis. Prediction of default in an organization can only be done within a certain level of probability. Distance to default explains the frequency which standard deviations of the price of the asset should change in order for default to be triggered future (Akbar & La, 2014).

1.1.5 Bank Size

Bank size is the cumulative assets a bank has and indicates a financial strength and economic capability of the said financial institution. Bank size is measured based on market capitalization, cumulative bank assets held, revenues generated from commercial activities of the bank, and the equity held in the books of the bank (Schildbach, 2017). Statistics by the Central Bank of Kenya, (2017) indicate that 75.5% of the mortgages in Kenya have previously been advanced by six commercial banks with one being categorized as medium while five others are from the tier one. Mwendwa (2015) indicates that the firm size is statistically significant in explaining how mortgage financing effects the profitability of financial firms. Kenya's banks are seen to have the ability and capacity to issue mortgages in Kenya owing to financial stability available as measured by the asset base.

1.1.6 Credit History Score

Credit history score of an individual refers to the history of a borrower with regard to the credit worthiness of the individual in meeting their financial obligations (Gopal, 2008). Credit score is computed based on mathematical models that are based on an individual's credit history based on outstanding balances, late payments and the age of credit of an individual. Credit score according to Metropol in Kenya ranges between 200 to 900. A score of less than 400 indicates that customers are in default (Metropol, 2018).

1.1.7 Mortgage Lending Commercial Banks Performance in Kenya

The value of total nonperforming mortgage loans outstanding increased from Ksh. 10.8 billion in 2017 to Ksh. 11.7 billion in December 2018. The ratio of nonperforming loans to total mortgage loans increased from 8.7 percent in 2017 to 9.1 percent in 2018.This was above the central bank of Kenya recommended ratio of 7 percent, associated with cashflow constraints for the mortgagors attributed mainly to failure by both the county and national governments to owner payments for suppliers (Central Bank of Kenya, 2018). Kenya had 24,458 mortgage loans accounts as at 2017 an upward shift from 22,013 held 2016, representing an increase of 2,445 or 11.11 percent due to increased demand from the ballooning middle class. The mortgage loan size increased from Ksh 7.5 million to Ksh 8.3 million attributed to high property prices. The number of commercial banks reduced from 37 to 34 in 2016 due to the collapse of Dubai and Imperial banks. Chase bank slumped into receivership under the guidance of the Central Bank of Kenya (Central Bank of Kenya, 2017)

In terms of the gross NPL, the value increased from Ksh.81.4 billion in 2017 to Kshs 108 billion, representing an upward rise of 32.7 percent. Asset quality worsened of from 2.3 percent recorded

in 2017 to 2.7 percent registered in 2018 a clear signal that credit risk in Kenya's mortgage sector was on the rise. Gross NPL ratio was 12.3 percent with an overall of 10.3 percent against the Central bank of Kenya recommended ratio of 4 percent.

1.2 Statement of the Problem

The mortgage sector in Kenya despite having recorded a significant growth, still remains dominated by large mortgage lending commercial banks which could indicate probable restrictions with regard to entry or high levels of credit risk for both medium and small commercial banks. Kenya's total mortgage loans held as at 2017 was equal to 2.5 percent of Kenya's GDP with about 24,458 mortgage accounts in the whole industry. The mortgage sector has in the recent past experienced poor performance and increased cases of mortgage delinquencies and defaults. In the financial period ending December 2017, the Kenya mortgage lending commercial banks recorded an average gross NPL ratio of 10.3 percent relative to CBK's recommended average of 4 percent (Central Bank of Kenya, 2017).

A few studies that have been done in attempt to address concerns in Kenya's mortgage industry comprise; Oyedokun, *et al* (2013) conducted a study to evaluate the effect of lending practices with regard to residential mortgage default. Mkukwana (2012) did a study to establish impact of macroeconomic factors on risk default through a case study of residential mortgages. Specifically, in Kenya, Osero *et al* (2013) did a study to examine how effective management strategies among the mortgage lending banks in Kenya loan default. Further, Nanyuki and Omar (2016) examined factors that influence the performance of the mortgage lending commercial banks in Mombasa and finally, Abdulrehman and Nyamute (2018) did a study on effect of mortgage financing on the financial performance of mortgage firms. These studies, however, did not adequately address how credit risk management impact performance of the mortgage institutions which is an existing gap in the field. The study thus seeks to fill the gap by specifically evaluating how credit risk management influence performance of mortgage lending commercial banks in Kenya. Size of bank which was not factored in the aforementioned studies and was included as a variable to factor in different risk appetites and capabilities for the commercial banks involved in mortgage lending in Kenya. Credit history score which was also not included in the aforementioned studies was incorporated in this study as a moderating variable having been emphasized on by CBK for all commercial banks monthly net debt position returns (Central Bank of Kenya, 2017). The credit history score is used for all loans classification to either normal, watch, substandard or loss (CBK, Prudential Guidelines, 2013)

1.3 Research Hypotheses

The study sought to resolve the below research hypothesis:

- **H_{01}:** Delinquency rate does not have significant influence on the performance of mortgage lending commercial banks in Kenya.
- **H_{02}:** Value at risk does not have significant influence on the performance of mortgage lending commercial banks in Kenya.
- **H_{03}:** Distance to default does not have significant influence on the performance of mortgage lending commercial banks in Kenya.
- **H_{04}:** Bank size does not have significant influence on the performance of mortgage lending commercial banks in Kenya.

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H_{05}: Credit history score does not have significant moderating effect on the relationship between credit risk management and performance of mortgage lending commercial banks in Kenya.

2.1 Theoretical Review

2.1.1 Merton's Default Risk Theory

Merton's default theory was conceived by Merton, (1970). The theory has extensively been utilized in the assessment of defaults in cooperatives and mortgage lending firms. Merton's model postulates that credit analysts should better appraise financial institutions, while also checking on the firms' ability to remain liquid throughout the period under analysis and debt expiry (Jorion, 2014). It has been used to determine the ability of debt owners to pay their debt obligations and can thus help credit analysts to determine an organization's credit default risk. Merton's theory was based on some basic assumptions about the capital structure of the firm (Merton, 1970). In the event of default occurring, the firm's market value of the assets owned by the company in relation to the liabilities of the company fall below the set certain threshold and thus, the firm is considered to have defaulted. One of the reasons for the default in the banks is the credit risk which is part of the risks experienced by commercial banks (Jorion, 2014).

2.1.2 Portfolio Theory

Portfolio theory was conceived and advanced by Markowitz (1952). The theory asserts that four basic steps are involved in portfolio construction as: security valuation, asset allocation, portfolio optimization and the performance management (Seibel, 2012). According to the theory, many companies use models for value at risk to manage market risk and interest rate risk exposures. According to Margrabe, (2007), in spite of credit risk remaining the largest risk facing most commercial banks, the habit of utilizing modern portfolio theory to credit risk management is yet to be fully embraced.

2.1.3 Theory of Information Asymmetry

Stiglitz *et al* (1970) established the theory which asserts that both mortgagees and mortgagors experience information asymmetry in their interactions. The phenomenon emanates from a mortgagor who borrows a mortgage and has information with regard to the probable risks related to the investment ventures for which the loan is intended. The mortgagee, however, is unaware of the information (Edward & Turnbull, 2013). The concealed details generate adverse selection and moral hazard problems (Horne, 2012).

2.1.4 Credit Risk Theory

The theory was advanced by Melton, (1974) and is also referred to as structural theory. It postulates that default occurrences stems from the development of the assets of the firm displayed by a dilution trajectory with fixed notable parameters like arrears rate, portfolio at risk and loan loss rate. According to the theory, loss provisional on default is recommended for all securitized loans since failure to pay debts could happen in the course of the entire life of a mortgage and not only at maturity (Crosbie *et al*, 2003).

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3.0 Research Methods

3.1 Research Design

Explanatory and descriptive research designs were used for the study. Saunders *et al.* (2009), explains that explanatory research design establishes root association between variables. Researchers should be knowledgeable of the phenomenon in order to infer or detect pertinent root associations (Zikmund *et al.*, 2012).

3.2.1 Empirical Model

According to Bard *et al*, (2014), several financial aspects that influence mortgagee's determination of the amount of mortgage advanced, for instance, financial market structure, mortgagor behavior, mortgage facility and bank characteristics. The borrower's features and behavior indicate the credit risk and hence affects amount of mortgage advanced. On the other hand, bank characteristic like credit policy, credit limits, reserve cash reserve ratio, and availability of money to lend are all supply-side factors that could affect the availability of credit. This study used panel regression model. The model was adopted since it has been used extensively in literature and for its simplicity (Maddala, 2013).

Mortgage performance is hypothesized to be influenced by the below factors and can best be simplistically written as:

$$Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \varepsilon_{it} \quad \text{..... (3.1)}$$

Where;

Y=Performance of Kenya 's mortgage lending commercial banks as determined through ratio of gross nonperforming loans to total mortgage advances

X_1= Delinquency rate as measured by arrears rate which is measured by total installments past due divided by gross portfolio outstanding

X_2 = Value at risk as evaluated through ratio of loans to assets

X_3 = Distance to default as assessed by debt service coverage ratio

X_4 = Bank size as determined by log transformation of the cumulative assets of commercial banks under study

$\beta_{0=}$ Intercept
$\beta_1, \beta_2, \beta_3, \beta_4$ = parameters of independent variables under study

β_5= parameter of moderating variable under study

$\varepsilon_=$ Error term

i= Banks under study
t=Period in years (2012-2018)

3.2.2 Moderating model

$$RGNPL = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 M + \beta_6 X_{1it} M + \beta_7 X_{2it} M + \beta_8 X_{3it} M + \beta_9 X_{4it} M + \varepsilon_{it} \quad \text{..... (3.2)}$$

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Where;

M=Moderating variable (Credit History Score)

All the variables have to be standardized using the moderating variable (M). The interaction terms (X_{1it} M, X_{2it} M, X_{3it} M and X_{4it} M) have to be calculated using the compute function as expressed in model (3.2). If β_6, β_7, β_8 and β_9 are significant, moderation effects exist in the four relationships. If only one is significant, moderation effect only exists in one of the relationship and if both β_6, β_7, β_8 and β_9 are insignificant, no moderation effect exists and M becomes just another independent variable (MacKinnon, 2011).

3.2 Data Collection

Secondary panel data of the 34 mortgage lending banks in operating in Kenya for the period between 2012 and 2018 were collected using a record survey sheet. However, data for 3 mortgage lending banks were missing or incomplete and were excluded in the study. The choice of the period was guided by the availability of data and increased number of mortgage portfolio at risk culminating to increased mortgage delinquency rates and also defaults. The data were based on the published audited accounts of mortgage lending commercial banks submitted to the CBK. Annual CBK publications such as Banking Supervision Report and Economic Review Reports.

3.3 Data analysis

STATA was employed for the data analyses. Data which was quantitative in nature was analyzed in form of inferential statistics involved measurement and relationship which include: correlation, panel regression and analysis of variance. The output of data analysis was presented in form of tables.

4.1 Findings

4.1.1 Panel Regression Results

The panel model output is shown in Table 4.1.

Table 1: Panel Regression Results

NPL	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Delinquency rate	2.533986	0.228219	11.10	0.002	-3.79321	8.86118
Value at risk	-0.84222	0.315452	-2.67	0.036	-4.79244	3.107992
Distance to default	0.103365	0.0239567	4.31	0.027	-0.44618	0.492907
Bank size	-7.6355	2.86961	-2.66	0.041	-70.4992	15.22812
_cons	5.6739	3.9529	1.43	0.193	-160.465	795.8128
R-squared:	within = 0.4917					
	between = 0.5309					
	overall = 0.4836					
Wald chi2(4)	=48.89					
Prob > chi2	=0.0000					

The R squared checked the explanatory power of the variable. The study was supported by R square of 0.4836 as shown in Table 1. This means that delinquency rate, value at risk, bank size, distance to default explains 48.36% of performance of mortgage lending commercial banks.

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4.1.2 Delinquency rate and performance of mortgage lending commercial banks

The output in Table 1 revealed that delinquency rate and performance of mortgage lending commercial banks are positively and significantly related (β =2.533986, p=0.002). The model is also justified by z-statistic of 11.10>1.96. This implies that a rise in delinquency rate results to a subsequent increase in the performance of mortgage lending commercial banks measured using non-performing loans. $Ho_1$was not rejected since p-value is 0.002<0.05.

4.1.3 Value at risk and performance of mortgage lending commercial banks

Results in Table 1 also showed that value at risk negatively and significantly related to performance of mortgage lending commercial banks (β =-0.84222, p=0.036). The model is also justified by z-statistic of 2.67 >1.96. This implies that a rise in delinquency rate results to a subsequent increase in the performance of mortgage lending commercial banks measured using non-performing loans. Ho_2 was not rejected since p-value is 0.002<0.05. Value at risk is employed by banks to measure the risks.

4.1.4 Distance to default and performance of mortgage lending commercial banks

Panel model in Table 1 revealed that distance to default is positively and significantly related to performance of mortgage lending commercial banks (β =0.103365, p=0.027). The model is also justified by z-statistic of 4.31>1.96. This implies that a rise in delinquency rate results to a subsequent increase in the performance of mortgage lending commercial banks measured using non-performing loans. $Ho_3$was not rejected since p-value is 0.027<0.05.

4.1.5 Bank size and performance of mortgage lending commercial banks

It was also found as illustrated in Table 4.1 that bank size is negatively and statistically related to performance of mortgage lending commercial banks (β =-7.6355, p=0.041). The model is also justified by z-statistic of 2.66 >1.96. This implies that a rise in delinquency rate results to a subsequent increase in the performance of mortgage lending commercial banks measured using non-performing loans. Ho_3 was not rejected since p-value is 0.041<0.05.

4.2 Moderating effect of Credit History Score

The study assessed the moderating of credit history score on linkage between credit risk management and performance of mortgage lending commercial banks in Kenya. Table 2 shows model the fitness for a regression model after moderation.

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Table 2: Moderating effect of Credit history score

NPL	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
Delinquency rate	2.597786	0.537148	4.84	0.021**	-4.3349	9.53047
Value at risk	0.77609	2.85678	0.27	0.786	-6.37528	4.823094
Distance to default	-0.01044	0.00429	-2.433	0.042**	-0.58724	0.566367
Bank size	28.7777	22.28923	1.29	0.197	-72.4638	14.90836
Delinquency rate*M	0.17619	0.018468	9.54	0.003**	-0.53815	0.185771
value at risk*M	-0.12021	0.017879	-6.72	0.017**	-0.37064	0.33022
Distance to default*M	0.021349	0.006104	3.50	0.025**	-0.01061	0.013312
Bank size*M	-0.011609	0.099244	0.12	0.907	-0.18291	0.206124
_cons	352.9227	248.2164	1.42	0.155	-133.572	839.4178

R-sq: within = 0.5669
between = 0.5373
overall = 0.5185

Wald chi2(4) = 43.93
Prob > chi2 = 0.0034

M=Moderator/ credit risk score

Output results pinpoints that R^2 rose from 0.4836 before moderation (Table .2) to 0.5185 after moderation. Delinquency rate, value at risk and distance to default were significantly related performance of mortgage lending commercial banks in Kenya post introducing the moderator. The hypothesis that credit history score does not have significant moderating effect on the relationship between credit risk management and performance of mortgage lending was rejected. The study accepted the alternative hypothesis that credit history score has a significant moderating effect on the relationship between credit risk management and performance of mortgage lending.

4.3 Summary of the Study

The findings indicated that delinquency rate is positively and significantly related to performance of mortgage lending commercial banks. Value at risk is negatively and significantly related to performance of mortgage lending commercial banks while distance to default is positively and significantly related to performance of mortgage lending commercial banks. It was further noted that bank size is negatively and significantly related performance of mortgage lending commercial banks. The findings also indicate that coefficient of determination improved after moderation using credit history score hence having a significant moderating effect.

5.1 Conclusion

The study concludes that delinquency rate positively influences performance of mortgage lending commercial banks in Kenya. A high delinquency rates may result to financial institutions leaving the mortgage market owing to high losses. Value at risk negatively influences performance of mortgage lending commercial banks in Kenya. Value at risk is a mechanism that provides an analysis of various risk positions. It provides an avenue for commercial banks dealing with mortgage funds to hedge against possible risk.

Distance to default positively influences performance of mortgage lending commercial banks in Kenya. Understanding the likelihood that a loan may be defaulted is an important tool in credit risk analysis since prediction of default in an organization can only be done within a certain level

of probability. Bank size negatively impacts performance of mortgage lending commercial banks. Bank size describes the economies of scale of the bank. A large bank reduces cost because of economies of scale and scope.

The study also concluded that credit history score moderates linkage between credit risk management and performance of mortgage lending commercial banks. Financial institutions including mortgage banks use the credit score in making an analysis of whether one will pay back their loans or they will default.

6.1 Recommendations

Mortgage lending commercial banks management may need to carefully draft credit policies with clear implementation procedures to enhance performance of mortgage lending to ensure maximum returns while minimizing default rates. Credit guidelines of the commercial banks may be integrated with the mortgage lending guidelines to form sound credit management procedures.

The use of credit-scoring models to screen loan applicants should be emphasized. However, this method may not be very precise and so commercial banks offering mortgages may be willing to absorb expenses of higher expected default rates in exchange for ancillary benefits related to high-volume credit-scored loans attached to securities.

7.1 Areas for Further Research

Further research may be conducted on demographic factors that result to mortgage loan default and also macroeconomic elements that impacts growth of mortgage lending in commercial banks. The macroeconomic factors include inflation, interest rate and money supply.

References

Abdulrehman, A., & Nyamute, W. (2018). Effect of Mortgage Financing On Financial Performance of Commercial Banks in Kenya. *Journal of International Business, Innovation and Strategic Management, 1*(6), 91 - 122. Retrieved from http://www.jibism.org/core_files/index.php/JIBISM/article/view/54

Akbar, S., & La, D. (2014). *Mortgage Lending Institutions in Scandinavia: A study of risk for the period 2000-2013* (Degree project). Umeå School of Business and Economics.

Altman, E.I., Hartzell, J., Peck, M., (1995). A Scoring System for Emerging Market Corporate Debt", *Salomon Brothers*, 15

Basel Committee on Bank Supervision, BCBS (2003). *Overview of the new basel capital accord. Technical report, Basel Committee on Bank Supervision, CH-4002 Basel*, Switzerland. Consultative Document.

Castagna, A., & Fede, F. (2013). *Measuring and managing liquidity risk*. Chichester: John Wiley & Sons.

CBK. (2018). *Quarterly report on Development in the Kenyan banking Sector* for *the period ended 30th March 2017*, Retrieved from www.centrabank.go.ke/downloads

Central Bank of Kenya (2016) Mortgage Finance in Kenya: *A Baseline Survey*

Central Bank of Kenya (2016). *Prudential guidelines 2013*. Retrieved from https://www.centralbank.go.ke/index.php/news/245-issuance-of-revised-prudential-guidelines-and-risk-management-guidelines-for-banks

Central Bank of Kenya (2016*). Risk management guidelines 2016*. Retrieved from https://www.centralbank.go.ke/index.php/news/245-issuance-of-revised-prudential-guidelines-and-risk-management-guidelines-for-banks on 10th April 2017

Central Bank of Kenya (2017). *Quarter 4 Economic Review Report, 2017*Retrieved from https://www.centralbank.go.ke/index.php/economic- review-reports on 25th February 2018

Central Bank of Kenya, (2016). *Risk management survey for the banking sector*. CBK, Nairobi.

Central Bank of Kenya, (CBK) (2017*). Bank Supervision report; Kenyan banking Sector for the period ended December 2017.* Retrieved on 26th February 2018.www.centrabank.go.ke/downloads.

Central Bank of Kenya, (CBK) (2018*). Bank Supervision report; Kenyan banking Sector for the period ended December 2018.* Retrieved on 21st November 2019.www.centrabank.go.ke/downloads.

Central Bank of Kenya, World Bank (2016) Mortgage Finance in Kenya: *Mortgage Survey Analysis*

Gopal, C. (2008). *Financial management*. New Delhi: New Age International (P) Ltd., Publishers.

Guguyu, O. (2018). *High loan default hits Chase Bank:* The Standard. Retrieved from https://www.standardmedia.co.ke/article/2001275680/high-loan-default-hits-chase-bank

Jin, C., & Ziobrowski, A. (2011). Using Value-at-Risk to Estimate Downside Residential Market Risk. *JRER*, *33*(3).

Jorion, P. (2014). Value at Risk: The New Benchmark in controlling market risk. *Irwin, Chicago*, *1*, 997.

Markowitz & Harry M. (1999). The early history of portfolio theory: 1600–1960, *Financial Analysts Journal, Vol. 55, No. 4*

Merton, R. C. (1974). On the pricing of corporate debt: The risk structure of interest rates*. *The Journal of Finance*, 29(2), 449-470.

Merton, R.C. (1963). An Inter-temporal Capital Asset Pricing Model. Econometrica 41 (5): 867–887

Metropol. (2018). *Metropol Corporation | Scores*. Retrieved from https://www.metropol.co.ke/personal/scores/

Mkukwana. K. (2012). *The Impact of Macroeconomic Factors on the Risk of Default: The case of Residential Mortgages*. University of Witwatersrand. Masters of Management in Finance and Investment.

Muchiri, N., & Anyanzwa, J. (2018). *Trouble brewing in Kenya's house loans market.* Retrieved from https://www.theeastafrican.co.ke/business/Trouble-brewing-in-Kenya-house-loans-market/2560-4891996-l9jehaz/index.html

Mwendwa, E. (2015). *The Effect of Mortgage Financing On Profitability of Commercial Banks in Kenya* (Degree of Master of Business Administration). University of Nairobi.

Osero, L., Walter, B., & Nyaoga, R. (2013). Effectiveness of Loan Default Management Strategies Among Commercial Banks in Kenya: A Survey of Selected Commercial Banks in Nairobi CITY. *International Journal of Management, IT and Engineering*, *3*(11), 326-339.

Oyedokun, T., Adewusi, A., Oletubo, A., & Thomas, O. (2013). Investigation of Mortgage Lending: An Overview of Nigerian Practice. *Research Journal of Finance and Accounting*, *4*(12), 150-159.

Saunders, M., Lewis, P., & Thornhill, A. (2009), Research methods for business students, 3rd, Pearson Education, England

Sinkey, J. F. (1975). A multivariate statistical analysis of the characteristics of problem banks. *The Journal of Finance*, 30(1), 21-36.

Stanga, I., Vlahu, R., & Haan, J. (2018). Mortgage delinquency rates: A cross-country perspective. *CEPR Policy Portal*. 1 (1).

Zikmund, W. G., Carr, J. C., Griffin, M., & Babin, B. J. (2012). *Business research methods*. Austral.