The Influence Of Inflation On Loan Portfolio Performance Amongst Listed Commercial Banks In Kenya.

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Abstract:
The main objective of the study was to establish the influence of inflation on loan portfolio performance amongst listed commercial banks in Kenya. The major components of inflation examined in this study were; Interest rates, Lending rates and Treasury bill rate. The dependent variable was loan portfolio performance. The theories examined were; the Expectations Theory and Portfolio Management Theory. This study used descriptive research design. The target population of this study was top level managers; middle level managers and operational managers of the 11 listed commercial banks licensed by the Central Bank of Kenya and were in operation as on 31st December 2015. The total population was 176 respondents selected purposely from the list of 11 commercial banks grouped according to management level. Questionnaires were used to collect primary data while secondary and quantitative data was collected from the statistical abstracts and bulletins of both the Central Bank of Kenya and the Kenya National Bureau of statistics. Cronbach's Alpha reliability test and factor analysis were carried out in order to test the goodness of the research instrument. Multiple linear regressions were used to analyze data and test the hypotheses using statistical package for the social sciences (SPSS) version 24. All the hypotheses were tested at 95 percent confidence level ($\alpha=0.05$). The study results concluded that there is a negative relationship between inflation and loan portfolio performance amongst listed commercial banks in Kenya. Based on the findings, the study recommends that banks should do well to reduce interest rate on loans. Reducing interest rate on loans make loans less expensive; thus, reducing the risk on borrower's ability to pay the interest due to an increased ability of borrowers to meet their obligations. This reduces the number of loan default and hence boasts loan portfolio performance.
Key words: Inflation, interest rates, lending rates, treasury bill rates and loan portfolio performance.

I. Introduction

Inflation is the rising price of goods and services overtime (Voznyuk, 2010). Inflation is often measured using the consumer price index (CPI) indicators, which calculate a currency's purchasing power relative to a diverse basket of consumer goods. Inflation is perhaps most pronounced in bond prices. These prices tend to have an inverse correlation with inflation, since higher inflation leads to higher expected yields, and higher yields lead to lower bond prices. Moreover, ongoing inflation depletes the value of the maturity (principal) payment, since that currency's value is becoming increasingly diluted.

Kenya as a region is facing very high inflation originating primarily from high food and fuel prices but also from demand pressures. The commercial banks in Kenya are susceptible to many forms of risk which have triggered occasional systemic crises (KBA, 2014). These include liquidity risk (where many depositors may request withdrawals in excess of available funds), credit risk (the chance that those who owe money to the bank will not repay it), and interest rate risk (the possibility that the bank will become unprofitable, if rising interest rates force it to pay relatively more on its deposits than it receives on its loans), (Ndung'u, 2014). Given these challenges, the government has agreed to coordinate such actions as tightening monetary policy, stemming volatility in the foreign exchange markets and curbing currency speculation activities (KBA, 2014).

Chenn (2011) argued due to the globalization, Kenyans economy has been experiencing inflation and other internal pressure. This has resulted to constant interest rate change hence influencing the banking business in the economy. Interest rate change shifts the spread given by the financial institution to their clients. This means that the banks have been revising the rates given to their customers hence making lending process unstable. Out of the competition, financial institutions have been introducing different spreads based on their policy strategy to meet their goals and objectives. Folawewo and Tennant (2008) in a paper prepared for the 13th Annual African Econometrics Society Conference in Pretoria, Republic of South Africa analyzed the determinants of spreads between banks' deposit and lending rates in Sub Saharan Africa countries (SSA). They found that macroeconomic policy variables such as inflation play significant role in explaining variations in interest rate spread in the region.

Mishkin (2000) explained that with inflation lenders or depositors who pay a fixed rate of interest on loans or deposits will lose purchasing power from their interest earnings while their borrowers' benefit. A positive effect of inflation is derived from debt relief where debtors who have debts with a fixed nominal rate of interest will see a reduction in the real interest rate as the inflation rate rises. The "real" interest on a loan is the nominal rate minus the inflation rate. Therefore, if one takes a loan, with an interest rate of 15% and the inflation rate is at 5% the real interest rate that one will pay for the loan is 10%. Banks and other lenders adjust for this inflation risk either by including an inflation premium in the costs of lending the money by creating a higher initial stated interest rate or by selling the interest at a variable rate. Variable rate loans are often used to compensate for changes in inflation. When a lender issues a loan, the lender is making a bet about the rate of inflation over the life of the loan. If inflation does not react in the way the lender expects, then the lender may not make enough profit. Lenders wary of this possibility will use variable rate loans to protect themselves against loss.

Variable rate loans will see higher interest rates when inflation is higher. Unfortunately, interest rates rarely drop when inflation goes back down. For corporate to protect themselves against high adjustable rates, a limit is set on how high the rate can climb. When a Commercial Bank offers a fixed rate loan, the loan becomes more competitive if the value of the currency decreases/high inflation. The scenario that results from this is that the corporate is cushioned from the inflation effects and the commercial bank stands to make losses during the loan duration but this is hardly the case since most commercial banks prefer a variable rate loan. Where the market conditions are such that the economy is experiencing low inflation and a fixed rate loan was advanced, the commercial banks would stand to make more returns. When a Commercial Bank offers a fixed rate loan, the loan becomes more attractive to the corporate since it can schedule payments with precision and the bank can make better margins where the economy is experiencing a low inflation rate. Ndung'u and Ngugi (2000) and Ngugi (2001) theoretically derived factors likely to explain the interest rate spread and empirically estimated an interest rate spread equation using monthly time series data for the period April 1993 to June 1999, while Ngugi (2001) extends the monthly time series data to December 1999. The factors considered by the former are deposits, loans, Treasury bill rate and interbank rate. They find that the spread is positively related with deposits but negatively related to loans.

The Kenyan banking industry experienced unprecedented instability (Pasha & Khemraj, 2010). Although the instability was not caused solely by the high inflation rates as it could be attributed to other factors such as information asymmetry, policy lending by state owned banks, politics among other factors, inflation was a key factor in the non-performance of loans (Ndung'u, 2014). Lending is a risky enterprise because repayment of loans can seldom be fully guaranteed. Kenya has paid dearly in the past following the collapse of more than ten banks in mid-1990's that was mainly attributed to non-performance of loans due to high rates of interest fueled by inflation. The high non-performance loans ushered a regime of high lending rates, which further exacerbated the levels of default.

The problem of interest rates and loan portfolio performance is not unique in Kenya. Others outside Kenya have researched on it considerably. The interest rate aspects of loan portfolio performance are discussed based on the theoretical and practical recommendations outlined in other research works done elsewhere outside Kenya. Saurina (2005) defines interest as the amount a borrower pays in addition to the principal of loan to compensate the lender for the use of the money while Interest rates are the expressions of interest as a percentage of the principal. Whereas interest rate is a rate which is charged or paid for the use of money, an interest rate is often expressed as an annual percentage of the principal. It is calculated by dividing the amount of interest by the amount of principal. In general, interest rates rise in times of inflation, greater demand for credit, tight money supply, or due to higher reserve requirements for banks. A rise in interest rates for any reason tends to dampen business activity (because credit becomes more expensive) and the stock market (because investors can get better returns from bank deposits or newly issued bonds than from buying shares).

In a loan structure, the interest rate is the difference in percentage between money paid back and money got earlier, keeping into account the amount of time that elapsed. When establishing the interest rate to the public, banks all over the world refer to these rates. If the firm is a sound primary firm with excellent trustworthiness, the bank would agree an interest rate only slightly higher than the rate the same bank would be requested to pay in the inter banking market from other lending institutions. By contrast, for smaller industrial firms, the rate usually would be significantly higher because of the worsened credit risk. According to Pasha and Khemraj (2010), the impact of real interest rates on Non-Performing Loans is extensively documented in the literature. Several studies report that high real interest rate is positively related to this variable. This variable is constructed by subtracting the annual inflation rate from the weighted average lending rate of each bank. Using a pseudo panel-based model for several Sub-Saharan African countries, Fofack (2005) finds evidence that economic growth, real exchange rate appreciation, the real interest rate, net interest margins, and inter-bank loans are significant determinants of Non-Performing Loans (NPLs) in these countries.

II.   Statement of the problem

The Kenyan banking industry experienced unprecedented instability (Pasha & Khemraj, 2010). Although the instability was not caused solely by the high inflation rates as it could be attributed to other factors such as information asymmetry, policy lending by state owned banks, politics among other factors, inflation was a key factor in the non-performance of loans (Ndung'u, 2014). Lending is a risky enterprise because repayment of loans can seldom be fully guaranteed. Kenya has paid dearly in the past following the collapse of more than ten banks in mid-1990's that was mainly attributed to non-performance of loans due to high rates of interest fueled by inflation. The high non-performance loans ushered a regime of high lending rates, which further exacerbated the levels of default.

Nyambok (2010) studied the relationship between inflation rates and liquidity of companies quoted at the Nairobi Stock Exchange (NSE). The study noted that increases in inflation had mixed effects on the liquidity of firms quoted at the NSE. The effects varied across different segments at the stock exchange. Katerega (2013) did a study on the interest rate spread and loan portfolio performance in Ugandan commercial banks. This study examined the role of lending interest rates on the loan portfolio performance in commercial banks in Uganda. The study specifically looked at how Centenary Bank has ensured that the bank loan portfolio is maintained within acceptable limits; examined how the bank ensures compliance with regulatory requirements and how the bank has worked out problem loans including rescheduling and restructuring for better performance.

A study by Afanasieff, Lhacer and Nakane (2002) suggest that macroeconomic variables are the most relevant factors explaining the behavior of bank interest rate spreads in Brazil. Crowley (2007) found that higher spreads are associated with lower inflation. Similarly, a study by Brock and Suarez (2000) shows that beyond bank specific variables, uncertainty in the Macroeconomic environment facing banks appears to increase interest spreads. Hesse (2007) finds that low inflation and Treasury bill rates as well as a stable exchange rate can be conducive to lower spreads and therefore cause a more efficient channeling of savings to productive investments. The study by Folawewo and Tennant, (2008) shows that the extent of government crowding out in the banking sector, public sector deficits, discount rate, inflationary level and the level of money supply are important determinants of interest rate spreads in Sub-Saharan African countries.

Despite the studies that have been done in developed countries, influence of inflation on loan portfolio performance have not been documented satisfactorily. To fill this gap and add to the body of knowledge, this study sought to examine the influence of inflation on loan portfolio performance amongst listed commercial banks in Kenya.

III.   Objective of the study

The main objective of the study was to determine the influence of inflation on loan portfolio performance amongst listed commercial banks in Kenya.

IV.   Research Hypotheses

H01: There is no statistically significant influence of inflation on loan portfolio performance amongst listed commercial banks in Kenya.

H0A: There is statistically significant influence of inflation on loan portfolio performance amongst listed commercial banks in Kenya.

V.   Review of Literature

Theoretical Framework

This section reviewed theories that are relevant to the area of study. The relevant theories that have been reviewed are; expectations theory and portfolio management theory.

Expectations theory

Lutz (1940) developed expectations theory as confirmed by Irungu (2013) who stated that the theory is built on the premise of expectations that people will have in regard to future conditions. If investors expect future interest rates to be high, they will prefer to hold long term securities and if the vice versa is true, they will prefer short term securities (Russel, 1992). Other expectations that will influence securities demand will include expectations on political conditions, expected inflation levels, among others. Investors expecting higher short-term interest rates are more likely to buy bonds maturing in the short term. If they were to invest money into a long-term debt they might not be able to make as much interest according to Auerbach (1988).

The theory is based on the assumptions that investors have perfect knowledge about the future short-term interest rates, there are no taxes or other costs involved in holding or trading and investors are assumed to be profit maximizers. With these assumptions the theory concludes that a long-term interest rate is an average of the expected future rates on short term bonds. Ignoring the compound interest factor this average will be a simple average. If the long-term rate of interest is an average of the short-term rates of interest, if the short-term interest

rates rise, the average will also rise and the long-term interest will also rise. Thus, the long-term rate always moves in the same direction in which short term rates move (Bekaert, 1998). The theory is relevant in that if people expect inflation to increase in future, they would tend to fail to deposit money in commercial banks and hence expensive loans as a result of low supply of funds.

Portfolio Management Theory

The basic portfolio model was developed by Harry Markowitz in the 1950s and early 1960s. Markowitz is considered the father of modern portfolio theory since he originated the portfolio model that underlies modern portfolio theory. He derived the expected rate of return for a portfolio of assets and the expected risk measure. Markowitz established that under reasonable assumptions, the variance (or standard deviation) of the expected rate of return was a meaningful measure of portfolio risk. From his model, the expected rate of return of a portfolio is the weighted average of the expected return for the individual assets in the portfolio. The traditional portfolio theory, Modern Portfolio Theory (MPT), introduced by Harry M. Markowitz, is a theory which attempts to maximize investors' expected return for a given amount of risk, or minimize investors' risk for a given level of expected return. MPT therefore includes two factors when choosing assets to form a portfolio, the mean and the variance and goes therefore also by the name of mean variance theory.

Portfolio theory deals with the selection of portfolios that maximize expected returns consistent with the individual acceptable levels of risk. The theory provides a framework for specifying and measuring investment risk and to develop relationships between risk and expected returns. Its main basic assumption is that investors often want to maximize returns from their investments for a given level of risk. The full spectrum of investments must be considered because the returns from all these investments interact hence the relationship between the returns for assets in the portfolio is important (Reilly & Brown, 2011). The legitimacy of the modern portfolio theory has been challenged by financial analysts who often cite Warren Buffett as a rule breaker. Warren Buffett, a major financial market referral with successful financial takeovers in his resume, is not a typical investor. Unlike the average mutual fund manager, Buffet often buys companies and then manages them. He provides them with economies of scale, lower cost of capital and the benefits of his managerial wisdom. And when he takes large portions in companies, he often gets a board seat. So perhaps his great returns are more a result of his managerial skills than his investment skills, or some combination of both. This, obviously, is not congruent with the line of thought of MPT proponents (Sabbadini, 2010).

Traditionally, organizations have taken an asset-by asset approach to credit risk management. While each company's method varies, in general this approach involves periodically evaluating the quality of credit exposures, applying a credit risk rating, and aggregating the results of this analysis to identify a portfolio's expected losses. The foundation of the asset-by-asset approach is a sound credit review and internal credit risk rating system. This system enables management to identify changes in individual credits, or portfolio trends in a timely manner.

Based on the changes identified, credit identification, credit review, and credit risk rating systems, management can make necessary modifications to portfolio strategies or increase the supervision of credits in a timely manner. This theory addresses the investments policies variable. The modern portfolio theory demonstrates that organizations manage their businesses on a portfolio basis. With assumptions that investors are homogenous and risk averse, they have to be motivated to invest, they need a rate of return that will compensate them for taking on the risk at the end of period of holding given assets. It is therefore important for banks to deploy prudent financial management practices in order to instill control within the various portfolios with a target of maximizing returns on each portfolio.

Review of Inflation variables

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would be significantly higher because of the worsened credit risk. According to Pasha and Khemraj (2010), the impact of real interest rates on Non-Performing Loans is extensively documented in the literature. Several studies report that high real interest rate is positively related to this variable. This variable is constructed by subtracting the annual inflation rate from the weighted average lending rate of each bank. Using a pseudo panel-based model for several Sub-Saharan African countries, Fofack (2005) finds evidence that economic growth, real exchange rate appreciation, the real interest rate, net interest margins, and inter-bank loans are significant determinants of Non-Performing Loans (NPLs) in these countries.

VI.   Research Methodology

Research Design

A research design is the structure, or the blueprint, of research that guides the process of research from the formulation of the research questions and hypotheses to reporting the research findings (Gakure, 2010). According to Lavrakas (2008), a research design is a general plan or strategy for conducting a research study to examine specific testable research questions of interest. Kothari (2004) described a research design as a master plan that specifies the methods and procedures for collecting and analyzing the needed information. Research design refers to how data collection and analysis are structured in order to meet the research objectives through empirical evidence (Cooper & Schindler, 2006). The study adopted descriptive research design. The advantage of this design is that the researcher is able to use various forms of data as well as incorporating human experience. It gives researchers the ability to look at what they are studying in various aspects and provides a bigger picture as opposed to other types of research design (Kothari, 2004).

Target Population

The target population was comprised of top level managers, middle level managers and operational managers of the 11 listed commercial banks licensed by the Central Bank of Kenya and were in operation as on 31st December 2015 and still in existence by the time of collecting data in the year 2016. A complete list of the listed commercial banks operating in Kenya was obtained from CBK.. There are 44 commercial banks and 11 are listed in the Nairobi securities exchange as on December 2015.

Sampling Frame

The sampling frame focused on the 44 commercial banks in Kenya CBK, (2011) with the sample being the 11 listed commercial banks in Kenya. The bank population was stratified broadly according to the level of management for instance, top level management, middle level management and operational management. The strata provided samples that were selected from each category and the departmental managers from the selected samples were interviewed. Beck and Polit (2003) refers to a sampling frame as the technical name for the list of the elements from which the sample will be chosen. 6.4 Sample Size and Sampling Technique This study used stratified sampling design and purposive sampling. Kothari (2012) noted that stratified sampling was used when population from which a sample is drawn did not constitute a homogeneous group. Stratified sampling involved organizing the units in the population into strata using common characteristics. In this case bank managers were classified into strata based on the level of management. Purposive sampling involved selecting a certain number of respondents based on the nature of their knowledge in credit management. The respondents included finance managers, credit managers, credit analysts, credit risk managers, portfolio managers and investor relations managers. This method was used to select respondents from the various bank departments. The method was appropriate because the sample selected comprised of informed persons who possess vital data that is comprehensive to allow gaining a better insight into the problem.

Sample Size and Sampling Technique

This study used stratified sampling design and purposive sampling. Kothari (2012) noted that stratified sampling was used when population from which a sample is drawn did not constitute a homogeneous group. Stratified sampling involved organizing the units in the population into strata using common characteristics. In this case bank managers were classified into strata based on the level of management. Purposive sampling involved selecting a certain number of respondents based on the nature of their knowledge in credit management. The respondents included finance managers, credit managers, credit analysts, credit risk managers, portfolio managers and investor relations managers. This method was used to select respondents from the various bank departments. The method was appropriate because the sample selected comprised of informed persons who possess vital data that is comprehensive to allow gaining a better insight into the problem.

Table 1 Sample Size

Management Level	Target popu. Per Bank	No. of Banks	Total Target Population	Percentages

Top Level Management	5	11	55	31.25
Middle level Management	5	11	55	31.25
Operational Management	6	11	66	37.5
Total	16	11	176	100.0

Data Collection Methods

The instruments used in this research study were questionnaires and secondary data. When used in combination, qualitative and quantitative methods complement each other and allow for complete analysis (Tashakkori & Teddlie, 2009). The questionnaires were used to obtain qualitative data for analysis to support or refute the hypotheses and to confirm the evidence obtained from the quantitative data analysis. They are valuable method of collecting a wide range of information from a large number of respondents and they are usually straightforward to analyze (Saunders et al., 2009). Secondary data was obtained from the Central Bank of Kenya. Secondary data was used to validate the findings from analysis of primary data which was collected using questionnaires. The strategy of using both primary and secondary data to address the same study objectives is meant to improve the interpretive coherence and improve both communicative and pragmatic validity of the study results.

Data Collection Procedures

Primary data was collected through the administration of questionnaires to credit managers, credit department employees and corporate clients of the commercial banks. The dully filled in collected questionnaires will be coded and responses fed immediately into excel for ease of analysis. Morrison and Louis (2007) describe primary data as those items that are original to the problem under study. Secondary data was obtained from the Central Bank of Kenya and Kenya National Bureau of Statistics. Kothari (2004) describes primary data as those which are collected afresh and for the first time, and thus happen to be original in character. Dawson (2009) states that secondary research data involves the data collected using information from studies that other researchers have made of a subject.

Pilot Study

According to Orodho (2003) a pilot study is necessary for testing the reliability of data collection instruments. The study carried out a pilot test to check the validity and reliability of the questionnaires in gathering the data required for purposes of the study. The questionnaires were pre-tested to selected commercial banks. After piloting, Comments and suggestions made by respondents during the pre-testing were seriously considered and incorporated.

Data Processing and Analysis

The statistical data analysis employed both qualitative and quantitative analysis approaches.

Qualitative Data Analysis

The primary data was analyzed using both descriptive and inferential statistical. The study used qualitative data collected through questionnaires to gather recipients' responses. This data will first be edited and respond rate calculated. The data was then categorized into different themes according to research variables and descriptive statistics such as mean, standard deviation and frequency distribution. Frequency distribution measures the point about which items tend to cluster and also describes the characteristics of the data collected (Kothari, 2012).

Quantitative Data Analysis

Quantitative data was analyzed using quantitative techniques. Inferential statistics will include Analysis of Variance (ANOVA), Pearson correlation, factor analysis and regression analysis. These were used to establish the association among the study variables and to test the formulated hypotheses. The study was based on the premise that liquidity (independent variable) as explained by current ratio, quick ratio and cash ratio have an influence on loan portfolio performance (dependent variable). In order to establish the statistical significance of the respective hypothesis, Correlation coefficient analysis was used to statistically test the hypotheses as presented in conceptual framework. The hypotheses was tested at 95 percent confidence level ($\alpha=0.05$). All tests were done using SPSS (statistical package for social science) version 24.

Empirical Model

Regression model was used in this study. Independent variables in this study were; current ratio, quick ratio and cash ratio and will be varied each at a time holding others constant to determine the effect of the variables

on loan portfolio performance. Multiple linear regressions will be ideal for this study since there are many variables as shown below;

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

Where: Y = Loan Portfolio Performance (dependent variable).

β_0 = the Y-Constant or intercept.

β_{1-5} = Regression coefficient for each

Table 2: Inflation Descriptive Statistics

	N	Mean	SD
This bank has the lowest (most competitive) interest rate in the market	143	3.82	.718
Potential loan takers greatly consider interest rate as the key factor in their decision	143	4.20	.724
In this bank, interest rate is stable over a reasonably long period	143	4.13	.807
Fixed lending rates in this bank has been our reason of our level of loan performance	143	3.96	.838
Customers values and makes their decisions based on our adjustable lending rates	143	3.96	.838
Lending rates adopted by our bank are quite competitive in the market	143	3.98	.800
Movement in treasury bills rates in this bank leads to a significant movement in loans	143	3.97	.787
Treasury bills rates in this bank are competitive in the market	143	4.10	.776
Fluctuations in treasury bills rates have a great influence on loan portfolio	143	4.19	.813
Valid N (listwise)	143		

Key: Ranked on a scale: 1.0-1.7(strongly disagree); 1.8-2.5(disagree); 2.6-3.3(neutral); 3.4-4.1(agree) and 4.2-5.0(strongly agree)

independent variable.

X1 = Interest Rates

X2= Lending rates

X3 =Treasury bills rate

ε = Stochastic or disturbance term or error term

VII. Research findings and Data analysis

Inflation Measures Results

The study sought to investigate the influence of level of inflation on loan portfolio performance of listed commercial banks in Kenya. Bank inflation was assessed by three broad measures namely; interest rates, lending rates and treasury bill rates.

Inflation Descriptive Statistics Results

Inflation was assessed by three measures namely interest rates, lending rate and risk-free rate of treasury bills. The findings in Table 2 above indicate that most respondents strongly agreed that potential loan takers greatly consider interest rate as the key factor in their decision with a mean of 4.20 and a standard deviation of 0.724 followed by those that agreed that interest rate was stable over a reasonably long period which stood at a 4.13 and a standard deviation of 0.813. The findings reveal that high interest rate and treasury bills rate fluctuations seemed to have the greatest effect on loan portfolio performance. According to the respondents inflation has an effect on loan portfolio performance. Therefore, changes in inflation will result to changes in portfolio performance.

The result suggests that inflationary were in place. As such, changes in inflation, there is a corresponding response on to mitigate the effect of inflation. Some of the measures included customers been keen on lending interest rate and its stability, and competitiveness of lending rates. They also value and make their decisions based on whether the lending rates are adjustable or not. During inflation, lending rates adopted by banks are quite competitive in the market and Movement in treasury bills rates bank leads to a significant movement in number of loans.

Inflation Factor Analysis

Table 3: Inflation KMO and Bartlett's sampling Adequacy Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.689
Bartlett's Test of Sphericity	Approx. Chi-Square	183.756
df	36	
Sig.	.000	

Initially, the factorability of the nine inflation items was examined. Kaiser-Meyer-Olkin measure of sampling adequacy tests was used to assess the suitability of the respondent data for factor analysis. Also, Bartlett's test of sphericity was together used with KMO to test for factor analysis assumptions.

The factor analysis assumptions test was conducted and result presented in Table 3 Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.689, above the commonly recommended value of 0.6, and Bartlett's test of sphericity was significant ($\chi2$ (143) = 183.756, p < .001). Given these overall indicators, factor analysis was considered to be suitable with all 9 items.

Inflation Factor Analysis (Total Variance Explained)

The variance result of the nine measures of bank inflation is presented in table 4 it is clear that the nine factors loaded into two components (factors) with a total variance of 51.1%. Factor 1 had the highest variance of 35.459% while factor two had 15.648%. These two factors had the greatest influence on bank inflation. This is confirmed by the fact they all had Eigen values of more than 1.0 as shown in Table 4 below.

Table 4: Inflation Factor Analysis (Total Variance Explained)

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.191	35.459	35.459	3.191	35.459	35.459	2.681
2	1.408	15.648	51.106	1.408	15.648	51.106	2.591
3	.986	10.956	62.062				
4	.790	8.773	70.836				
5	.630	7.004	77.839				
6	.591	6.567	84.406				
7	.569	6.318	90.724				
8	.454	5.044	95.768				
9	.381	4.232	100.000				
Extraction Method: Principal Component Analysis.							
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.							

Table 5 depicts the rotated component factor loadings for bank inflation amongst listed commercial banks. From the rotation matrix in table 4.27 below, the bank inflation measures were grouped into two factors namely interest rates and Treasury bill rates.

Table 5: Factor Loadings Based on a Principal Components Analysis with Promax Rotation for 9 Items of Inflation

	Component	
	1	2
most competitive interest rate in the market		.862
Loan seekers considers interest rate as the key factor in their decision		.862
In this bank, interest rate is stable over a reasonably long period		.565
Fixed lending rates has been our reason of our level of loan performance		.570
Customers values and makes their decisions based on our adjustable lending rates	.509	
Lending rates adopted by our bank are quite competitive in the market	.611	
Movement in TB rates in this bank leads to a significant movement in loans	.711	
Treasury bills rates in this bank are competitive in the market	.618	
Fluctuations in treasury bills rates have a great influence on loan portfolio	.827	

Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization.[a].
Rotation converged in 3 iterations.

Principal components analysis was used because the primary purpose was to identify and compute composite scores for the factors underlying inflation measures in commercial banks in Kenya. KMO and Bartlett's test tests suggested that factor analysis was appropriate. The nine items when subjected to PCFA with a Varimax rotation revealed that a two-factor structure for 9 items was apparent. The first component had 5 items and second component had 4 items. The first component was renamed as interest rate (n=5, α =0.738, mean=4.034) with a positive skew value of .26. The second component was renamed treasury bills (n=4, α = .720 mean=4.113) with a positive skew of 0.24. The Cronbach's Alpha coefficient values obtained were all greater than the 0.7 threshold indicated moderate and therefore acceptable internal consistency (Table 6). The skewness and kurtosis were well within a tolerable range for assuming a normal distribution, thus the data on interest rate and treasury bills were well suited for parametric statistical analyses.

Table 6: Descriptive Statistics of Inflation (interest rate and treasury bills)

	No. of items	M (SD)	Skewness	Kurtosis	Alpha(α)
Interest Rate	5	4.034 (.88)	.26	.40	.703
Treasury Bills	4	4.028 (.92)	.24	.33	.720

Key: Ranked on a scale: 1.0-1.7(strongly disagree); 1.8-2.5(disagree); 2.6-3.3(neutral); 3.4-4.1(agree) and 4.2-5.0(strongly agree)

Correlation of Inflation and loan portfolio performance

In order to establish the relationship between bank inflation and loan portfolio performance amongst listed commercial banks in Kenya correlation analysis was performed to obtain a correlation matrix shown in table 7. The Pearson correlation coefficient was generated at a significant level of 1 percent (2-tailed). The output indicates weak positive correlation between bank treasury bills and loan portfolio performance (r=.123, p=.144). The correlation between interest rate and portfolio performance is strong (r=.523, p=.004).

The result suggested that as the number of T-bills increased, the LPP increased too. The Treasury bill rate is used as a proxy for the return on the governments' debt instruments. It is expected that high Treasury bill rates could have a positive impact on commercial banks' investment in Government's instrument (Barrett, 2014). Further, it is anticipated that the high Treasury bill rates could engineer upward pressure on commercial rates in the economy thereby leading to higher interest rates on loans and advances. In this regard, the positive relationship is thus expected on commercial banks' portfolio.

Table 7: Correlation Result of Inflation (treasury bills, interest rate) and Loan Portfolio Performance in Listed Banks in Kenya Using Primary Data

		Treasury bills	Interest rates	Loan Portfolio Performance
Treasury bills	Pearson Correlation	1	1.000[**]	.123
	Sig. (2-tailed)		.000	.144
Interest rates	Pearson Correlation	1.000[**]	1	.523
	Sig. (2-tailed)	.000		.004
Loan Portfolio Performance	Pearson Correlation	.123	.523	1
	Sig. (2-tailed)	.144	..004	
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 8 below shows the correlation between inflation indicators (Treasury bills and interest) and portfolio performance indicator using secondary data; ROI. Data show that treasury bills and ROI were weakly and positively correlated (r=.102, p=.458). Interest rate correlated positively with ROI (r=-054, p=.695).

The results from both primary and secondary data show a positive relationship between inflation and portfolio performance. The positive result indicated that loan portfolio performance increases with increase in magnitude of inflation indicators in an economy and vice versa. Inflation makes it costly to keep a lot of cash on hand, as it causes the value of that cash to erode over time. Putting cash to work by saving it in an interest-bearing account or investing it can mitigate the negative effects of inflation. Therefore, during inflation banks lend out loans at increased interest rates than the rate of inflation to earn real interest rates (the difference between nominal interest rate and inflation rate). However, Hanson and Stein (2015) suggest that as nominal interest rates decline, banks rebalance their asset holdings toward longer maturities to prevent their portfolios' overall yield from decreasing too much.

Table 8: Correlation Result of Inflation (treasury bills, interest rate) and ROI in Listed Banks in Kenya Using Secondary Data

		Treasury bills	Interest Rate	ROI
Treasury bills	Correlation	1	-.875[**]	.102
	Sig. (2-tailed)		.000	.458
Interest Rate	P. Correlation	-.875[**]	1	.054
	Sig. (2-tailed)	.000		.695

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

Analysis of Variance (ANOVA) of Inflation Using the Primary Data

Table 9. below presents Analysis of variance (ANOVA) results using the primary data. The F- statistics tends to be greater when the null hypothesis of independence is not true. P-values of less than 0.05 indicate that the F statistics is high and that the null hypothesis of independence needs to be rejected since it is not true. In this case the F ratio (F= 23.268, p = 0.000) was found to be statistically significant hence the model used for analysis was fit. Thus, the model relating T-bills and interest rates as independent variables can be used to explain or relate with a bank's returns on investment as the dependent variable.

Table 9: Inflation ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	160.580	1	160.580	23.268	.000[b]
	Residual	973.085	141	6.901		
	Total	1133.664	142			

[a.] Dependent Variable: Loan Portfolio Performance. Predictors: (Constant), treasury bills, interest rate

Table 10 presents the ANOVA result obtained using secondary data. The F value indicated that the model was statistically significant (F= 6.364, p=.002). Therefore, the model used fitted the data significantly well and appropriate for projecting performance at given levels of inflation. Results from both primary and secondary data show that the regression model that relate treasury bills and interest rates to loan portfolio performance were significant. This means that the treasury bills and interest rates can significantly predict loan portfolio performance of commercial banks listed in the Nairobi securities exchange. As such the banks can enhance their loan investment through prudent adjustment of these ratios.

Table 10: ANOVA

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	94.471	2	47.235	6.364	.002[b]
	Residual	1039.193	140	7.423		
	Total	1133.664	142			

[a.] Dependent Variable: Loan Portfolio Performance, [b.] Predictors: (Constant), Interest rate, Treasury Bills

Model Fitness /Summary- Inflation
In Table 11 below, the study results showed that bank inflation had moderate explanatory power on loan portfolio performance as it accounted for 14.2% of its variability (R square =0.142).

Table 11: Inflation Model Summary of Primary Data

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.376	.142	.136	2.62703
a. Predictors: (Constant), treasury bills, interest rate				

The model summary result in table 12 shows the R-value of .289, that is; the multiple correlation coefficients between the predictor variables and the predicted value. The result shows that bank inflation explained 7% (R-square=.070) of variability on loan portfolio performance. Using the primary data, inflation accounted for 14.2% of variability of loan performance portfolio (R square =0.142).

Table 12: Model Summary of Secondary Data

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.289[a]	.083	.070	1.7448

a.   Predictors: (Constant), Interest rate, Treasury Bills

Regression Analysis on Inflation
To assess the influence of bank inflation on loan portfolio performance of listed commercial banks in Kenya the following null hypotheses was formulated:$H0_2$: There is no significant influence of inflation on loan portfolio performance amongst listed commercial banks in Kenya. The aggregate mean scores of primary data on inflation were regressed against the aggregate mean score of primary data on loan portfolio performance and regression results are presented in Table 13. From these results, the explanatory power of inflation on variability of loan portfolio performance amongst listed commercial banks was moderate at 37.6 percent (R square = 0.376). The individual results revealed that influence of inflation on loan portfolio performance was statistically significant (β = 0.376, P-value =0.000). Hence, $H0_2$ is rejected since $β \neq 0$ and P-value< 0.05. The fitted equation is:

$$\text{Loan p. performance} = 5.737 + 1.364\text{Treasury bills} + 1.659\text{Interest Rate.}$$

Hence it was established that there is statistically significant correlation between inflation and loan portfolio performance amongst listed commercial banks in Kenya.

Table 13. shows the result regression coefficients of inflation (interest rate and treasury bills) fitted to the regression model using secondary data. The corresponding t-values and significance level are also shown. From the result, it is clear that the coefficient of treasury bills was statistically significant ($β$=1.242, p=.008). The coefficient of interest rate which is one of inflation indicators, was significant ($β$=.449, p=0.000). Results from

both primary and secondary data agree that treasury bills and interest rates have significance influence on portfolio performance among listed banks in Kenya.

Table 13: Inflation Regression Coefficients

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Primary	(Constant)	5.737	1.807		3.175	.000
	Treasury bills	1.364	.423	.174	3.225	.000
	Interest rate	1.659	.8100	.384	2.048	.002
Secondary	(Constant)	12.469	1.982		6.291	.000
	Treasury Bills	1.242	.464	.239	2.678	.008
	Interest rate	.449	.133	.391	3.376	.000

Inflation and Loan Portfolio Performance

Simple linear regression established that the indicators of inflation; treasury bills (β = 1.364, P=0.000) and interest rate (β = 1.659, p =0.000) significantly influenced loan portfolio performance. Hence, $H0_2$ is rejected since $\beta \neq 0$ and P-value< 0.05. Treasury bills and interest rate correlated positively with loan performance. Therefore, loan portfolio amongst listed commercial banks in Kenya tends to be high under situations of high interest rate and treasury bills. Therefore, inflation is a significant determinant of bank inflation and loan portfolio performance amongst listed commercial banks in Kenya.

The government should ensure existence of stable political and macroeconomic environment. Interest rates, treasury bills rates and lending rates were mentioned as major components of inflation which has been found to have significant influence on loan portfolio performance of listed commercial banks in Kenya. Based on the findings, the study recommends that banks should do well to reduce interest rate on loans. Reducing interest rate on loans make loans less expensive; thus, reducing the risk on borrower's ability to pay the interest due to an increased ability of borrowers to meet their obligations. This reduces the number of loan default and hence boasts loan portfolio performance.

VIII.   Discussion of Key Findings

The objective of the study was to determine the influence of inflation on loan portfolio performance among listed commercial banks in Kenya. The indicators of inflation taken into consideration were the increase in interest rates, Lending rates and Treasury bill rate. Inflation accounted for 14.2% (R square =.142, see table4.33) of variability in loan portfolio performance. Inflation had a significant influence on loan portfolio performance (beta=-.145, p<.05) based on the multiple regression result. Therefore, statements which sought influence of inflation variable were concluded to be statistically significant in explaining loan portfolio performance in listed commercial banks in Kenya.

The findings suggested that at high inflation rate, the overall loan performance increases. The findings are in line based on the view that inflation leads to an increase in bank performance as long as the banks can be able to anticipate future inflation and adjust interest rate to generate higher revenue than cost which leads to higher profit and performance as a result of adjusting the rate of interest. This explains the positive relationship observed between inflation and LPP. The other view is that inflation affect the purchasing power and bank exchange rate regime, opportunity cost of holding currency in the future, worsen loans policy, disrupt business plans and the equity holding performance of banks. Based on this view, inflation and LPP can exhibit a negative relationship.

Inflation is also known to worsen the loans policy which affects the performance of banks as a result of withdrawals by depositors from the banking system. This reduces bank resources thereby decreasing a large proportion of their profitability as a proxy of LPP. In other words, it reduces the in-and-out flow of loans and advances since banks may not want to lend except at a higher interest rate which discourages borrowing. Based on these findings, inflation acts as a drag on overall performance as banks are usually compel to shift their resources from more productive activities simply to focus on profit and losses from currency inflation.

Therefore, the empirical findings on the effect of inflations on banking performance as a proxy for portfolio performance, is a mixed one, even though, a greater proportion of the findings revealed a negative relationship. The current study belongs to the family of studies which established a positive relationship.

IX.   Conclusions and Recommendation

Conclusions

The study sought to determine the influence of inflation on loan portfolio performance amongst listed commercial banks in Kenya. Simple linear regression established that the indicators of inflation; treasury bills (β = 1.364, P=0.000) and interest rate (β = 1.659, p =0.000) significantly influenced loan portfolio performance. Hence, $H0_2$ is rejected since $\beta \neq 0$ and P-value< 0.05. Treasury bills and interest rate correlated positively with loan performance. Therefore, loan portfolio amongst listed commercial banks in Kenya tends to be high under

situations of high interest rate and treasury bills. Therefore, inflation is a significant determinant of bank inflation and loan portfolio performance amongst listed commercial banks in Kenya.

Recommendation

The study results concluded that there is a negative relationship between inflation and loan portfolio performance amongst listed commercial banks in Kenya. As a result, the study recommends that the government should ensure existence of stable political and macroeconomic environment. Interest rates, treasury bills rates and lending rates were mentioned as major components of inflation which has been found to have significant influence on loan portfolio performance of listed commercial banks in Kenya. Based on the findings, the study further recommends that banks should do well to reduce interest rate on loans. Reducing interest rate on loans make loans less expensive; thus, reducing the risk on borrower's ability to pay the interest due to an increased ability of borrowers to meet their obligations. This reduces the number of loan default and hence boasts loan portfolio performance.

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