

Macroeconomics Determinants of Interest Rate Spreads Among Commercial Banks in Kenya



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ABSTRACT: The determination of interest rate spread in commercial banks is influenced by various macroeconomic variables, market microstructure features and the policy environment. However, studies on factors that contribute to the interest rate spreads among commercial banks in Kenya have produced mixed results that calls for further research. This study aimed to assess the determinants of interest rate spread in commercial banks in Kenya. Specifically, the study sought to establish the effect of inflation rate, domestic borrowing, credit risk and exchange rate risk on the interest rate spreads among commercial banks in Kenya. The study was anchored on fisher hypothesis, classical theory of interest and loanable fund theories. Explanatory research design was adopted to establish the causal relationship between the study's variables. Secondary data of the study for the period between 1970 -2022 was extracted from annual financial statements of commercial banks targeted by the study and Central bank of Kenya annual reports. Data was analyzed through descriptive and inferential statistics. The study adopted the regression model to obtain results. Based on the regression results, the study found that domestic borrowing had a significant positive effect on interest rate spreads among commercial banks in Kenya. Additionally, the study found that inflation rate, credit risk and exchange rate risk had a significant positive effect on interest rate spreads among commercial banks in Kenya. The study concluded that macroeconomic variables such as inflation rate, domestic borrowing, credit risk and exchange rate risks are key determinants of interest rate spread among commercial banks in Kenya. The study made the following recommendations to regulators and policy makers. First, ensure that the central bank's monetary policy actions effectively influence interest rates throughout the banking system and also Implement mechanisms to improve the transmission of changes in the central bank's policy rates to commercial banks' lending and deposit rates. Secondly, establish a framework for monitoring key macroeconomic indicators such as inflation, economic growth, exchange rates, and fiscal policies to identify potential factors impacting interest rate spreads and use the monitoring results to formulate timely and appropriate policy responses. The study recommends that future studies should conduct studies across different countries which could provide a more comprehensive understanding of the subject matter.

KEYWORDS: Interest rate spread, inflation rate, credit risk, exchange rate risk

1. INTRODUCTION

Having a dynamic and efficient financial system in commercial banking is necessary to enhance the growth of a market economy (Robson, 2018). Commercial banks attract savings by providing a range of deposit products to individuals who wish to save money. Banks make use of these accumulated savings by providing loans and advances to borrowers and investors. The difference between the interest rates charged by banks on loans and the rates offered to depositors is commonly known as the Interest Rate Spread (IRS). Financial indicators, particularly the Interest Rate Spread and Net Interest Margin, are crucial in assessing the efficiency of the banking system (Solomon, 2017).

The characteristics of the market microstructure within the banking sector and the policy environment play a decisive role in determining the interest rate spread. Differentiating between the pure spread and the actual spread is important in understanding its definition. According to Govan (2015), the pure spread is influenced by factors such as bank risk management, transaction size, interest rate elasticity, and interest rate variability. Gibson (2017) found that risk-averse banks tend to operate with smaller spreads compared to risk-neutral banks, highlighting the role of risk management. Paton (2019) explains that risk aversion leads to higher optimal interest rates and reduced credit supply. Macroeconomic variables and fiscal policy activities exert influence over the optimal interest rate spread, encompassing the pure spread. Juel and Rony (2016) highlight the significance of factors

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such as direct taxes, reserve requirements, transaction costs, and mandatory investment in shaping the definition of the interest rate spread.

The difference or spread between deposit interest rates and lending rates is a crucial factor in financial systems, as highlighted by Bruno (2016). This spread represents the additional costs incurred by banks in their intermediation role, connecting borrowers with fund lenders. If the margin is excessively large, it can lead to financial disintermediation. A wide margin discourages potential savers due to low returns on deposits and restricts financing options for borrowers. As a result, this situation reduces viable investment opportunities and hampers the growth potential of the economy, as noted by Gibson et al. (2016).

Johnson (2016), identified various reasons attributing to the spread of high interest rate. The common reasons are inclusive of low competition levels, diseconomies of scale as a result of the small markets, high operational costs, increased costs of transportations for funds following expensive telecommunications. Besides, strict regulatory controls and increased market risks have also contributed to high spread of interest rates. Such factors have highly contributed to high intermediation costs that results in high spread of the interest rates. Muna (2016) highlighted that small borrower having no property rights have do not have collaterals to offer. In that manner, they are considered to be high risk borrowers. The transaction costs incurred for such borrowers is relatively high, which is an indication of high punitive rates of interest.

Additionally, according to Peterson (2018), governance-related matters deserve special attention. These encompass maintaining law and order, as well as providing vital transportation and social infrastructure, all of which directly affect security. Insufficient security measures can lead to increased transaction costs and substantial intermediation expenses. A high interest rate spread, which signifies elevated intermediation costs, can pose challenges for borrowers in repaying their loans. The increased cost of borrowing may make it difficult for borrowers to fulfill their loan obligations. Consequently, this situation raises the risk of loan defaults and non-performance.

The magnitude of the interest rate spread differs across countries on a global scale. This spread is inversely related to the level of efficiency within the financial sector, which is often considered a result of a competitive economic environment. The distinctive characteristics of financial sectors are the key drivers of variations in interest rate spreads among countries worldwide. In economies where commercial banks are weak, the intermediation costs are higher, impacting their ability to effectively mobilize deposits and allocate them towards more productive purposes, as highlighted by Sharma (2018).

Demirgüç-Kunt and Huizinga (2019) conducted a cross-country analysis of interest spreads using data from 80 countries, focusing on commercial banks. Their study demonstrated that the fluctuations in interest margins and bank profitability can be attributed to a range of factors. These factors encompass bank characteristics, macroeconomic variables, explicit and implicit bank taxation, as well as deposit insurance regulations. Through considering factors such as variations in bank activities, levels of leverage, and the macroeconomic environment, they discovered that larger banks with a higher asset-to-GDP ratio and lower market concentration ratios tended to have lower interest margins and profits. Additionally, in developing countries, foreign banks exhibited higher interest margins and profits compared to local banks, while the opposite trend was observed in developed countries.

The interest margin of US banks was examined through an analysis of annual data, considering various factors. These factors included non-payment risk, interest rate risk, the interaction between interest rate risk and non-payment risk, liquidity risk (measured by the ratio of liquid assets to total assets), liabilities to net assets ratio, cost of resources without interest, and performance management. The results revealed that certain variables played a statistically significant role in determining the interest rate spread. These variables included non-payment risk (measured by the ratio of non-performing loans), cost of opportunity associated with non-interest provisions, debt-to-equity ratio, capital-to-total-assets ratio, and management efficiency (measured by the ratio of income-earning assets to total assets). Notably, these variables exhibited a direct relationship with the interest rate spread. Furthermore, the liquidity risk variable demonstrated an inverse association with the interest rate spread, indicating that higher liquidity risk corresponded to a narrower interest rate spread. The studies conducted by Angbazo (2017) and Ahmadian and Kyanvnd (2019) provide further support for these findings.

To explore the factors impacting interest rate spreads in banks across Central and Eastern European countries and Western European countries, a thorough comparative analysis was undertaken. The results of the study indicated that concentration levels, operational efficiency, capital adequacy, and risk management played significant roles in determining interest rate spreads in both sets of countries (Ahmadian & Kyanvnd, 2017).

Furthermore, the research highlighted that during the initial stages of institutional reforms, there was evidence of increased risk-taking behavior by banks, leading to wider interest rate spreads. However, as institutional reforms progressed, competitive pressures intensified, resulting in narrower interest rate spreads (Claeys & Vander Vennet, 2019). These findings contrast with research conducted in Colombia during the early 1990s, which suggested that financial liberalization measures did not directly

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lead to narrower interest rate spreads. Instead, the effects were primarily attributed to changes in the significance levels of specific factors impacting the interest rate spread (Barajas, Steiner et al., 1999; Azvayj, Farhadi & Kia, 2018).

Several studies have examined the interest rate spread in African countries, including the works of Folawewol and Tennant (2018), Beck and Hesse (2016), Aboagye et al. (2018), Ikhida (2019), and Ndung'u and Ngugi (2020). Folawewol and Tennant (2018) conducted a research study in which they employed a dynamic panel data model to examine the factors influencing interest rate spreads in 33 Sub-Saharan African countries, with a particular emphasis on macroeconomic variables. The results of their analysis demonstrated that interest rate spreads were affected by various factors, including the crowding out effect of government borrowing, public sector deficits, discount rate, inflation, money supply level, reserve requirement, economic development, and population size.

Another recent study conducted by Ahokpossi (2021) examined the determinants of bank interest margins in Sub-Saharan African countries. The study included a sample of 456 banks from 41 countries in the region. The results indicated that bank-specific factors like credit risk, liquidity risk, and bank equity played significant roles in determining interest margins. However, the study found that interest spreads were not sensitive to changes in economic growth. These studies contribute to our understanding of the factors influencing interest rate spreads in African countries, highlighting the importance of macroeconomic variables and bank-specific factors in shaping the dynamics of interest rate spreads in the region.

A study conducted by Aboagye et al. (2018) examined the relationship between the net interest margin of banks and various factors that can be categorized as bank-specific, banking industry-specific, and macroeconomic factors specific to the Ghanaian economy. The study found that certain factors had a positive impact on the net interest margin of banks. These factors included bank market power or concentration, domestic borrowing, staff costs, administrative costs, the extent to which a bank is risk-averse, and inflation. Conversely, the study also identified factors that had a negative impact on the net interest margin of banks. These factors included excess reserves of banks, the central bank lending rate, and management efficiency. An increase in these factors was associated with a decrease in the net interest margin of banks.

In their study, Beck and Hesse (2016) focused on the Ugandan banking system to understand the factors contributing to consistently high interest rate spreads and margins. They analyzed a bank-level dataset and examined various factors, including foreign bank presence, privatization, market structure, banking efficiency, and macroeconomic variables. The study found that foreign banks had lower interest rate spreads compared to domestic banks. However, there was no strong and economically significant relationship between interest spreads and factors such as privatization, foreign bank entry, market structure, and banking efficiency. Similarly, macroeconomic variables had limited explanatory power for the variation in bank spreads over time. On the other hand, the study revealed that bank-level characteristics played a more substantial role in explaining cross-bank and cross-time variation in spreads and margins. Factors such as domestic borrowing, operating costs, and the composition of loan portfolios had a significant influence. Additionally, the study identified time-invariant bank-level fixed effects as the largest contributors to the variation in spreads and margins among banks. Furthermore, the study found evidence suggesting that banks targeting the lower end of the market incurred higher costs, resulting in higher margins.

A study conducted by Beck et al. (2019) in Kenya aimed to explore various aspects of the country's financial sector, including stability, efficiency, and outreach. The researchers utilized interest rate spreads as an indicator of the efficiency of financial intermediation. To analyze the spreads, they examined different components, such as overhead costs, loan loss provisions, and taxes. By decomposing the interest rate spreads into these components, the researchers were able to gain insights into the factors influencing the spreads.

Among the notable studies examining interest rate spreads in Kenya, Ndung'u and Ngugi (2010) and Ngugi (2011) have garnered significant citations. In their research, Ndung'u and Ngugi (2017) identified theoretical factors that could account for interest rate spreads and empirically estimated an equation using monthly time series data spanning from April 1993 to June 2000. Ngugi (2017) extended the time series data until December 2015. The factors investigated by Ndung'u and Ngugi (2017) included deposits, loans, treasury bill rate, and interbank rate. Their findings indicated a positive relationship between interest rate spreads and deposits, while a negative relationship was observed between interest rate spreads and loans. Additionally, Ngugi (2011) introduced excess liquidity and the non-performing loans ratio as explanatory variables. The study revealed that an increase in the non-performing loans ratio corresponded to an increase in interest rate spreads, whereas excess liquidity exhibited a negative association with spreads. It is noteworthy that both studies primarily focused on macro-level analysis, specifically considering variables at the industry level. However, they did not consider macroeconomic indicators such as GDP and inflation.

The present study expands upon previous research by incorporating a broader range of variables, including both macroeconomic and bank-specific factors. Utilizing panel data from commercial banks, the study examines a more recent time period spanning from 2017 to 2021, characterized by significant policy and macroeconomic changes. Notably, this period includes the introduction of the Central Bank Rate as a policy tool used by the Monetary Policy Committee to indicate the stance of monetary policy. The

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objective of this study is to analyze the impact of inflation rate, domestic borrowing, credit risk, and exchange rate risk on the spread of interest rates in commercial banks in Kenya. By considering these factors, the study aims to provide insights into the relationship between these variables and the interest rate spread, thereby enhancing our understanding of the dynamics of interest rates in the Kenyan banking sector.

2. LITERATURE REVIEW

Taner (2019) conducted a study focusing on the influence of inflation uncertainty on credit markets. The findings of the research indicated that when inflation becomes unpredictable, it leads to higher interest rates and a reduction in loan supply, thereby impacting loan demand. This implies that an increase in inflation can result in elevated lending rates by banks and lower levels of bank lending. Emon (2020) supports this perspective by highlighting that lenders are aware of the erosive effect of inflation on the value of money over the loan period, which prompts them to raise interest rates to compensate for the loss. Consequently, the increased interest rates can affect borrowing patterns within commercial banks. These findings suggested a positive association between inflation rates and lending rates, although the precise extent of their influence on each other during different time periods remains uncertain.

In a study conducted by Keynes (2018), low-income countries and emerging markets were examined to analyze the effects of various deficit financing strategies on economic growth. The research findings indicated that market-based domestic borrowing was the most cost-effective approach for financing budget deficits compared to external borrowing and seigniorage. However, it was observed that all of these methods had negative impacts on growth, domestic savings, and inflation, which in turn influenced the interest rate spread among commercial banks.

In a study conducted by Keynes in 2019, the focus was on India's economic growth from 2013 to 2019 and its relationship with domestic borrowing. The author employed the cointegration technique and Granger causality test to explore two theoretical perspectives: the traditional view, which suggests a long-term negative impact of domestic debt on economic growth, and the Ricardian Equivalence hypothesis, which proposes that domestic debt has no significant effect on growth. The findings of the Engle-Granger cointegration test indicated that domestic debt and economic growth in India were not closely linked. Therefore, the study supported the Ricardian equivalence hypothesis, indicating that there is no significant relationship between domestic debt and growth in India.

Weir (2017) analyzed the impact of domestic borrowing and debt accumulation on growth and poverty in Pakistan. The study revealed that both domestic and external debt accumulation, as well as the burden of debt servicing, had negative consequences for the poor. However, the research indicated that although Pakistan's debt-to-GDP ratio was higher than that of other South Asian countries, it did not reach a level that would necessitate debt write-off. This implied that Pakistan had the capacity to repay its debts. In a separate study, Granger (2018) investigated the quantitative effects of public debt (both domestic and external) and economic growth on poverty in Nigeria. The research adopted the per-capita income approach and examined annual data spanning from 1970 to 2002. The findings emphasized the significant role played by growth and debt variables in exacerbating poverty in Nigeria.

Charan (1999) conducted a study to explore the correlation between gross government debt and per capita GDP growth in developed countries. The analysis encompassed data from 1970 to 2002, involving 24 industrialized nations. The findings of the study did not present strong evidence supporting a statistically significant relationship between domestic borrowing debt accumulation and per capita GDP growth.

Abbas and Christensen (2010) conducted a study that focused on investigating the relationship between domestic debt and economic growth in 93 low-income countries over the period from 1975 to 2004. They employed a Granger Causality Regression model to analyze the data. The findings of the study revealed that moderate levels of marketable domestic debt, measured as a percentage of GDP, had a significant positive influence on economic growth. However, when the debt levels surpassed thirty-five percent of total bank deposits, they had a negative impact on economic growth.

Feyzioglu, Swaroop, and Zhu (2019) conducted a study examining the overall effect of government debt on per capita GDP growth in twelve-euro area countries over a span of around 40 years, from 1970 to 2009. The research identified private savings, productivity of public investment, and real interest rates as the mechanisms through which government debt influenced economic growth. The results revealed a non-linear negative relationship between government debt and both total factor growth and economic growth.

Maana et al. (2018) conducted a study to assess the economic implications of domestic borrowing on Kenya's economy. The authors examined the impact of domestic debt on private sector lending using the ordinary least square technique, utilizing annual data spanning from 2016 to 2018. The findings indicated that domestic debt did not crowd out private sector lending in Kenya during the specified period. This outcome was attributed to the significant level of financial development in the country.

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Additionally, the study examined the impact of domestic debt on real output using a modified Barro growth regression model. The findings suggested that an increase in domestic debt had a positive influence on economic growth, although the effect was not statistically significant. Based on these results, the study recommended the implementation of comprehensive reforms aimed at promoting investment in treasury bonds and providing incentives to institutional investors. These measures were suggested as potential strategies to stimulate economic growth in Kenya.

Straka (2015) and Wheaton et al. (2017) have proposed models that define default as the outcome of a triggering event, which renders it economically unfeasible for a borrower to continue meeting their credit obligations. While there are various definitions of credit risk, the common aspect in almost all of them is the likelihood of experiencing losses due to default. However, there is divergence in how default is defined, as it depends on the philosophy and data available to each model developer. Default risk is often proxied by indicators such as liquidation, bankruptcy filing, loan loss or charge-off, nonperforming loans (NPLs), or loans with delayed payment obligations. In this research paper, credit risk is proxied by the ratio of non-performing loans to total loans advanced, which has been used by Beck and Hesse (2016), Calcagnini et al. (2019), and Maudos and Solis (2019).

The act of extending credit carries a significant risk, particularly in terms of potential default by borrowers (credit risk). For example, in 2018, the number of financial defaulters or credit risks nearly doubled, with Lehman Brothers being the largest single defaulter by volume, failing to pay \$144 billion of rated debt (Standard & Poor, 2019). It is hypothesized that when banks encounter clients with a high likelihood of default (credit risk), they mitigate the potential losses by increasing lending rates and/or lowering deposit rates, thereby widening the interest rate spreads. Additionally, high and inflexible interest rate spreads indicate the existence of perceived market risks (Mugume & Ojwiya, 2019).

According to Bandyopadhyay (2017), certain characteristics of individual borrowers, such as being divorced or separated, having multiple dependents, engaging in unskilled manual work, lacking education, and experiencing unemployment for a significant portion of the year, increase the likelihood of defaulting on credit obligations. This finding aligns with economic theories, particularly the human capital theory, which suggests that education and training serve as investments that can enhance employability and improve an individual's net productivity and income. However, many studies on credit risk have underestimated the benefits of education and training. Furthermore, there is ongoing debate regarding the influence of age and collateral position as factors affecting creditworthiness, as different arguments have been put forth regarding their impact on credit risk.

Foreign exchange risk refers to the likelihood that unexpected change in exchange rates will alter the home currency value if foreign currency cash payment and receipts are expected from a foreign source (Taggart & McDermott, 2018). Simakova (2017) conducted a study on the impact of exchange rates on the value of companies listed on stock exchanges, particularly during the global financial crisis and different economic conditions. The research utilized Jorion's model and panel data regression to examine the influence of foreign exchange rates. The findings indicated a negative relationship between exchange rates and share value. The negative exposure coefficients indicated that when the local currency was undervalued, it led to a decrease in the company's stock returns. In Hungary, the increased proportion of debt denominated in foreign currency resulted in higher vulnerability of companies to foreign exchange fluctuations. Undervaluation of local currencies pushed up stock prices in the countries under investigation. Furthermore, local currency depreciation had a positive impact on export volumes but simultaneously increased the cost of importing goods from other nations (Simakova, 2017).

Wanjiku (2016) conducted a study on the impact of fluctuations in foreign currency exchange rates on the financial performance of five-star hotels in Nairobi. The research employed a descriptive research design and focused on all the five-star hotels operating in Nairobi, Kenya. Secondary data from the monthly management reports of the hotels was used, covering the period from 2012 to 2016 and analyzed on a quarterly basis. Data regarding exchange rates, economic growth, and other relevant information was obtained from the Central Bank of Kenya.

Quantitative data analysis techniques were employed in the study, utilizing the Statistical Package for Social Sciences version 23. The significance of the results was tested using Analysis of Variance. The findings revealed that exchange rate fluctuations had a significant positive impact on the performance of the hotels. Therefore, when the Kenyan Shilling depreciated against the US Dollar, it led to an increase in the financial performance of the hotels. Inflation, on the other hand, had a negative relationship with the financial performance of the five-star hotels, while GDP showed a positive relationship. A rise in the GDP indicated an improvement in other sectors of the economy.

The study concluded that an increased depreciation of the Kenyan Shilling against the US Dollar, resulting in higher exchange rate fluctuations, would lead to improved performance in the hotels. This could be attributed to the hotels receiving a significant portion of their revenues in USD. Additionally, a further depreciation of the local currency would enhance exports while making imports more expensive, contributing to the positive impact on financial performance.

Kiptisya (2017) conducted a study to examine the impact of currency risk management on the performance of banks in Kenya. The findings indicated that managing foreign exchange risk had a positive and statistically significant effect on financial performance.

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Additionally, it was found that foreign exchange risk had a negative influence on performance, although this relationship was not statistically significant. The study identified various financial risk management techniques used by banks to hedge against currency risk, including cross currency swaps, options, and price adjustments. The application of financial risk management was found to offer several benefits to firms, such as achieving a leadership position in the industry, increasing asset productivity, improving efficiency, and enhancing profitability. The findings emphasized the importance for companies to develop effective risk management strategies for foreign exchange, highlighting the need for assessing financial risk and implementing appropriate risk management measures. (Kiptisya, 2017).

3. RESEARCH METHODOLOGY

3.1 Research Design

Explanatory research design was used for this study in order to determine the amount and type of the relationships between the variables under consideration as well as their causes and effects. This study tried to determine the causal relationship between macroeconomic determinants of interest rate spread in Kenya.

3.2 Data Type and Source

This research study made use of a secondary type of data. Inflation, credit risk, domestic borrowing, exchange rate, risk and the interest rate spread were used in data analysis. The World Bank, the Central Bank of Kenya, and the Kenya National Bureau of Statistics (KNBS) were consulted for the statistics. A time series technique was used, and the project's study period spanned from 1970 to 2022.

3.3 Model specification

The focus is to examine the linkage among unemployment, inflation, government spending and money supply in Kenya. The model is adapted from macroeconomic model stated as:

$$IRS = f(\Pi, CR, EXR, DB) \quad (1)$$

Where:

IRS=Interest rate spread,

Π =inflation rate,

CR= Credit risk,

DB=Domestic borrowing.

ER=Exchange rate risk.

The model specification in a stochastic form is stated as:

$$IRS = \beta_0 + \beta_1\Pi + \beta_2CR + \beta_3DM + \beta_4ER + \mu \quad (2)$$

3.4 Data Analysis Method

The unit test of the specified model was tested using the Augmented Dickey- Fuller Unit Roots Test (ADF). Heteroscedasticity was tested using the Breusch-Pagan test of heteroscedasticity. The study employed the Variance Inflation (VIF) factor test to test whether the independent variables of the regression model are correlated. The Pesaran/Shin/Smith (2001) ARDL bound tests was used to determine co-integration. Autocorrelation was tested using the Breusch-Godfrey test of Autocorrelation. The Akaike Information Criterion (AIC), Final Prediction Error (FPE), Hannan-Quinn Criterion (HQIC), and Schwartz Information Criterion (SIC) were used to determine the best lag duration of the ARDL model in this work. Parameter stability test of the time series model was also tested using the cumulative sum of recursive residuals (CUSUM) test.

4. ANALYSIS AND DISCUSSION

4.1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Interest rate spread	52	8.092468	4.950976	2.3025	23.79097
Inflation rate	52	9.842059	7.878877	-9.219158	41.98877
Domestic borrowing	52	23.6772	5.329572	16.48605	36.64775
Credit risk	52	4.279213	3.537934	.1988482	12.33627
Exchnage rate	52	52.34395	36.6253	7.001192	117.866

Source (Field data, 2023)

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A descriptive study involves creating a framework of various challenges, individuals, or events, and collecting data to analyze the frequencies of study variables or their associations. It serves multiple research objectives, such as describing an event or characteristics associated with a subject population, estimating the proportion of the population that possesses these characteristics, and exploring relationships between different variables (Ngechu, 2014). The choice of a descriptive design was made because it facilitated the generalization of findings to the larger population and enabled the analysis and examination of relationships between variables. Table 4.1 above shows the results of descriptive statistics for interest rate spread, inflation rate, exchange rate, domestic borrowing and credit risk.

The interest rate spread, with a mean value of approximately 8.09 and a standard deviation of around 4.95, represents the difference between the interest rates at which banks can borrow and lend money. This spread is a crucial indicator of the health of the financial sector and can impact borrowing costs for individuals and businesses. The range from a minimum of 2.30 to a maximum of 23.79 suggests significant variation in this spread over the observed 52 period.

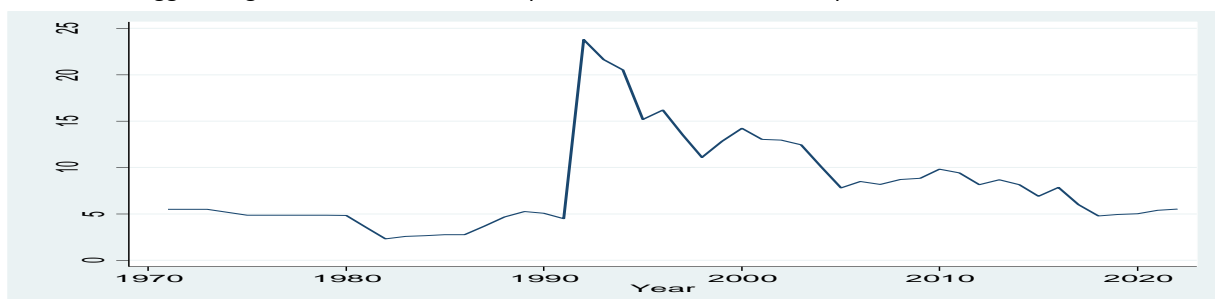


Figure 4. 1: Graphical representation for interest rate spread

The graph in figure 4.1 above shows graphical representation of interest rate spread over the last 52 years. The trend in interest rates over the provided period exhibits several distinct phases. From 1971 to the early 1980s, the interest rate spread remained relatively stable around 5.5, indicating a period of monetary stability. However, starting in the early 1980s, there was a significant decline, reaching its lowest point around 2.30 in 1982. This period coincided with aggressive monetary policy measures to combat high inflation.

Subsequently, there was a gradual increase in interest rates through the late 1980s and early 1990s, stabilizing around 5.25 by the end of 1989. The most striking change occurred in the early 1990s, with the interest rate skyrocketing to nearly 23.79 in 1992, indicating a sharp tightening of monetary policy. This likely reflects efforts to curb inflation and stabilize the financial system. Following this peak, interest rates gradually declined over the late 1990s and early 2000s. The early 2000s saw a period of relatively low interest rates, which started to rise again in the mid-2000s. The global financial crisis in 2008 led to a brief spike in interest rates, but they gradually declined again until the early 2010s. From there, interest rates experienced a somewhat fluctuating but generally upward trend, reaching around 5.52 in 2022.

The inflation rate, with a mean value of about 9.84 and a relatively high standard deviation of around 7.88, measures the percentage change in the general price level of goods and services. A positive inflation rate is normal, but negative values, as seen in this dataset, indicate periods of deflation. The wide range from -9.22 to 41.99 suggests substantial fluctuations in consumer prices during the observation period.

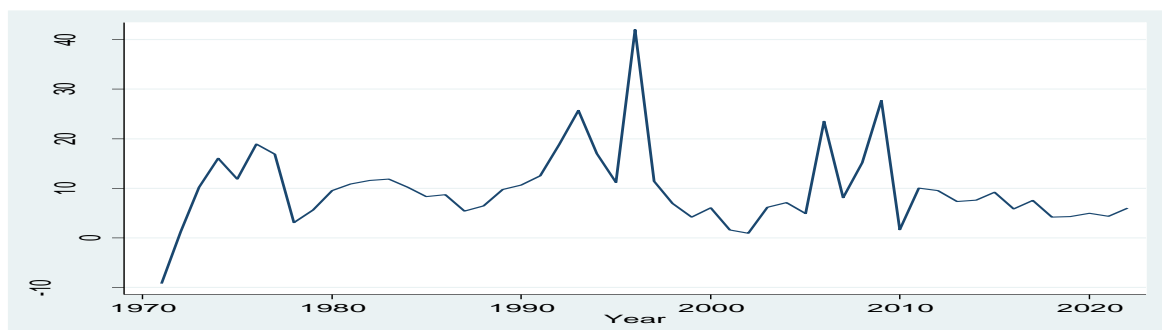


Figure 4. 2: Graphical representation for inflation rate

The graph in figure 4.2 above shows graphical representation of inflation rate over the last 52 years. The trend in inflation rates over the provided period demonstrates a dynamic economic landscape. In the early 1970s, there was a period of negative inflation (deflation) as indicated by the -9.22% in 1971, followed by modest positive inflation in 1972. However, from 1973 onwards,

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inflation rates began to surge, peaking at an alarming 41.99% in 1996, reflecting a period of high inflation and economic turbulence, possibly driven by various economic factors and external shocks. The late 1990s and early 2000s saw a significant decline in inflation rates, as they fell to single-digit percentages. This period of relative stability was disrupted by the global financial crisis in 2008, resulting in another spike in inflation. Subsequently, from the early 2010s, inflation rates generally remained within a moderate range, with occasional fluctuations, but not reaching the levels seen in the 1970s and 1990s

Domestic borrowing, with an average value of approximately 23.68 and a standard deviation of 5.33, indicates the amount of money a country is borrowing within its own borders. This can be influenced by government policies, economic conditions, and fiscal needs. The relatively narrow range from 16.49 to 36.65 suggests some stability in domestic borrowing levels.

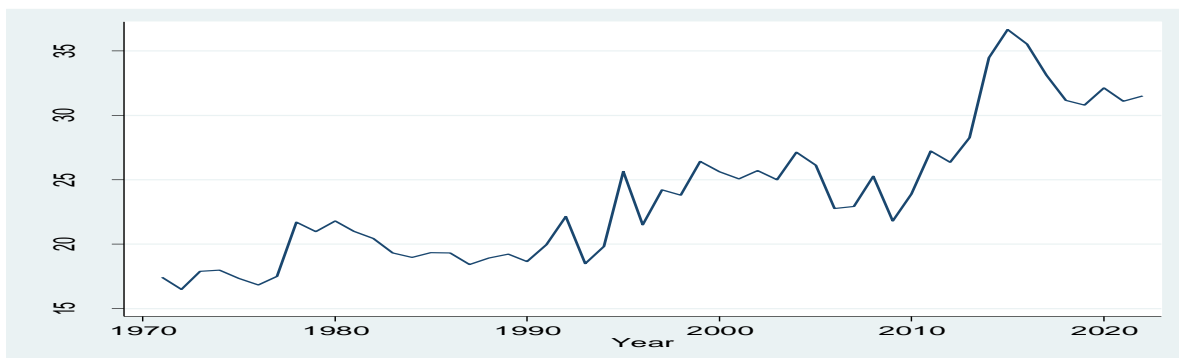


Figure 4. 3: Graphical representation for domestic borrowing

The graph in figure 4.3 above shows graphical representation of domestic borrowing over the last 52 years. The trend in domestic borrowing rates over the provided period reflects several notable phases. Beginning in the early 1970s, domestic borrowing rates were relatively stable, hovering around the high teens to low twenties, with minor fluctuations. This period of stability lasted until the late 1970s. However, starting in the early 1980s, there was a discernible upward trend that persisted throughout the decade, peaking in the early 1990s at around 26.41. This period of elevated borrowing rates may have been influenced by economic conditions and the need for increased government spending or investment.

From the mid-1990s to the early 2000s, there was a notable decline in domestic borrowing rates, potentially indicating improved economic conditions or fiscal management. However, the rates began to rise again, particularly around the time of the global financial crisis in 2008, possibly due to increased borrowing requirements during the economic downturn. The most remarkable phase occurred from 2013 onwards, where domestic borrowing rates surged significantly, reaching levels above 34.46 in 2014 and continuing to rise into the early 2020s. This period of sharply increasing borrowing rates might signify heightened government borrowing to fund various initiatives, respond to economic challenges, or manage debt

Credit risk, with an average value of 4.28 and a standard deviation of 3.54, measures the level of risk associated with lending or investing in a particular market or sector. The range from 0.20 to 12.34 indicates varying degrees of credit risk, which could impact lending decisions and financial stability.

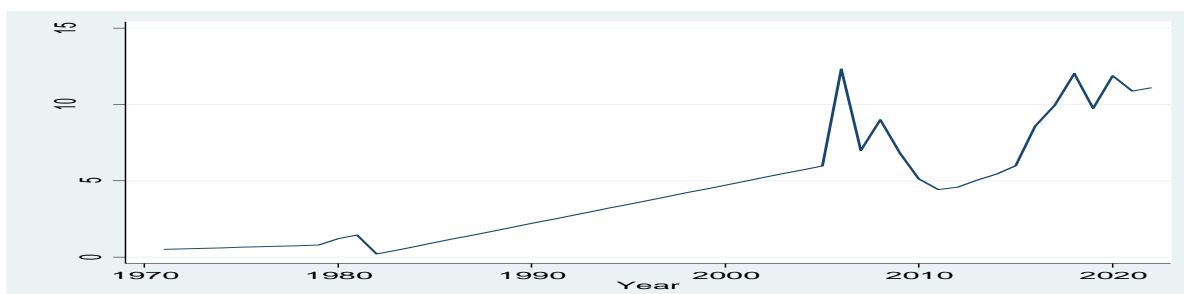


Figure 4.4: Graphical representation for credit risk

The graph in figure 4.4 above shows graphical representation of credit risk over the last 52 years. The trend in credit risk over the provided period reveals a fluctuating pattern with several noteworthy phases. In the early 1970s, credit risk was relatively low, gradually increasing year by year. However, from the early 1980s, there was a notable spike in credit risk, particularly in 1980, possibly indicating increased lending risk or financial instability during that period. The 1980s and early 1990s saw a steady rise in

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credit risk, with some fluctuations along the way. This upward trend continued into the mid-1990s, reaching a peak around 3.96 in 1997. This period might reflect various economic factors, including changes in lending practices and economic conditions.

The late 1990s to the early 2000s witnessed a more stable period with credit risk hovering around 4 to 5. However, a significant spike occurred in 2006, with credit risk reaching its highest point of 12.34. This spike may be linked to the global financial crisis, highlighting increased lending risk and financial instability during that time. Following the crisis, there was a decline in credit risk in the late 2000s and early 2010s, indicating improved stability. However, credit risk began to rise again from 2012 onwards, reaching levels above 10 in 2014 and continuing to fluctuate in the subsequent years.

The exchange rate, with an average value of 52.34 and a standard deviation of 36.63, represents the value of one country's currency in terms of another. The wide range from 7.00 to 117.87 shows significant volatility in the exchange rate over the observation period, which can have implications for international trade and financial markets.



Figure 4. 5: Graphical representation for exchange rate

The graph in figure 4.5 above shows graphical representation of exchange rate over the last 52 years. The trend in the exchange rate over the provided period reflects a series of distinctive phases. In the early 1970s, the exchange rate remained relatively stable around 7.14, but in 1975, there was a noticeable uptick. Throughout the late 1970s and 1980s, the exchange rate experienced a steady increase, signaling the depreciation of the currency. This trend continued into the early 1990s, with the exchange rate reaching substantial highs, notably in 1993 when it spiked to 58.00, potentially indicating significant economic challenges or external factors affecting the currency's value.

The mid-1990s to early 2000s saw some fluctuations, but the exchange rate remained relatively high. However, after 2003, there was a period of relative stability, with the exchange rate hovering between 75 and 80. This stability was interrupted by the global financial crisis in 2008, leading to a temporary depreciation. From the late 2000s onwards, the exchange rate trended upwards steadily, reaching 117.87 in 2022, possibly reflecting a combination of factors like economic recovery, trade dynamics, and monetary policy decisions. In summary, the exchange rate trend exhibited a long-term depreciation followed by periods of stability and occasional fluctuations, indicating the influence of both domestic and international economic factors on currency values.

Normality Test

Table 4. 1: Shapiro wilk test results

Test	Variable	Observation	w	v	z	Prob>z
Shapiro wilk	residual	52	0.92339	1.749	1.123	0.13075

Source: (Field data, 2023)

The null hypothesis stating that the data is normally distributed was accepted because the significance values obtained from the Shapiro-Wilk were more than the predetermined level of significance ($\alpha = 0.05$). Therefore, it can be concluded that the data series used in the study follow a normal distribution.

Tests for Multicollinearity

Multicollinearity implies that two or more of the predictor variables are highly correlated. The study used the Variance inflation factor (VIF) and the correlation matrix to check for the presence or absence of multicollinearity. Multicollinearity is present if the VIF value is higher than 10 (Gujarati, 2012) or the pairwise correlation coefficients are greater than 0.8. Table 4.3 indicates that the VIF values range between 1.16 and 8.46; which, are less than 10, implying the research variables do not suffer from multicollinearity.

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Table 4. 2: Multicollinearity test results

Variable	VIF	1/VIF
Exchange rate	8.46	0.118263
Domestic borrowing	5.05	0.197929
Credit risk	4.80	0.208150
Inflation rate	1.16	0.861408
Mean VIF	4.87	

Source: (Field data, 2023)

Test for Autocorrelation

The residuals' autocorrelation was investigated using the Breusch-Godfrey Lm test. At the 5% level of significance, the alternative hypothesis of serial correlation was contrasted with the null hypothesis of no serial correlation. According to Breusch (1978) and Godfrey (1978), if the chi-square test statistic p value is less than the level of significance of 5%, the null hypothesis of no serial correlation is rejected, and if it is greater than the level of significance of 5%, the null hypothesis of no autocorrelation is accepted. Additionally, the results of this inquiry were supported by the Durbin Watson test of serial correlation.

The results of the Breusch Godfrey Lm test for serial correlation are shown in Table 4.4. The null hypothesis that there is no serial autocorrelation is accepted since the chi-square p value in the aforementioned table, which is 0.0885, is higher than the level of significance of 5%. (0.05).

Table 4. 3: Autocorrelation test results

Wooldridge test for autocorrelation in panel data

H0: no first order autocorrelation

Chi2(4, 48) = 2.902

Prob > Chi2 = 0.0885

Source: (Field data, 2023)

Test for Heteroskedasticity

To check whether the residuals were heteroscedastic, the White test was applied. The null hypothesis of homoscedasticity was contrasted with the alternative hypothesis of heteroscedasticity. According to Breusch and Pagan (1979), the homoscedasticity null hypothesis is accepted if the chi-square test statistic's corresponding p value is greater than the 5% level of significance and rejected if it is lower than that mark. Table 4.5 shows the outcomes of heteroscedasticity test which demonstrate that the residuals of the model are homoscedastic. This is validated by the chi-square test findings, which have p values larger than the 5% level of significance and a p value of 0.3576. This shows that the model variance is constant.

Table 4. 4: Homoscedasticity Test Results

Source	Chi(2)	df	Prob>chi(2)
White test for heteroscedasticity	15.31	14	0.3576

Source: (Field data, 2023)

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Test for Stationarity

From the results of the table 4.6 below, the null hypothesis of unit root of interest rate spread, inflation rate, domestic borrowing, credit risk and exchange rate is rejected at 5 percent level of significance. This suggests that interest rate spread, inflation rate, domestic borrowing, credit risk and exchange rate do not have a unit root which means they are stationary.

Table 4. 5: Stationarity test results

Variable	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Interest rate spread	-7.613	-3.580	-2.930	-2.600
Inflation rate	-10.888	-3.580	-2.930	-2.600
Domestic borrowing	-8.088	-3.580	-2.930	-2.600
Credit risk	-11.223	-3.580	-2.930	-2.600
Exchnage rate	-6.357	-3.580	-2.930	-2.600

Source: (Field data, 2023)

Correlational Analysis

Findings revealed that inflation rate was positively and significantly associated with interest spread ($r = 0.3457$, $p < 0.05$) indicating 34.57% positive relationship with interest spread. Further, exchange rate was positively and significantly correlated to interest spread ($r = 0.3078$, $p < 0.05$) showing that exchange rate has 30.78% positive relationship with interest spread. Credit risk also showed a positive correlation with the domestic borrowing, given by ($r = 0.7804$, $p < 0.05$), indicated by 78.04%. Moreover, exchange rate risk was positively correlated with domestic borrowing ($r = 0.8795$, $p < 0.05$) an indication of 87.95% positive relationship with domestic borrowing. Lastly, exchange rate risk was positively correlated with credit risk ($r = 0.8892$, $p < 0.05$) an indication of 88.92% positive relationship with credit risk.

Table 4. 6: Correlation test results

	Interest rate spread	Inflation rate	Domestic borrowing	Credit risk	Exchnage rate
Interest rate spread	1.0000				
Inflation rate	0.3457*	1.0000			
Domestic borrowing	0.0931	-0.2536	1.0000		
Credit risk	0.1165	-0.0542	0.7804*	1.0000	
Exchnage rate	0.3078*	-0.0976	0.8795*	0.8892*	1.0000

Source: (Field data, 2023)

Regression Results

The table 4.8 below illustrates the model summary of ARDL regression model, the results showed that all the tfour predictors (inflation rate, domestic borrowing, credit risk and exchange rate risk) explained 95.25 percent variation of interest spread. This showed that considering the four study independent variables, there is a probability of predicting interest spread by 93.92% (R squared =0.9392).

Table 4. 7: Regression summary model

Summary of the Model				
Model	R ²	Adjusted R ²	Root MSE	Number of obs.
1	0.9535	0.9392	1.2552	48

Source: (Field data, 2023)

a. Predictors: (Constant), inflation rate, domestic borrowing, credit risk, exchange rate risk

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b. Independent variable: Interest rate spread

Test of Hypothesis and Discussion of the study

Hypothesis 1 (H₀₁) stated that inflation has no significant effect on interest rate spread in commercial banks in Kenya. The findings of the study revealed that inflation had a significant impact on interest spread, as indicated by the coefficient estimate of $\beta_1 = 0.007$ (p -value = 0.014, which is lower than the significance level of $\alpha = 0.05$). Therefore, the null hypothesis was rejected, and it was concluded that the inflation rate had a significant effect on interest spread. This suggests that for each unit increase in the inflation rate, there was an estimated increase of 0.007 units in the interest spread.

An escalation in the inflation rate can trigger an expansion of the interest rate spread due to its impact on both borrower costs and lender risk perceptions. As inflation rises, the real value of money diminishes, causing borrowers to face higher repayment costs in terms of purchasing power. To compensate for this loss, lenders may raise nominal interest rates, including an inflation premium, leading to higher borrowing costs. Moreover, the uncertainty stemming from increased inflation can heighten lenders' apprehensions about potential erosion of returns, compelling them to incorporate a risk premium into their lending rates. This combined effect of inflation and heightened risk perception prompts a widening of the interest rate spread, representing the difference between lending and borrowing rates, and thus influencing lending decisions and economic dynamics

Hypothesis 2 (H₀₂) stated that domestic borrowing has no significant effect on interest rate spread in commercial banks in Kenya. The research findings indicated that domestic borrowing has a significant impact on interest spread. The coefficients of estimate for domestic borrowing were positive and statistically significant, with a β_2 value of 0.2269 (p -value = 0.034, which was less than the significance level of $\alpha = 0.05$). As a result, the null hypothesis was rejected, suggesting that there is a significant relationship between domestic borrowing and interest spread. For each unit increase in domestic borrowing, there was an associated increase of approximately 0.2269 units in interest rate spread.

An upsurge in domestic borrowing can amplify the interest rate spread by altering the demand and supply dynamics in the lending market. As the government or other entities increase their borrowing from the domestic market, they elevate the demand for available funds. This heightened demand can lead to a scarcity of funds, causing the cost of borrowing to rise. Commercial banks, responding to this increased demand for funds, may raise their lending rates to optimize profitability. This, in turn, expands the interest rate spread between the higher lending rates and the relatively stable borrowing rates. Consequently, an increase in domestic borrowing exerts upward pressure on interest rates, contributing to a broader interest rate spread as banks adjust their lending rates to accommodate the heightened demand for funds in the lending market.

Hypothesis 3 (H₀₃) stated that credit risk has no significant effect on interest rate spread in commercial banks in Kenya. The study yielded significant findings regarding the impact of credit risk on interest spread. The coefficients of estimate for credit risk exhibited statistical significance, with a β_1 value of 0.0466 (p -value = 0.024, lower than the significance level of $\alpha = 0.05$). Consequently, the null hypothesis was rejected, indicating that credit risk has a significant effect on interest spread. The study concluded that for each unit increase in credit risk, there is an associated increase in interest spread of approximately 0.0466 units.

An elevation in credit risk can augment the interest rate spread by introducing higher costs associated with lending and a need for greater compensation for the increased risk exposure. When credit risk rises, lenders become more cautious about the likelihood of borrower defaults, potentially leading to higher loan loss provisions and reduced profitability. In response, lenders may opt to increase their nominal interest rates to account for the anticipated higher losses due to potential defaults. This increase in interest rates encompasses a risk premium aimed at offsetting the heightened credit risk. Consequently, borrowers facing higher lending rates due to the risk premium contribute to the expansion of the interest rate spread between the cost of borrowing for banks and the rates offered to borrowers. This interplay between credit risk and the need for risk compensation contributes to the widening of the interest rate spread, reflecting the greater uncertainties and potential losses associated with lending in a higher-risk environment.

Hypothesis 4 (H₀₄) stated that exchange rate risk has no significant effect on interest rate spread in commercial banks in Kenya. Contrary to the initial hypothesis, the research findings indicated that foreign exchange rate does indeed have a significant effect on interest spread. The coefficients of estimate for exchange rate risk exhibited statistical significance, with a β_4 value of 0.0141 (p -value = 0.000, lower than the significance level of $\alpha = 0.05$). Consequently, the null hypothesis was rejected, indicating that foreign exchange rate has a significant impact on interest spread. For each unit increase in the exchange rate risk, there was an associated increase of approximately 0.0141 units in the interest spread. Moreover, the t -test value of 5.00 demonstrated that the effect of the foreign exchange rate was more than six times greater than the associated error.

An escalation in exchange rate risk can lead to an enlargement of the interest rate spread by influencing borrowing and lending costs in an environment of heightened currency fluctuations. When exchange rate risk increases, borrowers and lenders both face

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an elevated level of uncertainty regarding the potential impact of currency fluctuations on loan repayments and returns. To address this uncertainty, lenders might adjust their lending rates upward, incorporating an exchange rate risk premium to compensate for potential losses due to unfavorable currency movements. Borrowers, in turn, encounter higher borrowing costs as a result of the added risk premium. This mutual risk perception between lenders and borrowers prompts an increase in nominal interest rates, leading to a wider interest rate spread that reflects the gap between the higher lending rates and the borrowing rates. The increase in exchange rate risk thus contributes to a broader spread as lenders seek to mitigate the risks associated with volatile currency markets and borrowers bear the brunt of the resulting higher costs.

Table 4. 8: ARDL regression results

Interest rate spread	Coef.	Std. Err.	t	P>z	[95% Conf. Interval]
Interest rate spread					
L1.	.0057174	.1367881	0.04	0.967	-.2717018 .2831365
L2.	.308231	.1032173	2.99	0.005	.0988967 .5175654
Inflation	.0069593	.0026845	2.59	0.014	.0015149 .0124038
Credit risk	.0465686	.0198037	2.35	0.024	.0064049 .0867323
L1.	.0141869	.0204301	0.69	0.492	-.0272472 .0556211
L2.	-.0463682	.0188033	-2.47	0.019	-.084503 -.0082335
L3.	-.0253722	.0144759	-1.75	0.088	-.0547307 .0039864
Exchange rate	.0140734	.0021247	6.62	0.000	.0097644 .0183824
L1.	-.0062118	.0032901	-1.89	0.067	-.0128845 .0004608
Domestic borrowing	.2269497	.1030701	2.20	0.034	.0179138 .4359856
L1.	-.4438148	.1057895	-4.20	0.000	-.6583658 -.2292638
_cons	6.264246	1.744491	3.59	0.001	2.726256 9.802237

Source: (Field data, 2023)

RECOMMENDATION AND CONCLUSION

The study recommends that to address inflationary pressures, monetary authorities should continue to pursue prudent monetary policy measures aimed at maintaining price stability and controlling inflation within target levels. This could involve using tools such as open market operations, reserve requirements, and interest rate adjustments to manage liquidity in the banking system and curb inflationary expectations.

Secondly, to mitigate credit risk, regulators should focus on strengthening the regulatory framework governing lending practices and risk management standards within the banking sector. This may include enforcing stricter lending criteria, enhancing credit assessment processes, and promoting greater transparency and disclosure of credit-related information. Additionally, policymakers could explore the establishment of credit guarantee schemes or risk-sharing mechanisms to incentivize banks to extend credit to borrowers perceived as higher risk, thereby reducing overall credit risk in the system.

Thirdly, given the vulnerability of interest rate spreads to exchange rate fluctuations, policymakers should implement measures to mitigate exchange rate risk and enhance currency stability. This could involve adopting a flexible exchange rate regime coupled with interventions such as foreign exchange market interventions, forward contracts, and hedging instruments to manage exchange rate volatility and reduce uncertainty for commercial banks.

Finally, to address the impact of domestic borrowing on interest rate spreads, policymakers should prioritize fiscal consolidation efforts to reduce government borrowing and crowding out of private sector credit. This may involve implementing prudent fiscal policies aimed at reducing budget deficits, improving revenue mobilization, and enhancing public debt management practices to minimize the government's reliance on domestic borrowing.

In conclusion, by implementing targeted policies to address inflation, credit risk, exchange rate risk, and domestic borrowing, regulators and policymakers can help mitigate the adverse effects of these macroeconomic determinants on interest rate spreads among commercial banks in Kenya. By promoting financial stability, improving risk management practices, and enhancing the efficiency and competitiveness of the banking sector, these policies can contribute to a more resilient and inclusive financial system that supports sustainable economic growth and development

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