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Understanding the Dynamics Between Monetary Policy and Interest Rate Spreads in Uganda: A Quantitative Study

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Abstract: This study delves into the intricate relationship between monetary policy variables and interest rate spreads in Uganda's financial sector. It examines the impact of the rediscount rate, inflation, money supply, and the Real Effective Exchange Rate on interest rate spreads. Findings indicate that while short-term changes in the rediscount rate have a limited effect on interest rate spreads, higher rates widen spreads in the long term as banks adjust strategically. Initially, inflation narrows spreads, but persistent high inflation widens them over time as banks hedge against inflation risk. Moreover, an increase in money supply reduces spreads in the short run but has diminishing effects over time. Recommendations include transparent adjustments of the rediscount rate, robust inflation targeting frameworks, and vigilant monitoring of the money supply to support economic growth and financial stability. Overall, this study provides insights for policymakers and financial institutions, emphasizing the importance of considering both short-term and long-term effects in monetary policy adjustments for Uganda's economic stability.

Keywords: *Monetary policy, Interest rate spreads, Uganda.*

1. Background

Interest rate spreads play a crucial role in shaping the economic landscape of any nation (NWAFOR, 2022). They reflect the disparity between the interest rates earned on assets and those paid on liabilities within the financial system (Liao, 2020). Understanding the relationship between interest rate spreads and monetary policy is essential to comprehend the macroeconomic environment as a whole (Mbabazize et al., 2020). It is impossible to overestimate the impact of monetary policy tools on interest rate spreads, such as the rediscount rate, inflation, money supply, and the Real Effective Exchange Rate (REER) (Schelling & Towbin, 2020). By determining the cost at which banks can obtain funds, the central bank's rediscount rate directly affects interest rate spreads (Mbowe et al., 2020). Changes in the rediscount rate have an impact on lending rates, which in turn changes how interest rate spreads are shaped across the financial system (Shrestha, 2022). Another crucial factor is inflation, which gradually reduces the purchasing power of money (Mbowe et al., 2020). High inflation rates typically lead to wider interest rate spreads as lenders demand compensation for the loss in value (Nabende et al., 2020). Moreover, changes in the money supply exert a significant influence on interest rate spreads (Obeh & Brotoboh, 2021). Expansionary monetary policies, aimed at increasing the money supply, tend to lower interest rates, narrowing spreads as banks compete for borrowers (Owusu-Ankamah & Sakyi, 2021).

Conversely, contractionary monetary policies, which reduce the money supply, may lead to higher interest rates and wider spreads as credit becomes scarcer (Kwak, 2024). Additionally, the Real Effective Exchange Rate (REER) impacts interest rate spreads by influencing the competitiveness of domestic goods and services in the international market (Ibenyenwa et al., 2020). A strong REER may necessitate higher interest rates to attract foreign capital, while a weak REER may prompt lower rates to stimulate economic activity (Lilian et al., 2022). Global interest rate spreads exhibit considerable variation across countries and regions, reflecting diverse economic conditions and monetary policy frameworks (Hofmann et al., 2021). According to the Global Financial Stability Report (2023), as of August 2023, Argentina reported the highest deposit interest rate worldwide, reaching a staggering 113 percent, followed closely by Zimbabwe at 110 percent (Lilian et al., 2022). Conversely, countries such as Switzerland, Denmark, and Japan reported some of the lowest interest rate spreads globally (Hofmann et al., 2021). Switzerland's benchmark three-month SARON stood at -0.75 percent, reflecting the country's negative interest rate policy. Denmark's primary interest rate, the certificate of deposit rate set by the Central Bank, remains relatively low.

Similarly, Japan's Bank of Japan maintained a negative interest rate of -0.1 percent. The role of the rediscount rate, inflation, money supply dynamics, and the Real Effective Exchange Rate (REER) in shaping interest rate spread trends globally and in Africa is significant (NWAFOR, 2022). High inflation rates often coincide with wider interest rate spreads, while monetary policy decisions, especially changes in the rediscount rate, significantly influence borrowing costs and, consequently, interest rate spreads (Nabende et al., 2020). Moreover, fluctuations in the money supply and exchange rate dynamics further contribute to the variability of interest rate spreads, reflecting the broader macroeconomic environment (Obeh & Brotoboh, 2021). In Uganda, interest rate spreads have demonstrated distinctive trends over the years, influenced by both domestic and external factors (Mbabazize et al., 2020). The Central Bank Rate (CBR), a crucial policy rate, stood at 10.00 percent at the end of 2022, representing a notable increase from the previous year's value of 6.50 percent (Schelling & Towbin, 2020). Despite this rise, the CBR remained lower than its level a decade earlier, reflecting efforts to maintain accommodative monetary policy amidst evolving economic conditions (Shrestha, 2022). However, the average CBR in Sub-Saharan Africa was slightly higher at 11.80 percent, indicating regional variations in monetary policy stances (Shrestha, 2022).

An analysis of the decomposition of interest rate spreads in Ugandan banks reveals significant contributors such as overhead costs and loan loss provisions (Nabende et al., 2020). Over the period from 2008 to 2018, overhead costs accounted for an average of 61 percent of spreads, highlighting their substantial impact on the cost of financial intermediation (Mbabazize et al., 2020). Furthermore, the contribution of both overhead costs and loan loss provisions has increased in recent years, underscoring the need to address efficiency and risk management challenges in the banking sector (Nabende et al., 2020). This study aims to contribute to the body of knowledge by providing a comprehensive analysis of the dynamics between monetary policy and interest rate spreads in Uganda (Mbabazize et al., 2020). By examining the role of key factors such as the rediscount rate, inflation, money supply dynamics, and the Real Effective Exchange Rate, this research seeks to offer valuable insights into the drivers of interest rate spread trends (Shrestha, 2022). Ultimately, the findings of this study can inform policymakers and stakeholders about potential strategies to enhance the efficiency and stability of the financial system, fostering sustainable economic growth and development (Nabende et al., 2020).

2. Literature Review

The Effect of Rediscount Rate and Interest Rate Spread in Uganda: The rediscount rate, a key instrument of monetary policy, plays a crucial role in influencing interest rate spreads within the Ugandan economy (Abadi et al., 2023). Firstly, the rediscount rate directly impacts commercial banks' cost of borrowing from the central bank (Mbowe et al., 2020). An increase in the rediscount rate drives up banks' funding costs, which in turn leads to higher lending rates and wider interest rate spreads as banks try to remain profitable (Mbabazize et al., 2020). On the other hand, a decrease in the rediscount rate lowers banks' borrowing costs, which results in lower lending rates and narrower interest rate spreads (Oyadeyi, 2023). Furthermore, changes in the rediscount rate reveal the monetary policy stance of the central bank (Bertsatos, 2023). A tightening monetary policy, characterized by an increase in the rediscount rate, aims to curb inflationary pressures (Kariuki, 2023). Higher interest rates resulting from this policy stance led to wider interest rate spreads, which may dampen borrowing and investment activities in the economy (Ajayi & Akutson, 2023).

Conversely, a loosening monetary policy, indicated by a decrease in the rediscount rate, aims to stimulate economic growth (ARIWA, 2023). Lower interest rates under this policy stance narrow interest rate spreads, making borrowing more affordable for businesses and individuals, thereby encouraging investment and consumption (Oyadeyi, 2023). Thirdly, the responsiveness of interest rate spreads to shifts in the rediscount rate determines how well monetary policy transmission mechanisms work (Epor et al., 2023). Changes in the rediscount rate are effectively transferred to interest rates in the economy through a well-functioning monetary policy framework, which in turn affects decisions about borrowing and spending (Mbabazize et al., 2020). However, factors such as market structure, financial intermediation efficiency, and liquidity conditions may affect the speed and magnitude of this transmission process (Nabende et al., 2020). Fourthly, the relationship between the rediscount rate and interest rate spreads is influenced by external factors such as global economic conditions and exchange rate movements (Nabende et al., 2020).

Fluctuations in international interest rates or changes in exchange rate dynamics can impact domestic interest rates, thereby affecting interest rate spreads in Uganda (Nelson & Julius, 2024). Finally, the stability and predictability of the rediscount rate are essential for maintaining confidence in the financial system and supporting economic growth (Schelling & Towbin, 2020). Central bank credibility and transparent communication regarding monetary policy decisions are critical for anchoring inflation expectations and ensuring that changes in the rediscount rate are transmitted effectively to interest rate spreads, thereby fostering financial stability and sustainable economic development (Owusu-Ankamah & Sakyi, 2021). The Effect of Inflation on Interest Rate Spread in Uganda**:** Inflation exerts a significant influence on interest rate spreads within the Ugandan economy, with several key dynamics at play (Fix, 2023). Firstly, inflation erodes the purchasing power of money over time, prompting lenders to demand higher nominal interest rates to compensate for the expected loss in real value (Gürkaynak et al., 2023).

This phenomenon, known as the Fisher effect, suggests a positive relationship between inflation and nominal interest rates, leading to wider interest rate spreads in periods of high inflation (Azumah et al., 2023). Secondly, inflation expectations play a crucial role in shaping interest rate spreads (Amanda et al., 2023). Anticipated changes in future inflation levels can impact lenders' pricing decisions, leading to preemptive adjustments in nominal interest rates (Fix, 2023). If lenders anticipate higher inflation in the future, they may raise nominal interest rates to preserve real returns, thereby widening interest rate spreads (Gürkaynak et al., 2023). Conversely, if inflation expectations are anchored and well-anchored by credible monetary policy, lenders may be more confident in maintaining stable nominal interest rates, resulting in narrower interest rate spreads (Bertsatos, 2023). Thirdly, the effectiveness of monetary policy in combating inflation influences the relationship between inflation and interest rate spreads (Gormsen & Huber, 2023). Tightening monetary policy, characterized by increases in the central bank policy rate, aims to curb inflationary pressures by raising nominal interest rates (Liao, 2020).

Higher interest rates under this policy stance lead to wider interest rate spreads, which may dampen borrowing and spending activities, thereby contributing to inflation containment (Oyadeyi, 2023). Conversely, loosening monetary policy, indicated by decreases in the policy rate, aims to stimulate economic growth by lowering nominal interest rates (Ibenyenwa et al., 2020). Lower interest rates under this policy stance narrow interest rate spreads, making borrowing more affordable and supporting consumption and investment activities (Liao, 2020). Fourthly, the pass-through of changes in inflation to interest rate spreads depends on the efficiency and competitiveness of the banking sector (Gormsen & Huber, 2023). Factors such as market structure, competition levels, and regulatory frameworks influence the speed and magnitude of this transmission process (Ogden et al., 2024). Finally, external factors such as global inflation trends and exchange rate movements can also impact inflation dynamics and, consequently, interest rate spreads in Uganda (Schoenmaker & Schramade, 2023). Fluctuations in international commodity prices, currency depreciation, or changes in global liquidity conditions can spill over into domestic inflation dynamics, affecting nominal interest rates and interest rate spreads (Abadi et al., 2023).

The Effect of Money Supply and Interest Rate Spread in Uganda: The relationship between money supply dynamics and interest rate spreads in Uganda is characterized by several key interactions (Gunardi & Disman, 2023). Firstly, changes in money supply influence interest rate spreads through their impact on the overall level of liquidity in the financial system (Liao, 2020). Expansionary monetary policies aimed at increasing the money supply inject liquidity into the banking sector, leading to lower interbank lending rates (Oyadeyi, 2023). Lower interbank rates translate into lower lending rates for businesses and individuals, thereby narrowing interest rate spreads (Oyadeyi, 2023). Conversely, contractionary monetary policies aimed at reducing the money supply drain liquidity from the banking system, leading to higher interbank rates (Gunardi & Disman, 2023). Higher interbank rates result in higher lending rates, widening interest rate spreads as banks seek to maintain profitability amidst tighter liquidity conditions (Oyadeyi, 2023). Secondly, changes in money supply dynamics influence interest rate spreads by affecting inflation expectations (Kariuki, 2023). Expansionary monetary policies may raise concerns about potential inflationary pressures, leading to upward adjustments in inflation expectations (Gunardi & Disman, 2023). Anticipated increases in inflation expectations can prompt lenders to demand higher nominal interest rates to compensate for the expected loss in real value, thereby widening interest rate spreads (Fix, 2023).

Conversely, contractionary monetary policies that reduce the money supply may anchor or even lower inflation expectations, leading to stable or declining nominal interest rates and narrower interest rate spreads (Abadi et al., 2023). Thirdly, the responsiveness of interest rate spreads to changes in money supply dynamics depends on the efficiency and competitiveness of the banking sector (Liao, 2020). Factors such as market structure, competition levels, and regulatory frameworks influence the speed and magnitude of the transmission process from changes in money supply to interest rate spreads (Ogden et al., 2024). Furthermore, the credibility and openness of the central bank's communication and policy implementation determine how well monetary policy influences the dynamics of the money supply and interest rate spreads (Nabende et al., 2020). Lastly, outside variables that may affect Uganda's money supply dynamics and interest rate spreads include changes in exchange rates and worldwide liquidity circumstances (Nelson & Julius, 2024). Fluctuations in international capital flows, changes in global interest rates, or shifts in investor sentiment can spill over into domestic money supply dynamics, affecting interest rates and interest rate spreads (Epor et al., 2023).

The Effect of Real Effective Exchange Rate and Interest Rate Spread in Uganda: The Real Effective Exchange Rate (REER) plays a crucial role in shaping interest rate spreads within the Ugandan economy (Uche et al., 2023), with several key dynamics at play (Amanda et al., 2023). Firstly, changes in the REER influence interest rate spreads through their impact on the competitiveness of domestic goods and services in the international market (Nelson & Julius, 2024). A strong REER, indicating an overvalued exchange rate, can lead to a loss of competitiveness for Ugandan exports, as they become relatively more expensive for foreign buyers (Epor et al., 2023). This loss of export competitiveness can weigh on economic growth and external balances, prompting policymakers to adopt measures to support export-oriented industries (Nelson & Julius, 2024). One such measure may involve lowering interest rates to stimulate domestic demand and offset the adverse effects of an overvalued exchange rate (Ogden et al., 2024). Lower interest rates under this scenario narrow interest rate spreads, making borrowing more affordable for businesses and individuals, thereby supporting consumption and investment activities (Gunardi & Disman, 2023). Conversely, a weak REER, indicating an undervalued exchange rate, can enhance the competitiveness of Ugandan exports (Gürkaynak et al., 2023).

3. Methodology

This section describes the method used to explore how monetary policy affects interest rate spreads in Uganda, employing a quantitative strategy. An Auto-Regressive Distributed Lag (ARDL) model is employed in the study to investigate the relationships among several variables, including the money supply, inflation, rediscount rate, interest rate spread, real effective exchange rate, external debt, and foreign direct investment.

Research Design: This study adopts a quantitative, non-experimental, longitudinal design to examine the relationship between monetary policy and interest rate spreads in Uganda. It uses time series data to test hypotheses derived from the theory of monetary transmission mechanisms. The analysis focuses on the impact of monetary policy indicators like the rediscount rate, inflation, money supply, real effective exchange rate, external debt, and foreign direct investment on the interest rate spread, guided by a deductive research methodology.

Theoretical Framework: The theoretical underpinning of this study is rooted in the monetary transmission mechanism, which describes how policy-induced changes in the nominal money supply or base interest rates affect real economic variables such as output, inflation, and the spread between lending and deposit rates. The interest rate spread, defined as the difference between lending and deposit rates, serves as a crucial indicator of the monetary policy stance and its effectiveness in influencing economic activities. According to the theory, monetary policy adjustments impact the cost of capital, which in turn affects investment decisions, consumption patterns and ultimately, economic growth.

Model Specification: The study specifies a functional form of the model that captures the dynamic interactions between the monetary policy indicators and the interest rate spread. The general functional form is expressed as:

IRS=f (RDR, INFL, M2, REER, EXTDEBT, FDI)

Where:

- IRS represents the interest rate spread,

- RDR is the rediscount rate,
- INFL denotes inflation,
- M2 signifies money in supply,
- REER stands for the real effective exchange rate,
- EXTDEBT denotes external debt, and
- FDI represents foreign direct investment.

Empirical Model: To empirically estimate the relationships specified in the functional form, the study employs an Auto-Regressive Distributed Lag (ARDL) approach. The ARDL model allows for the examination of both short-term and long-term dynamics among the variables. The econometric form of the model is represented as follows:

$$\Delta LnIRS_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \Delta LnIRS_{t-i} + \sum_{j=0}^{q} \beta_j \Delta LnX_{t-j} + \epsilon_t$$

Where:

- Δ denotes the first difference operator,
- $LnIRS_t$ is the logarithm of the interest rate spread at time t,
- LnX_{t-j} represents the logarithms of the rediscount rate, inflation, money supply, real effective exchange rate, external debt, and foreign direct investment at time $t-j$
- α_0 is the intercept,
- α_i and β_j are coefficients to be estimated,
- p and q are the lag orders selected based on information criteria,
- ϵ_t is the error term.

Data Collection and Analysis: This research employs time series data for Uganda, drawing from the Bank of Uganda and World Bank databases, covering the years 2000 to 2022. The selection of this period is influenced by data availability and reliability. Before proceeding with the analysis, the data series undergoes the Augmented Dickey-Fuller (ADF) test to check for stationarity. The Auto-Regressive Distributed Lag (ARDL) model, along with the Bounds Testing approach for cointegration, is then applied to estimate the model, aiming to uncover long-term equilibrium relationships among the studied variables.

Estimation Technique and Model Validation: The study adopts the ARDL Bounds Testing approach for estimating the model, chosen for its capability to manage variables of mixed integration orders (either I(0) or I(1)). Optimal lag lengths for the ARDL model are determined based on information criteria, including the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC). To validate the model, diagnostics tests for serial correlation, heteroscedasticity, and model stability are performed, ensuring the empirical findings' accuracy and integrity. The interpretation of the ARDL model's long-run coefficients is then aligned with theoretical insights and previous research on the dynamics between monetary policy and interest rate spreads.

4. Results

Table 1: Summary Statistics of Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
spread	23	18.13957	1.690141	15.73	22.86
Rdr	23	14.34036	3.619416	7.511667	22.04167
Infl	23	8.495212	17.18646	-3.16956	85.35327
m2	23	9657.735	7936.795	1167.493	26302.34
Reer	23	102.8512	6.674581	92.12749	116.989
extdebt	23	36.73352	19.74794	11.17634	70.75517
Fdi	23	3.456787	1.22567	2.039005	6.656597

The table's analysis reveals varied patterns among different economic indicators. The "spread" variable demonstrates a relatively stable distribution, evidenced by its narrow standard deviation, suggesting minor

fluctuations. Conversely, "rdr" (rediscount rate) and "infl" (inflation) show higher volatility, with "infl" particularly displaying a wide range, including negative minimums indicative of deflationary periods. "M2," representing money supply, has a high mean and wide range, indicating significant variations in monetary conditions. "Reer" (real effective exchange rate) exhibits modest variation, pointing to stable comparative price levels. "Extdebt" (external debt) reveals a significant disparity in levels, while "fdi" (foreign direct investment) maintains a consistent mean with occasional outliers, as seen in the maximum value far from the mean. This suggests an economic environment marked by both stability in certain areas and considerable volatility in others.

Table 2: Correlation Results

	SPREAD	RDR	INFL	M2	REER	EXTDEBT	FDI
spread	1						
Rdr	0.6237	1					
Infl	0.1503	-0.0806	1				
m2	-0.2072	-0.2539	-0.1634	1			
reer	0.1736	0.0057	0.1691	-0.5331	1		
extdebt	-0.296	-0.0869	-0.2782	-0.0436	0.0284	1	
fdi	-0.1298	0.1363	-0.0207	-0.3342	0.2519	-0.4141	1

The correlation matrix analysis for the study reveals that while "rdr" (rediscount rate) has a moderately strong positive correlation with "spread" (0.6237), suggesting a direct relationship, it shows minimal correlation with "reer" (real effective exchange rate) and "extdebt" (external debt), and a slight negative correlation with "m2" (money supply). "Infl" (inflation) demonstrates weak correlations with all variables, suggesting limited predictive power. Notably, "m2" is moderately negatively correlated with "reer," indicating potential inflationary pressures as the money supply increases. "Fdi" (foreign direct investment) and "extdebt" display a moderate negative correlation, implying that higher FDI levels may be associated with lower external debt. The matrix suggests multicollinearity might not be a significant concern for this model, as no two variables are highly correlated (beyond the ±0.8 threshold).

Table 3: Variance Inflation Factor Results

Variable	VIF	1/VIF
LnM2	2.08	0.481835
LnREER	1.53	0.651611
LnFDI	1.51	0.66019
LnEXTDEBT	1.49	0.670041
LnINFL	1.4	0.713297
LnRDR	1.19	0.841981
Mean VIF	1.53	

The Variance Inflation Factor (VIF) serves as a diagnostic tool to quantify the extent of multicollinearity within independent variables of a regression model, by elucidating the degree to which the variance of an estimated regression coefficient is inflated due to multicollinearity. A VIF exceeding 5 or 10 denotes pronounced multicollinearity, indicating substantial correlation among the variables, which may impair the precision of the estimated coefficients. Examination of the VIF outcomes reveals that "LnM2" manifests the most significant VIF at 2.08, highlighting a degree of multicollinearity yet remaining beneath the conventional threshold of concern. Additional variables, including "LnREER," "LnFDI," "LnEXTDEBT," "LnINFL," and "LnRDR," exhibit VIF values ranging from 1.19 to 1.53, indicative of a minimal to moderate presence of multicollinearity. The mean VIF value across these variables is computed at 1.53, indicating an average increase of 53% in the variance of coefficient estimates attributed to the intercorrelations among the predictors, compared to a scenario of no correlation. Nonetheless, the relatively subdued VIF figures presented do not denote acute multicollinearity, thereby implying that the estimates of the regression coefficients are likely to be robust and credible.

Diagnostic Tests

Heteroskedasticity Test: A heteroscedasticity test serves as a statistical method to verify a key presumption in regression analysis, which is the constancy of error variance (the disparity between forecasted and observed values) across all independent variables. When this presumption is breached, known as heteroscedasticity, it can undermine the precision of statistical assessments within regression models. Therefore, conducting a heteroscedasticity test is crucial for confirming the dependability of regression analysis and the legitimacy of the inferences made from it. The results of the test are as follows,

Table 4: Breusch-Pagan

Test	H0	Variables	chi2(1)	Prob > chi2
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	Constant variance	fitted values of D.LnIRS	0	0.9545

The test statistic chi2(1) has a value of 0.00, and the associated probability (Prob > chi2) is 0.9545. This high p-value suggests that there is no statistical evidence to reject the null hypothesis of homoscedasticity (constant variance) in the regression model's errors at conventional significance levels. In practical terms, the results indicate that the variance of the errors is consistent across all levels of the independent variables, and there is no indication of heteroskedasticity in the model based on the fitted values of the dependent variable "D.LnIRS". Therefore, the standard errors of the regression coefficients can be considered reliable for inference.

Serial Correlation Test: Serial correlation is the measure of how much a data point in a time series is related to its preceding data points. This can indicate whether past values influence future values. Testing for serial correlation helps in identifying non-randomness in data, which is essential for creating accurate models. The results are presented as follows,

Table 5: Durbin's Alternative Test for Autocorrelation

Test	H0	lags(p)	chi2	df	Prob > chi2
Durbin's alternative test for autocorrelation	no serial correlation	1	9.986	1	0.0016

The p-value of the test, being below the standard threshold of 0.05, leads to the rejection of the null hypothesis, thereby indicating the presence of serial correlation in the model residuals when considering a single lag. The presence of serial correlation suggests that the residuals are not independent of each other, which can result in inefficiencies in the estimated coefficients and biased standard errors. This could potentially compromise the reliability of any hypothesis tests conducted. However, despite the detection of serial correlation, the model's estimations can still provide valuable insights if the primary objective is prediction rather than inference, or if the model is used as an exploratory tool to identify potential relationships and inform more robust model specifications in future research.

Normality Test for Residuals: In regression analysis, a crucial assumption is the normality of residuals. Residuals represent the discrepancies between the actual values of the dependent variable and those predicted by the model. These residuals should follow a normal distribution. This normality assumption underpins many statistical techniques. These methods rely on the normal distribution to calculate accurate p-values and confidence intervals, which are essential for drawing reliable conclusions about a model's significance. Testing for normality of residuals is therefore vital to ensure the validity of these statistical tools. If the residuals deviate from a normal distribution, it suggests potential issues with the model's specification or the presence of underlying patterns in the data that the model fails to capture. Consequently, neglecting normality tests can lead to inaccurate conclusions and unreliable predictions. The results of the normality test are presented as follows,

Table 6: Skewness/Kurtosis Test for Normality

Test	Variable	Obs	Pr(Skew)	Pr(Kur)	adj chi2(2)	Prob>chi2
Skewness/Kurtosis test for Normality	Residuals	18	0.6615	0.9784	0.19	0.9083

The p-values are all significantly higher than the accepted significance level of 0.05. This suggests that there is insufficient statistical support for the null hypothesis, which states that the residuals have skewness and kurtosis characteristics consistent with a normal distribution. The residuals are consistent with a normal distribution, satisfying an important assumption for many inferential techniques in regression analysis. Therefore, the model does not show violations of the normality assumption based on these test results.

Omitted Variable Test: Omitted variable bias in regression analysis arises when relevant, but excluded, variables influence both the outcome of interest and other included variables. This skews the results, making interpretations of relationships between variables misleading. It's particularly worrisome in time series analysis, where missing variables can introduce errors and invalidate the model. The Ramsey RESET test helps detect such issues by checking for omitted variables, especially those capturing non-linear effects, ultimately improving the reliability of time series models.

Table 7: Ramsey Test Result

Test	H0	F(3, 1)	Prob > F
Ramsey RESET test using powers of the fitted values of D.LnIRS	no omitted variables	27.98	0.1379

The Ramsey RESET test yields an F-statistic of 27.98 and a p-value of 0.1379, testing for the absence of omitted variables in the model. With the p-value exceeding the standard threshold of 0.05, the null hypothesis cannot be rejected, implying that there is no statistical evidence of omitted variable bias within the model's specification according to this test.

Cointegration: Cointegration is a statistical property of a set of time series variables whereby any linear combination of them will tend to revert to a long-term equilibrium, despite individual series being non-stationary. This concept is vital in time series analysis because it implies that the variables have a meaningful long-term relationship even if they appear to drift apart in the short term. In economic terms, this often signifies that the variables influence each other over time. Checking for cointegration is essential as it enables the use of error correction models that account for both short-term fluctuations and long-term equilibrium, thereby providing more reliable forecasts and inferences. The ARDL bounds test for cointegration is particularly useful because it is applicable irrespective of whether the underlying variables are I(0) or I(1), and it provides a systematic approach to testing the existence of a long-term relationship between the variables. The cointegration results for the study as in the table below,

Table 8: Bounds Test Results

F: 33.581				
t: -7.733	H0: no levels of relationship			
Critical Values (0.1 - 0.01), F-statistic, Case 3				
K	**0.1**	**0.05**	**0.025**	**0.01**
1	2.12	3.23	2.45	3.61
2	2.75	3.99	3.15	4.43
Accept the regressor I(0) if F is less than the crucial value. If F exceeds the critical value for I(1) regressors, reject				
T-statistic, Critical Values (0.1 - 0.01), Case 3				
K	**0.1**	**0.05**	**0.025**	**0.01**
1	-2.57	-4.04	-2.86	-4.38
2	-3.13	-4.66	-3.43	-4.99
Accept the I(0) regressors if t > the crucial value. For I(1) regressors, reject if t < critical value.				

Note: in the long-run connection, k is the number of non-deterministic regressors. The critical values are from Smith, Shin, and Pesaran (2001).

The ARDL Bounds Test results show an F-statistic of 33.581 and a t-statistic of -7.733, both of which provide strong evidence against the null hypothesis of no cointegration among the variables in the model. Given that the F-statistic significantly exceeds the upper bound critical value, and the t-statistic is more negative than the lower bound critical value at the 5% significance level, we can conclude that a stable long-term relationship exists between the variables under consideration. This indicates that any short-term imbalances among the variables are likely to adjust toward a long-term equilibrium.

Regression Results: In the long-term analysis of the ARDL model, the rediscount rate appears to be a strong driver of the interest rate spread, suggesting that policy decisions reflected through the rediscount rate have a lasting effect on the spread between lending and deposit rates. Inflation too has a positive association, indicating that over time, as prices rise, the spread tends to widen, possibly reflecting the risk premium required by banks. Conversely, external debt and foreign direct investment (FDI) exert a negative influence, implying that higher external debt levels and greater FDI inflows might compress the interest rate spread in the long run. Notably, the impact of money supply and the real effective exchange rate on the spread is not statistically significant in the long term, which could suggest that their effects may be more transient or overshadowed by other macroeconomic factors. In the short-term scenario, the relationship dynamics shift. Inflation quickly affects the interest rate spread negatively, indicating that immediate inflationary conditions may temporarily narrow the spread. The money supply also shows a significant negative short-term effect, suggesting that an increase in money supply leads to a decrease in the spread, possibly due to an immediate liquidity effect. The real effective exchange rate stands out with a strong positive short-run effect, which might reflect market reactions to currency valuation changes. In both timeframes, the error correction term's significance confirms the model's appropriateness, as it indicates that any short-term imbalances in the interest rate spread correct themselves significantly over time, moving towards the long-term equilibrium established by the model.

Table 9: ARDL Regression Results

Interest Rate Spread	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Error Correction Term	-0.80915	0.104637	-7.73	0.002	-1.09967	-0.51863
Long Run						
Rediscount Rate	0.282501	0.03438	8.22	0.001	0.187047	0.377955
Inflation	0.076004	0.02452	3.1	0.036	0.007926	0.144083
Money Supply	-0.02341	0.018829	-1.24	0.282	-0.07568	0.028868
REER	0.111216	0.165966	0.67	0.539	-0.34958	0.572011
ExtDebt	-0.07525	0.022987	-3.27	0.031	-0.13907	-0.01143
FDI	-0.16905	0.046757	-3.62	0.022	-0.29887	-0.03923
Short Run						
Rediscount Rate	-0.06305	0.040577	-1.55	0.195	-0.17571	0.049609
Inflation	-0.04511	0.012555	-3.59	0.023	-0.07996	-0.01025
Money Supply	-0.37302	0.12322	-3.03	0.039	-0.71513	-0.0309
REER	0.843667	0.189056	4.46	0.011	0.318765	1.368569
ExtDebt	0.071463	0.036416	1.96	0.121	-0.02964	0.172568
FDI	0.005538	0.030458	0.18	0.865	-0.07903	0.090102
Constant	1.81216	0.735849	2.46	0.069	-0.23089	3.855205

5. Discussion and Conclusion

Rediscount Rate: The interest rate spread is marginally impacted, albeit negatively, in the short term by the rediscount rate. This implies that immediate adjustments to the rediscount rate do not have a strong influence on the difference between the lending and deposit rates in Ugandan banks. This could be because banks may not immediately change their lending behaviors or may have existing loans that are not affected by policy changes. Over time, the positive and significant coefficient for the rediscount rate suggests that higher

rediscount rates lead to wider interest rate spreads. The rediscount rate is a reflection of the borrowing costs incurred by financial institutions. As such, a long-term increase in the rate may lead banks to increase lending rates to maintain profits, even while deposit rates may not increase in line with this. This aligns with the monetary transmission mechanism, where policy rates eventually permeate through to affect lending and deposit rates, with a time lag that results in these long-term effects.

Inflation: Inflation shows a significant negative relationship with the interest rate spread in the short term. When inflation increases, it is typical for the central bank to react by increasing interest rates to control inflationary pressures. In the short term, this may result in a narrowing of the spread if deposit rates are quick to adjust due to heightened demand for compensation against inflation, whereas lending rates might adjust more slowly due to fixed rates on existing loans or lag in risk assessment changes. In the long term, inflation has a positive effect on the interest rate spread. Over time, persistent inflation might lead to a more cautious approach by banks, widening the spread to hedge against inflation risk and to maintain the real interest margin. This is reflective of the cost of carry in the transmission mechanism, where sustained higher inflation can lead to increased costs for lenders, which they offset by raising lending rates more than deposit rates.

Money Supply: The money supply has a significant negative impact on the interest rate spread in the short run. An increase in the money supply typically leads to lower interest rates as more funds are available in the banking system. In the immediate term, this can reduce the interest rate spread as banks may lower lending rates to encourage borrowing, while deposit rates may not fall as quickly due to competitive pressures and existing rate agreements. In the long run, the relationship between the money supply and the interest rate spread is negative but not statistically significant. Over time, the effect of money supply on spreads seems to diminish or become uncertain. This may be because other factors come into play that influence the spread, such as changes in borrowers' risk profiles, banks' risk management strategies, and the overall economic context in Uganda. The disparate short- and long-term effects highlight the complexity of Uganda's financial system.

For example, while changes in the policy rate set by the central bank may not immediately impact bank behavior, over time, strategic adjustments might have a significant impact on spreads. Additionally, the unique reactions to inflation in the short and long term suggest that banks and consumers respond differently over various time horizons. In Uganda, where the economy might be sensitive to inflation and liquidity conditions, such dynamics emphasize the importance of a cautious and forward-looking monetary policy. In conclusion, the rediscount rate, inflation, and money supply each have distinct and nuanced impacts on the interest rate spreads in Uganda, with the effects varying in the short and long run. Policymakers and financial institutions should account for these temporal differences when designing and implementing monetary policies. Recognizing the lag in the transmission mechanism is crucial for anticipating the broader economic consequences and for effective financial stability oversight.

Policy Recommendation: Gradual Adjustment of the Rediscount Rate: The evidence suggests that immediate adjustments to the rediscount rate have minimal impact on the interest rate spread in the short term, but significant effects are observed in the long term. This implies that rapid changes to the rediscount rate might not immediately influence banks' lending and deposit behaviors but lead to a wider interest rate spread over time due to adjustments in the cost of borrowing. Therefore, it's recommended that the Central Bank adopt a policy of gradual and transparent adjustments to the rediscount rate. This approach allows for smoother transitions and provides banks with the time necessary to adjust their lending rates in a manner that is more aligned with the central bank's policy objectives. A gradual adjustment policy could mitigate potential market disruptions and ensure that the monetary policy transmission mechanism operates more effectively. In the Inflation Targeting Framework, the connection between inflation and the interest rate spread is complicated, having a notable detrimental influence in the short term and a beneficial effect in the long term. This dichotomy underscores the importance of managing inflation expectations through a clear and robust inflation-targeting framework. By setting explicit inflation targets and being transparent about the measures to achieve these targets, the Central Bank can help stabilize the financial market's response to inflationary pressures. Such a framework would enable banks to anticipate inflationary trends and adjust their lending and deposit rates, accordingly, minimizing the volatility of interest rate spreads. An effective inflation-targeting regime would also enhance the credibility of the Central Bank, fostering a more stable economic environment conducive to growth.

Monitoring and Management of Money Supply: The significant negative impact of an increased money supply on the interest rate spread in the short term, and its uncertain long-term effects, highlight the need for vigilant monitoring and management of liquidity in the banking system. The Central Bank should employ a set of tools designed to adjust the liquidity in a manner that ensures a balanced money supply, thus preventing excessive short-term fluctuations in interest rates while maintaining stable interest rate spreads over the long term. Active liquidity management would also allow the Central Bank to respond more effectively to external shocks and changing economic conditions, ensuring that the banking sector remains resilient and supportive of economic growth.

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