

Macroeconomic Determinants of Interest rate Spread in Ghana: Evidence from ARDL Modelling Approach

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Abstract

The Ghanaian economy appears to be in a certain cycle of high lending and low borrowing rates culminating in wide interest rate spreads. A number of studies point to the fact that the spread between the lending rates and borrowing rates is too wide to promote efficient financial intermediation between savers and borrowers but failed to look at macroeconomics effect on the interest rate spread in Ghana. This study contributes to the discussion by evaluating the macroeconomic variables (factors) that affect the interest rate spread with a view to determining their short-term and long-term relationships for policy recommendations that will serve the interest of all stake holders in the financial services' sector and the general Ghanaian economy. Using autoregressive distributed lag (ARDL) cointegration and Vector Error Correction analysis, we observed both short-run and long run relationship between identified macroeconomics variables and interest rate spread in Ghana. The study recommends that, government borrowing, interest and inflation rate are kept low while pursuing policies that maximise savings.

Introduction

Interest rate in its base form refers to the amount charged on money borrowed or lent out expressed as a percentage within a period of time, usually one year. It is also sometimes referred to as the cost/price of money given out for a defined period of time.

Interests are charged when people borrow funds for varying purposes from commercial to personal and paid when people lend to the finance institutions through various deposit vehicles.

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The important point worthy of note is that interest of whatever kind is supposed to at least preserve the value of money over time. The value of money naturally declines with time as a result of a number of factors, principal among which is the inflation rate.

The business of banking is basically one of the financial intermediation-mobilization of deposits from surplus units of an economy and lending to deficit units of an economy. When banks mobilize deposit from customers, they pay interest on these deposits to ensure that deposits do not lose value over the period that the money is kept with the bank. The interest on deposits is termed borrowing rate in recognition of the fact that deposits are invariably a way of the bank borrowing from the public (customers). At the other end, when banks lend money to customers, interest is charged on it for a number of reasons, including value preservation, compensation for risk, profit among others. This interest is referred to as bank lending rate.

The gap between the lending rates and the deposit rates is termed bank interest rate spread. Bank interest rate spread is the interest rate charged by banks on loans to customers minus the interest rate paid by banks for demand, time or savings deposits. When borrowing rates are high, it encourages deposit and provides needed funds for the bank to lend out. However, for a given lending rate, an increase in borrowing rate will lead to a decline in the interest rate spread which could affect bank profitability. Furthermore, when lending rates are low, they tend to induce investment in an economy leading to growth and development. However, for a given borrowing rate, a lower lending rate will tend to reduce the bank interest rate spread which could affect bank profitability.

According to the Begg, Fischer and Dornbusch (1994) IS-LM model, the impact of monetary policy on real activity is mainly due to money demand and variations of a single interest rate. However, when imperfect substitution among financial instruments is allowed, returns across financial instruments can be different. If variations of interest rates can be linked to the stance of monetary policy, then an easing of monetary policy does not necessarily produce the same effect on interest rates in every financial market. Moreover, the impact of monetary policy on real activity will not only depend on the level of interest rates but also on its effects on the structure of the interest rates.

Financial deregulation has modified the nature and impact of the monetary aggregates. In most Organisations for Economic Co-operation and Development (OECD) countries, the link of money and credit to economic activity has been weakening as financial innovation developed both new ways of finance and new saving products. In a lot of respects, the study and understanding of interest rates are important for a number of reasons.

Firstly, every economy's ability to set and achieve economic targets depends on the reliability of the variables used as predictive variables in setting these targets. For instance, in analysing the use of monetary policy variables in predicting Gross National Product (GNP), Sims (1980), using US data, was able to show that the interest rate is better than M1 (a monetary aggregate) in predicting Gross National Product (GNP). Using Granger causality tests and variance decomposition from VAR models, Bernanke and Blinder (1992) have shown that the federal funds rate has a greater predictive power for real variables than the monetary aggregates M1 and M2. They have also shown that this rate is an exogenous instrument of monetary policy and is therefore, a better indicator of the stance of monetary policy than the monetary aggregates. These studies suggest that when interest rates in general are properly understood, monetary policy formulation and implementation will lead to the attainment of macroeconomic targets with relative ease.

Secondly, the behaviour of interest rates spreads give information about the position of an economy on the business cycle. A number of studies, such as Stock and Watson (1989), Bernanke (1990) and Friedman and Kuttner (1992), have shown that interest rate spreads are good leading indicators of the business cycle for they contain information on future activity that is not already included in interest rates and monetary aggregates. For these and other reasons, therefore, it is imperative that serious efforts are made properly understand the behaviour of interest rates in general and their spreads in particular.

The Ghanaian economy appears to be in a certain cycle of high lending and low borrowing rates culminating in wide interest rate spreads. A number of studies point to the fact that the spread between the lending rates and borrowing rates is too wide to promote efficient financial intermediation between savers and borrowers.

The spread between lending rate and deposit rate in Ghana has been widening over the years and has earned Ghana the reputation of having the highest lending rate in sub-Saharan Africa. It is noted that this situation accounts for the slow growth rate of the economy, as private businesses are unable to borrow at the current interest rate to expand their businesses so as to create employment to absorb the unemployed masses. There is a general perception that while lending rates are too high to induce any meaningful investment and are at the core of low private sector investment in Ghana, borrowing rates are too low for savings mobilisation and is blamed for the low savings rate in Ghana. Deposit-lending rate spreads are closely related to the banking sector's ability to channel savings into productive uses.

Several studies have looked at the causes and implications of high spreads, but in some regions, particularly Africa, spreads have received less attention. Some of the regional studies that have been conducted are briefly looked at as follows. Gelos (2006) found that Latin American banks had high spreads because of higher interest rates, fewer efficient banks, and larger reserve requirements than banks in other regions. Brock and Rojas-Suarez (2000) found that higher operating costs and higher nonperforming loans (NPLs) were related to higher spreads. Randall (1998) found that the share of loans going to the public sector in the Caribbean was negatively correlated with spreads (one possible explanation for this was that greater government involvement resulted in larger transactions that were more efficient to manage). Barajas, Steiner, and Salazar (1999) found that in Columbia spreads widened in the 1990s as a result of high NPLs of the public banks and private banks' greater responsiveness to credit quality and more careful approach to risks. Banco Central do Brazil (1999) identified credit risk, taxes, and overhead costs as the main determinants of the high ex-ante spread in Brazil (more important even than the high level of required reserves, which are nevertheless significant).

It is generally agreed that high lending rates have adverse effects on an economy as a result of its effect on investment and other macro economic variables. In Ghana, there is widespread perception that the spread is too wide (Kwakyie, 2010; Bawumia, Belnye and Ofori, 2005). Bawumia et al (2005) had examined the determinants of interest rate spread in Ghana but the study only looked at market and firm characteristics despite the strong theoretical connection between of interest rate and fundamental macroeconomic factors.

He attributes several factors such as high cost of funds, high lending risk, high public sector borrowing, the low savings rate relative to borrowing and bi-causality between interest rate and fundamental macroeconomics indicators like inflation and exchange rates to the high interest rate spread but empirical analysis of the relationship between interest rate spread and these variables in both short run and long run is missing in the literature. This study evaluates the variables (factors) that affect the interest rate spread with a view to determining their short term and long term relationships and seeking for policy measures from them.

Methodology

Data and Sources of Data

The empirical analyses make use of monthly data sets on inflation, treasury bill rates, total banking sector deposits and extent of public sector crowd out in terms of domestic lending activities. The inflation data is derived from a CPI series with monthly rates for inflation. Use is also made of primary market interest equivalent rates on the debt securities isolated. Data on the Ghana CPI was obtained from Ghana Statistical Service while data on the debt securities and public sector crowd out was obtained from Bank of Ghana.

The main data source of data used is the secondary data. Secondary data are data collected not for some purpose other than the research situation at hand. A wide variety of secondary data readily available for use and this researcher did take due advantage of them. However, the purpose for which secondary data were originally gathered will normally differ from the objective of the specific of the research. The secondary to data is used because the researcher seeks to establish the veracity of relationships between certain variables, for which reason past data of the respective variables is most appropriate. This research has made extensive use secondary data sources from relevant state institutions, including the statistical service, the Bank of Ghana, ministry of finance among others.

The use of secondary data has two inherent advantages. Firstly, secondary data has cost and time advantages over primary data. A research study will invariably be less expensive and easier complete if it utilizes secondary data than primary data. Secondly, secondary data is readily available.

Certain kinds of data an individual may find difficult to collect on his/her own as primary data may be readily available. However, the major limitations to the secondary data usage are in respect of relevance and accuracy.

Variable Definition

Dependent Variable

Interest rate spread (SP). Based on the data available in the Bank of Ghana annual publications on the banking sector in Ghana, we used an *ex-ante* approach in calculating the interest rate spread. In a recent study Crowley (2007), compared both *ex-ante* and *ex-post* measures of interest rate spreads for the aggregate banking sector in English-speaking African countries. His findings suggest that analyses using *ex-ante* measures of interest rate spreads provide more useful results than those using *ex-post* measures. This approach uses the rates quoted on loans and on deposits and draws inferences from the difference between them. The dependent variable, bank interest rate spread, is therefore defined as the difference between bank lending and deposit rates. Ideally, it is measured as the difference between the average interest rate earned on loans, and the average interest rate paid on deposits for individual commercial banks (Sologoub, 2006). However, due to the unavailability of such bank-level data on interest rates in Ghana, and in order to understand the broad state of efficiency of financial intermediation in the economy, banking sector spreads are instead examined. This is done by using the average monthly commercial bank base lending and deposit rates provided by the Bank of Ghana for the years considered (1999-2010), making up a total of 144 months. The banking sector interest rates spread is calculated as;

$$SP = \text{Average Commercial Bank Lending Rate} - \text{Average Commercial Bank Deposit Rate}$$

Independent Variables

1. Inflation (INF). This variable (INFL) is generally considered as an indicator of the cost of doing business in an economy. Higher rate of inflation is expected to lead to higher lending rate for reasons already advanced in the review of literature. It is therefore expected the rate of inflation will be positively correlated with banking sector IRS, particularly in a developing country where, inflation is high and variable (Chirwa and Mlachila, 2004).

2. **Treasury bill rate (TB).** It is generally regarded as an indicator of the interest rate policy being pursued by the government, and a benchmark for the rates charged by commercial banks. This variable is therefore, also expected to be positively correlated with the banking sector IRS, because lower Treasury bill rates would lead to lower lending rates, hence lower banking sector interest rate spread and vice versa.
3. **Crowding out (CD).** This measures the extent of government dependence on the domestic banking sector for the financing of its fiscal deficit. Fiscal deficits ensue when the public sector expenditure exceeds public sector revenues/inflows. This variable measure for the entire banking sector, public sector borrowing as a percentage of total loans advanced by the banking sector. Robinson (2002) notes that, 'the level of government borrowing and its influence on money and credit markets is .an element of macroeconomic policy that imposes constraints on the flexibility of interest rates.' Crowd is therefore expected to be positively correlated with banking sector IRS, as government's heavy reliance on domestic banking sectors for deficit financing increases competition for funds and causes interest rates (lending rates) to rise. For a given deposit rate, a rise in lending rates will lead to a rise in the interest rate spread in the economy.

Total deposits (TD)

The total volume of deposits mobilized by the banking sector determines to a large extent, the supply of loanable funds. An increase in total deposits is expected to increase the supply of loanable funds and lead to a reduction in lending rates. Therefore, for any given level of deposit rates, interest rate spreads are expected to reduce when the total deposits increase (as a result of a reduction in lending rates). It is therefore expected that the variable DEPOS (total deposits) will be negatively correlated to the interest rate spread.

The expected relationship between the banking sector interest rate spread (IRS) and its market and macroeconomic determinants is therefore specified as follows:

$$SP_t = \beta_0 - \beta_1 TD_t + \beta_2 INF_t + \beta_3 CD_t + \beta_4 TB_t + e_t$$

Where;

B_0 is a constant

$\beta_1, \beta_2, \beta_3, \beta_4$ are coefficients of respective variables

TD_t is total deposits at any point in time

INF_t is the rate of inflation at any point in time

CD_t is the extent of public sector domestic borrowing at any point in time

TB_t is the Treasury bill rate in any particular month

e_t is the error term

Method of Analysis

Empirical studies show that most of the time series are not stationary. Indeed, the visual inspection of all the variables intended to be used in this study in their levels suggests that they are trending and therefore, non-stationary. That is, their mean and variances depend on time. As econometric theory shows, when the variables are non-stationary, the standard ordinary least squares cannot be applied because there might be a spurious regression which affects forecasting performance.

A number of methods are suggested to solve this problem. One of them is taking the differences of the series and then putting them into regressions. However, in this case, we are confronted with a new problem. This method leads to the loss of information that is important for the long-run equilibrium. As long as the first differences of the variables are used, determining a potential long-run relationship between these variables becomes impossible. This is the point of origin of cointegration analysis.

The cointegration approach developed by Engle, and Granger (1987) overcame this problem. According to this approach, time series which are not stationary at levels but stationary in the first difference can be modelled with their level states. In this way, loss of information in the long run can be prevented. However, this approach becomes invalid if there are more than one cointegration vectors. Moving from this point, with the help of the approach developed by Johansen (1988), it is possible to test how many cointegration vectors there are among the variables by using the VAR model in which all the variables are accepted as endogenous.

Therefore, unlike the Engle-Granger method, a more realistic examination is provided without limiting the test in one cointegration vector expectation.

However, in order to perform these tests developed by Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990), the condition must be met that all series should be not stationary at the levels, and they should become stationary when the same differences are taken. If one or more of the series are stationary at levels, that is to say, $I(0)$, the cointegration relationship cannot be examined with these tests. Due to this limitation, the study employs the bounds testing approach to cointegration, which has become increasingly popular in recent times.

The ARDL Cointegration Approach

To search for possible valid dynamic long-run relationships amongst the variables of interest, the study adopts the recently developed autoregressive distributed lags (ARDL). This new version of the cointegration techniques for determining long-run relationships among the variables in this study was developed by Pesaran *et al.* (2001). There are a number of advantages of using this cointegration approach over other alternatives like the conventional Johansen (1998) and Johansen and Juselius (1990).

Firstly, the Johansen conventional cointegration method estimates the long-run relationship under the restrictive assumption that all the model's variables are integrated of order 1, that is $I(1)$. However, and as shown at Pesaran and Shin (1995) and Pesaran *et al.* (2001), the ARDL models yield consistent estimates of the long run coefficients that are asymptotically normal irrespective of whether the underlying regressors are purely $I(0)$, purely $I(1)$, or mixture of both. This implies that, unlike the standard cointegration approach, the ARDL avoids the pre-testing of variables to identify the order of integration of the underlying variables.

Secondly, the ARDL method avoids the larger number of specification to be made in the standard cointegration test. These include decisions regarding the number of endogenous and exogenous variables (if any) to be included, the treatment of deterministic elements, as well as the optimal of lags to be specified. The estimation procedures are generally very sensitive to the method used to make these choices and decisions (Pesaran and Smith, 1998).

With the ARDL methodology, it is possible that different variables have different optimal lags, which is impossible with the conventional cointegration test.

Furthermore, the ARDL methodology provides unbiased estimates of the long-run model and valid t-statistics by the inclusion of dynamics in the model, even when some of the regressors are endogenous (Inter, 1993). This is particularly important in this study because of potential endogeneity of some of the regressors (particularly inflation).

Lastly, when compared to other alternative techniques, the ARDL methodology performs better with small sample data which according to Nayaran (2004) should be between 30 and 80 observations like the one in this study.

The ARDL Model Specification

According to Pesaran and Pesaran (1997), there are two steps for implementing the ARDL approach to cointegration procedure. First, the existence of the long-run relationship between the variables in the system is tested using an F-test. Secondly, the error correction representation and long-run model are estimated after the lag orders of the variables are chosen using Akaike Information Criterion (AIC). Then the stability tests, namely Cumulative Sum of Recursive Squares (CUSUM) and Cumulative Sum of Square of Recursive Residuals (CUSUMQ) tests are conducted.

To conduct the bounds test approach in examining the relationships, the model should be stated in an unrestricted error correction model (UECM) form as follows:

$$\Delta SP_t = \gamma + \sum_{i=1}^{p_1} \alpha_i \Delta SP_{t-i} + \sum_{i=0}^{p_2} \beta_i \Delta TB_{t-i} + \sum_{i=0}^{p_3} \pi_i \Delta INF_{t-i} + \sum_{i=0}^{p_4} \varpi_i \Delta TD_{t-i} + \sum_{i=0}^{p_5} \theta_i \Delta CD_{t-i} + \lambda_1 SP_{t-1} + \lambda_2 TB_{t-1} + \lambda_3 INF_{t-1} + \lambda_4 TD_{t-1} + \lambda_5 CD_{t-1} + \varepsilon_t$$

Unit Root Test

The computed F-statistics provided by Pesaran *et al.* (2001) for the estimation of the ARDL model assumes that the variables are of I(0) or I(1). It is therefore, important to determine the order of integration of the variables to ensure that the order of integration fall within this.

To determine the order of the series, two different unit root tests were conducted augmented Dickey and Fuller (1979) (ADF) and Phillips and Perron (1988) (PP).

Data Presentation and Analysis

Data and Descriptive Statistics

This study is conducted using monthly data from the IMF's *International Financial Statistics*, the Bank of Ghana and the Ghana Statistical Service for the period January 1999 – December 2010. Attempts were made to extend the years of coverage as much as possible, however, based on the availability of data for critical variables a maximum of 144 months was included.

Table 1: Descriptive statistics

	CD	INF	SP	TB	TD
Mean	-0.95	2.74	2.81	2.81	7.94
Std. Dev	0.21	0.31	0.17	0.41	0.76
Skewness	-0.53	0.283	-1.499	-0.18	0.00
Kurtosi	2.51	2.43	7.82	2.21	1.82
Jarque-Ber	6.21	2.93	146.56	3.37	6.22
Probabilit	0.04	0.23	0.0	0.18	0.04
Observation	10	10	10	10	109

Table 1 above highlights the descriptive statistics (means and standard deviations) for all the variables under consideration. It depicts the averages of both the dependent and independent variables for the period. The statistics suggest that the average public sector domestic loans as a percentage of total banking sector loans is about 0.3944 (39.44%). By implication, on the average for any amount of loans advanced by the banking sector; 39.44% were given to the public sector thereby making the public sector a critical player in the money market. The average total monthly deposit is found out to be about GHS 3739.32 million. With regards to inflation and Treasury bill rates, the monthly averages are about 16.36% and 18.05% respectively.

It is observed that mean Treasury bill rate is higher than the mean inflation rate from which it can be concluded that for the period under consideration, holders of treasury bills were covered against risk of loss in value resulting from price changes. Considering the fact that treasury bills are largely seen to be default risk free, the about two percentage point difference between inflation and Treasury bill rates could be seen as adequate compensation above risk of value loss.

Unit Root Test

Though the ARDL approach to cointegration does not require the pre-testing of the variables included in the model for unit root, the computed F-statistics provided by Pesaran *et al* (2001) are no more valid in the presence of I(2) or beyond variables because they are based on the assumption that the variables are either I(0) or I(1). It is therefore, important to carry out the implementation of the unit root tests to ensure that none of the variables is integrated of order 2 or beyond. To determine the order of integration of the variables, the study employs ADF and PP tests. The results of the DF ADF and PP tests as reported in Table 2, which are obtained from E-Views 5.1 indicate that all the time series variables are I(1) except interest rate spread.

Table 2: Unit Root Test: ADF Test and PP-Test

Variable	ADF		PP		Order of integration
	Levels	1 st Difference	Levels	1 st Difference	
<i>TB</i>	-1.60[0.475]	-17.90[0.00]**	-1.95[0.30]	-19.20[0.00]**	I(1)
<i>CD</i>	-1.66[0.448]	-10.49[0.00]**	-1.69[0.43]	-10.49[0.00]**	I(1)
<i>SP</i>	-3.69[0.00]**	-	-3.60[0.00]**	-	I(0)
<i>INF</i>	-2.253[0.188]	-5.37[0.00]**	-1.85[0.354]	-10.62[0.00]**	I(1)
<i>TD</i>	-0.225[0.931]	-13.43[0.00]**	-0.22[0.9317]	-13.43[0.00]**	I(1)

Note: The null hypothesis for the PP and ADF test is that the data process under examination contains a unit root. Critical values of PP & ADF 1% and 5% are -3.43 and -2.86 respectively (see MacKinnon, 1996). * (**) denotes rejection of the hypothesis at 10% (5%) significance level

Estimated Relationship

The results of the unit root tests indicate that the ARDL model for $\log Y_t$ can be implemented using upper bound critical values reported in Pesaran *et al* (2001) for determination of cointegration.

The calculated F-Statistics $F_{sp}(SP/TB, INF, TD, CD) = 4.35$ for ARDL (7, 2, 4, 2, 1) is higher than the upper bound critical Value 3.87 at 5% significance level. This implies that there is cointegration relationship between the variables. The significant negative coefficient of EC(-1) (see Table 4) further supports the existence of long-run relationship. The study thus proceeds to analyze the short- and long-run coefficients of the variables. The lag order of the variables in the system was selected by Akaike Information Criterion and obtains the ARDL (7, 2, 4, 2.1) specification. The long run coefficients of the variables under consideration are reported in Table 3 below.

The long run estimate shows that inflation proxy by CPI has a positive and significant relationship with the interest rate spread. The estimated coefficient shows that 1 percent increase in the inflation lead to 0.25% increase in the interest rate spread. The result is consistent with existing studies and in line with theory. High inflation is considered undesirable. Inflation creates uncertainty, especially since the volatility of inflation tends to increase, the higher it is. Such uncertainty entails various costs, such as high default rate resulting in high credit risk. The long run effect is the demand for a high risk premium from banks and other financial intermediaries, which leads to high interest rate spread. The short run estimate lends credence to the long run findings. Increase in growth of inflation, which signifies volatility of inflation leads to high interest spread. Table 3 shows that a percentage increase in inflation growth rate leads to about 0.11% increase in the growth of interest rate spread. This indicates that, although, the interest rate spread growth responds to inflation rate growth; it is not complete pass-through. The finding of this study is in line with the theoretical position of the relationship between inflation and interest rate spread. There is a positive effect of inflation and significant at 10% levels in the determination of interest rate spread in Ghana. The finding reinforces the need to keep inflation as low as possible in an economy.

Contrary to the expectation of inverse relationship between interest rate spread and total deposit, the study recorded positive significant long run relationship between interest rate spread and total deposits. It is possible that financial intermediaries try to maintain their profit margin and associate risk level in lending at low rate by disproportionately reducing the saving rate. Table 3 shows that 1% increase in total deposits leads to about 0.12% increase in interest rate spread in Ghana in the long run.

In the short run total deposit exhibit insignificant relationship with interest rate spread and was therefore not included in the model. This is not surprising as financial intermediaries may not respond promptly to increase in total deposits unless it persists.

Crowding effect, which measures the proportion of total loans that is given to government as a percentage of GDP is generally found to be insignificant in the long run but positively associated with higher spreads, with the relationship being highly significant in the short run. Public sector involvement could cause inefficiencies in financial intermediation in the short run but equilibrium is established in the long run. Governments almost have an unlimited capacity to take loans at relatively higher interest rates than the private sector. This fact coupled with the fact that government borrowings are treated as default risk free implies that private individuals and businesses will have to be prepared to pay higher rates to attract funds away from government. Hence, anytime there is an increase in domestic borrowing activity by government, it is almost always accompanied by an increase in lending rates and as a consequence a rise in interest rate spread. This true for short run but the situation could be different in the long run. In long run savers will look for means of lending directly to government directly by investing in short term government securities such T-bills which will wipe-off the profit and bring the spread to normal in the long run. It therefore does not come as a surprise that the variable crowding effect is found to be significantly positive in short run (see Table 4) and insignificant in the long run (see Table 3).

Treasury bill acts as an alternative investment for savers and is very normal that increase in T-bill rate exhibit negative effect on interest spread. The saver have option of choosing between low savings rate and high treasury bill rate and because of competition in the money market, lenders cannot continue to lend as high as they wish but they have no option than to offer competitive saving rate to attract and sustain its customer. This leads to a reduction in the interest rate spread, hence the negative relation in the short run as shown in Table 4.

Table 3: Long-Run Relationship, ARDL(7,2,4,2,1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TB	-0.144	0.026	-1.528	0.130
INF	0.249*	0.037	1.847	0.068
TD	0.121**	0.014	2.310	0.023
CD	-0.082	0.040	-0.569	0.570
C	-4.156	0.326	-3.565	0.000
R-squared	0.507087	Mean dependent var		-0.003333
Adjusted R-squared	0.377990	S.D. dependent var		0.090990
S.E. of regression	0.071762	Akaike info criterion		-2.243039
Sum squared resid	0.432578	Schwarz criterion		-1.668505
Log likelihood	143.0026	F-statistic		3.927969
Durbin-Watson stat	2.040988	Prob(F-statistic)		0.000003

** and * indicate significance at 5% and 10% levels respectively

Table 4 Short-Run Relationship

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SP(-2))	0.364*	0.084	4.313	0.0000
D(SP(-3))	0.127	0.100	1.266	0.2085
D(SP(-4))	-0.165**	0.084	-1.955	0.0535
D(SP(-5))	-0.203*	0.078	-2.609	0.0105
D(SP(-7))	0.170*	0.076	2.209	0.0295
D(TB)	-0.117*	0.037	-3.166	0.0021
D(INF)	0.115**	0.070	1.638	0.0647
D(CD(-1))	0.415*	0.112	3.693	0.0004
EC(-1)	-0.125*	0.054	-2.306	0.0232
C	0.765	0.338	2.2607	0.0260
@TREND	-0.000	0.000	-1.596	0.1136
R-squared	0.421923	Mean dependent var		-0.003333
Log likelihood	134.4761	F-statistic		7.006793
Durbin-Watson stat	2.123436	Prob(F-statistic)		0.000000

** and * indicate significance at 5% and 10% levels respectively

Model Diagnostics

The key regression statistics show that the dependent variables explain satisfactory portion of the variation in the interest rate spread in the long run explaining 50.7% and in the short run explaining 42.19%. The independent variables are jointly significant at 1% level in both short and long run with F-statistic(P-Value) of 7.006(0.000) and 3.927(0.000) respectively. DW-statistics equals 2.04 and 2.12 respectively for long run, and short run estimates give evidence of no autocorrelation in respective residuals. The test statistics shown in table 2 indicates that the model passes the diagnostic tests against serial correlation, functional form misspecification, non-normality and heteroscedasticity test at 5%. The cumulative sum of squares (CUSUMQ) plots (fig.1) from a recursive estimation of the model also indicates stability in the coefficients over the sample period.

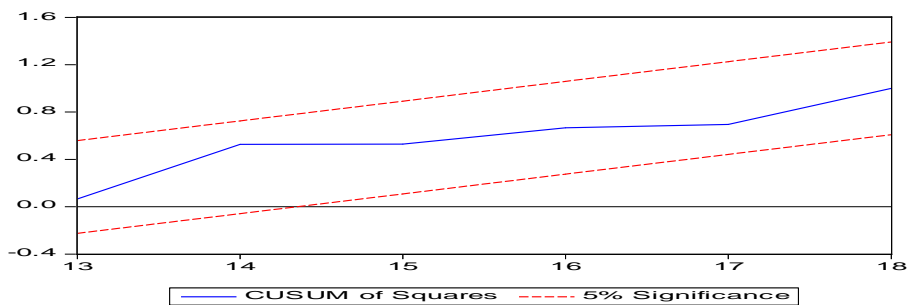


Figure 1: Cumulative Sum of Squares (CUSUMQ) Plots

Table 5: ARDL-VECM Model Diagnostic Tests

Serial Correlation	$F(2, 21)=0.813229[0.4569]$	Functional Form	$F(1, 22)=0.4599[0.5047]$
Heteroskedasticity	$F(14, 23)=1.5314[0.1767]$	Normality	$\chi^2(2)=1.3985[0.4969]$

Conclusion

The literature documents numerous factors that influence the spread between banking sector lending and deposit rates. Interest rate spreads, on the other hand, exhibit a wide variety of behaviours across countries in Africa and other parts of the world. In spite of limitations, a number of factors were examined and several were found to have a robust effect on interest rate spreads.

These factors could be disaggregated into market specific and macroeconomic factors and included among other factors such as inflation rates, size of the economy, banking sector competition, deposit mobilisation, public sector domestic borrowing, Treasury bill rates, and exchange rate volatilities. The issue of the macroeconomic determinants is missing in literature in Ghana. The current study examines the effect of four macroeconomic variables on interest rate spread in Ghana. These are the rate of inflation, the total banking sector deposits, Treasury bill rates and public sector domestic borrowing decisions (crowd out). Using autoregressive distributed lag (ARDL) cointegration and Vector Error Correction analysis, we observed both short-run and long run relationship between identified macroeconomics variables and interest rate spread in Ghana. The study recommends that, government borrowing, interest and inflation rate are kept low while pursuing policies that maximise savings.

References

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