Developing Country Studies
ISSN 2224-607X (Paper) ISSN 2225-0565 (Online)
Vol.3, No.12, 2013
www.iiste.org

Macroeconomic and Industry Determinants of Interest Rate Spread-Empirical Evidence

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Abstract
This paper examines bank-specific, industry-specific and macroeconomic factors that influence interest rate spreads (IRS) in commercial banks in Ghana using unbalanced panel data set from 33 commercial banks covering the 21-year period 1990 to 2010. The study employed annual time series data from 1990 to 2010. Results suggest that interest rate spread in Ghana is significantly influenced by bank- specific and macroeconomic variables. These are bank ownership, Management inefficiency, Gross Domestic Product Per Capita (GDPPC) and Government Securities which all have positive relationship with IRS. Government borrowing on the other hand also influences IRS significantly but has a negative effect. The paper's findings are important for central banks, the commercial banks and managers of the economy for efficiency and effectiveness. The paper is the first of its kind in Ghana a developing country with emphasis on macroeconomic variables.
Keywords: Ghana, Interest Rate Spread, Bank-specific factors, Industry-Specific factors, Macroeconomic variables

1. Introduction and Background

Ghana is noted as a country with large interest rate spreads (IRS) which are associated with inefficiency generating the debate among academics, politicians and practitioners about the determinants of interest rate spread. In an attempt to understand these dynamics, there has been a plethora of studies both theoretical and empirical on the subject matter.

While there are several strategies of addressing the problem of competition and efficiency, this paper attempts to investigate the factors that influence the determination of the banks' interest rate spread. Even though Ghana, like most developing countries has gone through costly banking sector reforms, the sector is still characterized by persistently high interest rate spreads. Such spreads according to Robinson (2002:5) reflect the costs of intermediation that banks incur, inclusive of their normal profits. This has important implications for the growth and development of these poorer economies as numerous authors suggest that there is a critical link between the efficiency of bank intermediation and economic growth.

This paper seeks to examine the effect of bank-specific, industry-related and macroeconomic variables on the IRS in Ghana over the period 1990 to 2010 using an unbalanced panel data set of 33 commercial banks. While a number of studies have examined the effects of internal and external factors on bank interest rate spread in several countries and geographic regions, hardly any systematic research has been carried out for the Ghanaian economy. This paper attempts to include in the interest rate model some variables which have most often been ignored in previous studies but which are important macroeconomic tools in the management of the Ghanaian economy. These are the Treasury bill rate, the discount rate, the required reserve and Government borrowing. Also investigated is inflation using the CPI as proxy and Economic Growth represented by the Gross Domestic Product Per Capita (GDPPC).

The rest of the paper is organized as follows: Section 2 reviews the literature, Section 3 looks at the methodology, Section 4 discusses the empirical findings, while Section 5 draws conclusions.

2. Review of Literature

2.1 Theoretical Literature

IRS is a very important subject in asset and liability management. The spread according to Rose and Hudgins (2008) measures the effectiveness of a financial firm's intermediation function in borrowing and lending money and also the intensity of competition in the firm's market. Tennant and Folawewo (2009) define IRS as the difference between the average lending rate and the average deposit rate. According to Demirguc-Kunt and Peria (2010) banking literature has often used bank spreads as indicators of banking efficiency and competition.

Higher spreads and margins are often interpreted to signal greater inefficiencies and lack of competition in the banking sector. In the view of Demirguc-Kunt and Huizinga (1998) differences in interest margins reflect differences in bank characteristics, macroeconomic conditions, existing financial structure and taxation, regulation, and other institutional factors.

2.2 Empirical Literature

Empirical literature identifies microeconomic and macroeconomic variables as affecting IRS. Microeconomic variables can be divided further into bank-specific and industry-specific variables. In this research, bank ownership (whether locally-owned or foreign) and the efficiency of management are the bank-specific factors investigated, while industry specific factors are financial sector development and competition. The macroeconomic variables considered are the required reserve, the discount rate, inflation, Government borrowing, Treasury bill and the Gross Domestic Product Per Capita (GDPPC).

2.2.1 Bank Specific Factors

Ownership - Demirguc-Kunt and Huizinga (1998), Koeva (2003) and Grenade (2007), hold the view that foreign banks have higher margins and profits compared to domestic banks in developing countries, while the opposite holds in developed countries.

Management efficiency- There is a considerable degree of consensus that the quality of management makes the difference between sound and unsound banks. As this variable is measured by the cost/income ratio, an increase of this ratio means a deterioration of management efficiency and will result in a decrease in the net interest margin. Navneet, Boopen, Sawkut, Shalini and Binesh (2009), Sarpong, Winful and Ntiamoah (2011) and Demirguc-Kunt and Huizinga (1998) maintain that variations in overhead and operating costs are reflected in variations in bank interest margins as banks pass their operating costs on to depositors and lenders. Bawumia, Belnye and Ofori (2005) indicate that high operating cost, which is mainly due to labour costs, and banks' determination to maintain high profit margins are the two bank specific factors which contribute significantly to wider interest spreads.

2.2.2 Industry-Specific Factors

Financial Sector Development -The usual indicators of financial sector development or financial deepening include the ratio of money supply to GDP (M2/GDP or M2+/GDP), the ratio of currency-in-circulation to money supply, credit to the private sector as a share of GDP or the ratio of total bank assets to GDP. An increase in any of these ratios according to Demirguc-Kunt and Huizinga (1998) and Tennant and Folawewo (2008) is an indication of improvement in the development of the financial sector. A well developed financial system is supposed to have lower IRS. A wide IRS is indicative of inefficiency which is associated with lower financial deepening.

Competition- According to Buchs and Mathiesen (2005), a competitive banking system is required to ensure that banks are effective forces for financial intermediation to channel savings into investment, fostering higher economic growth. Rose and Hudgins (2008), Das and Ghosh (2007) and Jimenez and Saurina (2006) argue that greater competition tends to squeeze the difference between the lending rate and the borrowing rate. If other factors are held constant, the spread will decline as competition increases, forcing management to try to find other ways (such as generating fee income from new services) to make up for an eroding earnings spread. This has been collaborated by Ngugi (2001), who points out that empirical results show that market imperfections widen the interest rate spread.

2.2.3 Macroeconomic Variables

Reserve Requirement-The reserve requirement in the banking sector may constrain credit supply. Navneet et. al. (2009), therefore observe that increase in non-interest bearing reserve requirements result in a widening of banking spread as banks face reduced liquidity. Sarpong et al. (2011) and Kwakye (2010) also confirm that in Ghana, commercial banks respond to increases in reserve requirements by increasing the margin between lending and deposit rates.

Treasury Bill Rates-The works of Folawewo and Tennant (2008) indicate that the Treasury bill rate is statistically insignificant in determining the interest rate spread. Ngugi (2001) however, identifies an asymmetric response with the treasury bill rate where lending rates increase with the treasury bill rate, and become sticky downward when the treasury bill rate declines.

The Discount Rate-The central bank's tool known as the discount rate is the interest rate that commercial banks pay to borrow funds from Reserve Banks. By raising or lowering the discount rate, the central bank can promote or discourage borrowing and thus alter the amount of revenue available to banks for making loans. Commercial banks usually respond to changes in the Discount Rate with proportionate changes in their Prime Lending Rate. The discount rate therefore serves as an important indicator of the condition of credit in an economy. Because raising or lowering the discount rate alters the banks' borrowing costs and hence the rates that they charge on loans, adjustment of the discount rate is considered a tool to combat recession or inflation. According to Folawewo and Tennant (2008), the discount rate is positively correlated with banking sector spreads, and has one of the largest coefficients.

Inflation-Cukierman and Hercowitz (1990) find that when the number of banking firms is finite, an increase in anticipated inflation leads to an increase in IRS. When banking firms approach infinity (competitive case), there is no correlation between IRS and inflation because the spread tends towards marginal cost of intermediation as the number of banks increases. Demirguc-Kunt and Huizinga (1998) indicate that inflation is associated with higher realized interest margins. Bank income increases more with inflation than bank costs do. Athanasoglou, Delis and Staikouras (2006), note however, that the effect of inflation depends on whether banks' wages and other operating expenses increase at a faster rate than inflation. The question posed by Athanasoglou et al (2006), is how mature an economy is so that future inflation can be accurately forecast and thus banks can accordingly manage their operating costs. As such, the relationship between the inflation rate and profitability is ambiguous and depends on whether or not inflation is anticipated.

Government Borrowing- Looney and Frederiken (1997) suggest that two main effects may occur with Government borrowing which are the crowding out or the complementarity effect. Crowding out might occur if the government uses the limited physical or financial resources or produces an output to compete with the private sector. Thus, the net effect of government investment on private investment depends on the extent of crowding out on the one hand and the complementarity of public and private investment on the other hand.

Economic Growth-This is represented by the Gross Domestic Product Per Capita. A higher GDPPC is an indication of increase in purchasing power and for that matter the ability of borrowers to pay their loans. It also means the ability of savers to increase their savings. If an increase in GDPPC leads to a lower demand for loans and more savings then the spread is supposed to decrease, on the other hand if it would lead to a higher demand for loans because people now have more income and can therefore afford higher amounts of loan then depending on which ever (savings and demand for loans) increases more the interest rate spread will reduce or increase accordingly.

3. Methodology

3.1 Data and Sources

An annual time series data for the period 1990 to 2010 is used for this study. The sources of data are Bank of Ghana and all the commercial banks in Ghana.

3.2 Empirical Model

Following the works of Demirguc-Kunt and Huizinga (1998:3), Moore and Craigwell (2000:6) and Sologoub (2006:2) this study modeled the relationship between interest rates spread using a panel framework as follows:

$$IRS_{it} = \alpha_i + \sum \varphi_j X^{F}_{jit} + \sum \psi_j X^{I}_{jit} + \sum \gamma_j X^{M}_{jit} + \mu_{it}$$

Where IRS represents interest rate spread, defined as the difference between lending and borrowing rates in the banking industry and X^{F} represents a vector of bank level characteristics, X^{I} represents industry characteristics and X^{M} represents macroeconomic indicators ; α_i represents bank specific unobserved heterogeneity and ε_{it} is the error term.

3.3 Estimation Technique

The concept of panel data is used to analyse the relationships between the dependent variables in the model and the chosen explanatory variables. Unlike the usual pooled ordinary Least Squares (OLS), panel data regression techniques take into account various biases and other disturbances in regression analyses by controlling for unobservable or unspecified differences among firms not easily incorporated in practice. The study employs the panel data model below:

$$Y_{it} = \alpha_i + \delta_t + \beta' X_{jit} + \varepsilon_{it} \qquad t = 1,\ldots,T; \quad j = 1,\ldots,k \;\&\; i = 1,\ldots N$$

Where α represents cross sectional heterogeneous effect which is time invariant, δ time variant effect but cross-sectionally invariant, X_{it} is a vector of explanatory variables, i represents the number of Banks, j is the number of explanatory variables and t represents time period, measured in years. ε is the unobserved time specific effect and μ is the idiosyncratic error term.

3.3.1 Bank Specific Variables

Ownership Structure is a binary variable assuming the value 1 for locally owned bank 0 for foreign owned banks. Foreign owned banks are expected to report lower IRS than the locally owned banks. To assess the role of management and officers of banks, the efficiency of management is measured. Management Efficiency is measured by the ratio of operating expenses to total income as an inverse indicator of quality of management. It is expected that more efficient management should lead to reduced IRS.

3.3.2 Banking Industry Variables

The two banking industry variables used in this research are the financial sector development and competition. Two major indicators are used to represent financial sector development-the ratios of M2+ to GDP and bank total asset to GDP. This study also uses the Hirschman-Herfindahl Index (HHI) as an indicator of industry competition. It is measured as the sum of square of the market shares of all firms in industry j for year t, the market share of each bank is the ratio of total asset (ta) of the ith bank to the industry's total asset (TA). Thus:

$$HHI_t = \sum_{i=1}^{n_{jt}} s_{it}^2 = \sum_{i=1}^{n_{jt}} \left(\frac{ta_{it}}{TA_t} \right)^2$$

3.3.3 Macroeconomic Variables

The macroeconomic determinants of interest rate spread included in this study account for the impacts of macroeconomic instability and the macro-policy environment on banking sector IRS. The macro-policy environment is captured in the model through the use of five variables: the extent of government reliance on the banking industry, discount rates and treasury bills, inflation and required reserves. GDPPC is used as a proxy for economic growth.

Inflation is proxied by the Consumer Price Index (CPI). This variable is an indicator of the cost of doing business in an economy, and it is expected to be positively correlated with IRS. The GDPPC represents the average income level of the population. Government Borrowing represents the extent of government dependence on the domestic banking sector for the financing of its fiscal deficit. This variable measures for the entire banking sector, public sector borrowing as a percentage of total loans. Governments' heavy reliance on domestic banking sectors for deficit financing increases competition for funds and causes interest rates to rise. Governments borrow directly from the banks and also through the issue of Government Securities which in this study is represented by the Treasury bill.

The Discount Rate (policy rate) is defined as the cost faced by commercial banks when borrowing from central banks. It serves as a leading indicator of interest rates in the economy. If the policy rate is increased, transaction interest rates should move upwards and vice versa. The policy rate works by directly controlling the amount of money available to the public and consequently inflation.

The Treasury bill rate 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 while the Required Reserves is used as a proxy for the influence of regulatory and supervisory institution. As put forward by Tandelilin (2007) and Bawumia (2010), the enforcement of regulations such as the required reserves limits the ability of bank managers to over-issue liabilities or divert assets into high-risk ventures.

4. Discussion of Empirical Findings

4.1 Descriptive Statistics

Several descriptive statistics are calculated of the variables under study in order to describe the basic characteristics of these variables. Table 4.1 presents the descriptive statistics of the data, containing sample

means, medians, maximums, minimums, standard deviations, skewness, kurtosis as well as the Jarque-Bera statistics and probabilities (p values).

As can be seen from Table 4.1, all the variables exhibit a positive mean. Also the sum squared deviation row represents the net change over the sample period. In terms of skewness, Ownership, and IRS have distribution that are negatively skewed while the remaining variables exhibit a positive skewness which implies that they have fat right tails. Kurtosis value of Competition (Compt), Government Borrowing, Government Security, CPI, Management Efficiency (MGT) and Bank Reserve shows that data is not normally distributed because values of kurtosis are deviated from 3. The reported Jarque-Bera statistics and corresponding p-values are used to check for the normality assumption. Based on the Jarque-Bera statistics and p-values this assumption is rejected at 5 percent level of significance for Competition (Compt), Government Borrowing, Government Security, CPI, Management (MGT) and Bank Reserve variables, with the remaining variables being normally distributed. The descriptive statistics indicates that the values are not normally distributed about its mean and variance and therefore, being sensitive to speculation and shows periodic change.

Table 4:1: Descriptive Analysis of Variables

	COMPT	DISCOUNT RATE	FIN.SEC .DEV.1	FIN.SEC. DEV.2	GDPPC	GOVT BORROW	GOVTSEC UR	CPI	IRS	OWNERSHIP	MGT	RESERVE
Mean	0.58318	27.38143	0.023873	1.959948	465.2947	3891.947	34320.94	23.24286	15.27952	0.666667	13.32857	15528.72
Median	0.061171	27	0.023793	2.007763	214	1885.2	17937.38	19.3	17	1	11.73	5154.53
Maximum	4.652771	45	0.033381	2.876694	1553.97	19249.68	178106.7	58.5	26.32	1	31.4	74117.44
Minimum	0.000142	13.5	0.015324	1.104808	19.668	854.3	1139.23	10	5.91	0	4.53	348.31
Std. Dev.	1.197997	10.11137	0.005822	0.468456	515.5206	4784.994	43369.81	12.75063	5.60046	0.483046	6.092984	20831.64
Skewness	2.432931	0.43798	0.015071	0.134109	1.070826	2.197293	1.985074	1.326085	-0.0778	-0.70711	1.314251	1.620149
Kurtosis	7.993041	2.085291	1.813486	2.372495	2.813454	6.780886	6.92183	4.236994	2.382952	1.5	4.98141	4.595923
Jarque-Bera	42.53119	1.403499	1.232634	0.40749	4.043791	29.40654	27.24998	7.493642	0.354338	3.71875	9.480629	11.41569
Probability	0	0.495717	0.539929	0.81567	0.132404	0	0.000001	0.023593	0.837638	0.15577	0.008736	0.00332
Sum	12.24679	575.01	0.501332	41.15892	9771.188	81730.89	720739.7	488.1	320.87	14	279.9	326103.1
Sum Sq. Dev.	28.70394	2044.796	0.000678	4.389022	5315416	4.58E+08	3.76E+10	3251.571	627.3031	4.666667	742.4891	8.68E+09
Observations	21	21	21	21	21	21	21	21	21	21	21	21

4.2 Correlation of Matrix

The correlation analysis is performed to measure the extent of multicollinearity among variables. The logic behind the assumption of no multicollinearity is simply that if two or more independent variables are linearly dependent on each other, one of them should be included instead of both. If the value of correlation coefficiency is greater than 0.70 or less than -0.70, it can be interpreted as variables having multicollinearity problem. The solution to the multicollinearity problem is to drop one of the collinear variables. According to the correlation table (Table 4.2 below), the variables that indicate more than 0.70, with a high probability value were dropped to avoid autocorrelation and multicollinearity problem.

Table 4.2: Correlation Analysis of Variables

	COMPT	DISCOUNT RATE	FSD1	FSD2	GDPPC	GOVT BORROW	GOVTSECUR	CPI	IRS	OWNERSHIP	MGT	RESERVE	TBILL
COMPT	1	-0.473	0.352	-0.475	0.878	0.984	0.946	-0.339	0.265	-0.662	0.019	0.96	-0.47
DISC. RATE	-0.473	1	-0.603	0.25	-0.734	-0.443	-0.631	0.698	-0.478	0.764	0.045	-0.638	0.877
FSD1	0.352	-0.603	1	0.221	0.513	0.273	0.512	-0.32	0.667	-0.404	-0.35	0.489	-0.451
FSD2	-0.475	0.25	0.221	1	-0.561	-0.52	-0.459	0.262	-0.125	0.556	0.105	-0.508	0.387
GDPPC	0.878	-0.734	0.513	-0.561	1	0.867	0.915	-0.457	0.496	-0.88	-0.16	0.97	-0.683
GOVT BORROW	0.984	-0.443	0.273	-0.52	0.867	1	0.908	-0.307	0.195	-0.666	0.016	0.94	-0.449
GOVTSECUR	0.946	-0.631	0.512	-0.459	0.915	0.908	1	-0.41	0.447	-0.768	-0.1	0.956	-0.615
CPI	-0.339	0.698	-0.32	0.262	-0.457	-0.307	-0.41	1	-0.099	0.487	0.073	-0.398	0.685
IRS	0.265	-0.478	0.667	-0.125	0.496	0.195	0.447	-0.099	1	-0.386	-0.33	0.427	-0.331
OWNERSHIP	-0.662	0.764	-0.404	0.556	-0.88	-0.666	-0.768	0.487	-0.386	1	0.222	-0.784	0.754
MGT	0.019	0.045	-0.349	0.105	-0.16	0.016	-0.101	0.073	-0.333	0.222	1	-0.084	0.005
RESERVE	0.96	-0.638	0.489	-0.508	0.97	0.94	0.956	-0.398	0.427	-0.784	-0.08	1	-0.607
TBILL	-0.47	0.877	-0.451	0.387	-0.683	-0.449	-0.615	0.685	-0.331	0.754	0.005	-0.607	1

4.3 Augmented Dickey-Fuller Unit Root Test

Most time series data are often presumed to be non-stationary and thus it is necessary to perform a pretest to ensure there is a stationary cointegrating relationship among variables to avoid the problem of spurious regression. Before proceeding with the OLS estimations, it is necessary to examine the time series properties of the variables by employing unit root tests. The Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979; 1981) unit root tests is being done in this study in order to check whether the time series are stationary or not. Table 4.3 presents the ADF unit root tests results. The optimal lag lengths for the ADF test were chosen. Lag five was the most efficient lag to be chosen based on the lag order selection criterion. ADF test indicates that Management, Interest Rate Spread (IRS), GDPPC, are stationary at levels with the remaining variables being stationary at first difference.

Table 4.3 Augmented Dickey-Fuller (ADF) Unit Root Test

Augmented Dickey-Fuller (ADF) Unit Root Test							
Variables	***Levels (Intercept Only)***				***First Difference (Intercept Only)***		
	Sig.level(%)	t-statistics	Prob.*		Sig.level (%)	t-statistic	Prob.*
ADF test statistics	-	-20.723	0				
Management	1	-3.4553					
	5	-2.8724					
	10	-2.5726					
ADF test statistics	-	-8.70885	0				
IRS	1	-3.45599					
	5	-2.87272					
	10	-2.5728					
ADF test statistics	-	-6.57103	0				
GDPPC	1	-3.45519					
	5	-2.87237					
	10	-2.57262					
ADF test statistics	-	-5.0089	0				
Bank Reserve	1	-3.80855					
	5	-3.02069					
	10	-2.65041					
ADF test statistics	-	-2.69511	0.093			-4.7707	0.002
CPI	1	-3.45589			1	-3.9204	
	5	-2.87268			5	-3.0656	
	10	-2.57278			10	-2.6735	
ADF test statistics	-	-1.16503	0.668			-4.3285	0.0035
Tbill	1	-3.80855			1	-3.8315	
	5	-3.02069			5	-3.03	
	10	-2.65041			10	-2.6552	
ADF test statistics	-	-1.60964	0.46			-3.7557	0.0117
Discount Rate	1	-3.80855			1	-3.8315	
	5	-3.02069			5	-3.03	
	10	-2.65041			10	-2.6552	
ADF test statistics	-	-1.54554	0.4907			-3.9875	0.0072
Fin. Sec. Devt. 1	1	-3.80855			1	-3.8315	
	5	-3.02069			5	-3.03	
	10	-2.65041			10	-2.6552	
ADF test statistics	-	-1.93813	0.3095			-3.8115	0.0104
Fin. Sec. Devt.2	1	-3.80855			1	-3.8315	
	5	-3.02069			5	-3.03	
	10	-2.65041			10	-2.6552	

*MacKinnon (1996) one-sided p-values.

4.4: Regression Analysis for Interest Rate Spread (IRS)

Table 4.4a indicates that four variables namely Ownership, Management, GDPPC and government borrowing significantly influence Interest Rate Spread (IRS defined as the difference between lending rate and borrowing rate) at the 5% significant level while Government Security significantly influence Interest rate spread at the 10% significant level. Government Borrowing has negative relationship with interest rate spread whiles local ownership, management, GDPPC and Government Security in the model have positive relationship with IRS. This suggests that as Government borrowing increases, IRS reduces. And also the positive relationships suggest that IRS increases with local ownership and increases in management inefficiency, GDPPC and Government Securities will lead to increase in IRS.

Table 4.4a: Regression Analysis for Interest Rate Spread (IRS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.195280	5.384772	-0.407684	0.6897
OWNERSHIP	8.195168	3.406067	2.406050	0.0305
FIN.SEC. DEVT.2	-1.270050	1.938812	-0.655068	0.5230
MANAGEMENT	1.331469	0.496314	2.682715	0.0179
GDPPC	0.023184	0.005204	4.455289	0.0005
GOVT BORROWING	-0.001860	0.000398	-4.673380	0.0004
GOVT SECURITY	9.55E-05	5.11E-05	1.868099	0.0828
R-squared	0.788941	Mean dependent var		15.27952
Adjusted R-squared	0.698487	S.D. dependent var		5.60046
S.E. of regression	3.075223	Akaike info criterion		5.345833
Sum squared resid	132.3979	Schwarz criterion		5.694007
Log likelihood	-49.13130	Hannan-Quinn criter.		5.421396
F-statistic	8.722031	Durbin-Watson stat		1.849198
Prob(F-statistic)	0.000447			

The fundamental regression statistics show that R^2 (78.89%) is high implying that overall goodness of fit of the model is satisfactory. It also means that about 78% of IRS variation is explained by the model. Further, the Durbin Watson Statistic (1.8) shows that there is no autocorrelation in the residuals. The F-statistic of 8.722031 with its corresponding p-value [0.000447] suggests that the six independent variables jointly impact IRS. The diagnostic test statistics reported in Table 4.4b indicates that the model passes serial correlation, heteroskedasticity and normalilty test at the 5%, meaning a good model. The cumulative sum (CUSUM) plots in Figure 4.1 from a recursive estimation of the model indicate stability in the dependent variable over the sample period.

Table 4.4b: Model Diagnostic Tests

Serial Correlation	F(5,9)=1.024084[0.2196]
Heteroskedasticity	F(5, 10)=0.14684[0.9765]
Normality	X2 (2)=0.024128[0.98801]

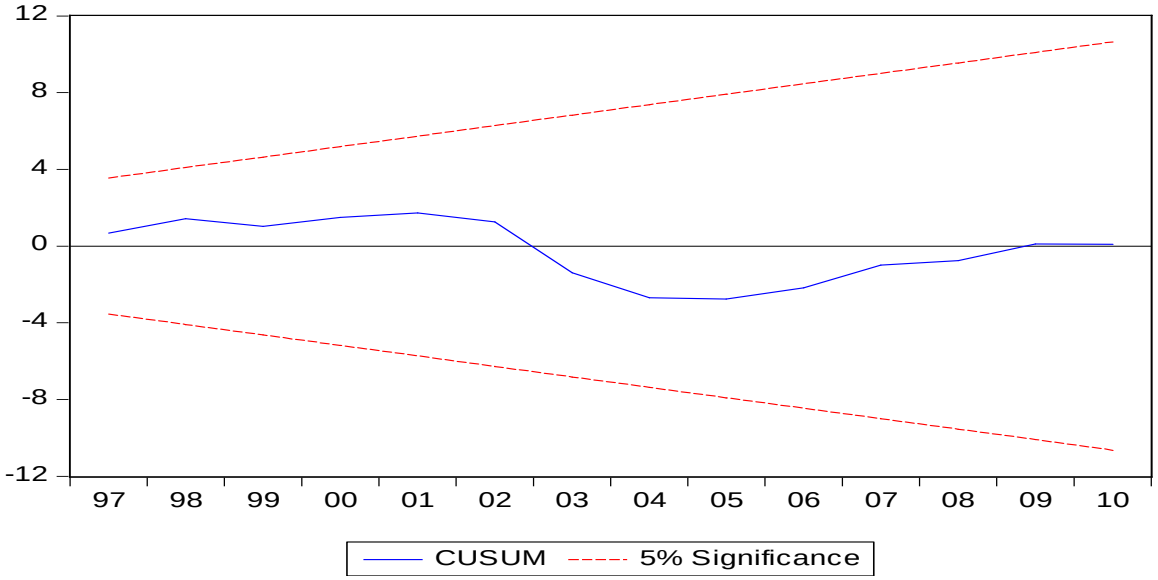

Figure 4.1: Stability Test for Interest Rate Spread (IRS)

5. Conclusions and Recommendations

This paper sought to investigate the effect of bank-specific, industry-specific and macroeconomic factors on interest rate spread of commercial banks in Ghana. Novel features of this study are the analysis of the effect of the level of the financial sector development measured, firstly, as a ratio of money supply to GDP, and secondly as a ratio of bank assets to GDP. Also the introduction of the bank rate or the discount rate into the interest rate spread model.

This study involved the following three stages: (1) a brief introduction and background of the rsearch, (2) a discussion of the determinants of bank interest rate spread, 3) the empirical model, and 4) the discussion of empirical findings.

It has been found that locally-owned banks in Ghana have wider spread than their foreign counterparts, while management inefficiency, GDPPC and Government Security and Government borrowing also have significant relationship with IRS. Management Efficiency, GDPPC and Government Security have a positive relationship with IRS. An increase in each of these variables is supposed to lead to a higher IRS. Government borrowing however has a negative relationship with IRS. Six of the variables are found not to have any relationship with IRS. These are the two industry-specific variables, namely competition and financial sector development and also the following macroeconomic variables: required reserve, Treasury bill rate, the Discount rate and inflation.

The results confirm the perception that locally-owned banks tend to have wider spreads than foreign-owned banks, an indication that locally-owned banks are regarded as less efficient and therefore cover for their inefficiency by increasing the IRS. Management inefficiency means higher expenses and for inefficient banks to match the high expenditure lending rates must be increased while borrowing rates are kept low resulting in wide IRS.

For the macroeconomic variables, an increase in GDPPC means as income levels go up, IRS increases, suggesting that bank customers demand more loans as their economic conditions improve and also depositors make more money available to the banks and therefore banks can afford to increase interest charged on loans and reduce interest paid on deposits. The positive relationship between IRS and Government Securities points to the fact that investment in Treasury bills creates shortage for loanable funds and therefore bank managers can only make more loans by charging more interest on loans that would compensate for the high cost of borrowed funds. On the other hand Government direct borrowing results in the lowering of the IRS. Government is classified by banks as a low risk customer. Government loans are therefore contracted at lower interest rates. The more Governments borrow from the banks the more comfortable the banks are and so IRS is minimised. That the financial sector development measured as the ratio of total bank assets to GDP does not influence IRS means that the growth of the banking sector, all things being equal will not lead to a change in the IRS.

References

1. Annual Reports of All Commercial Banks in Ghana for the Period 1990 to 2010.
2. Bawumia, M., Belnye, F. & Ofori, M. E. (2005). The Determination of Bank Spreads in Ghana: An Empirical Analysis of Panel Data. Bank of Ghana working Paper WP/BOG-2005/09.
3. Bank of Ghana Annual Report (Various Editions).
4. Cukierman, A. and Hercowitz, Z., (1990). Oligopolistic Financial Intermediation, Inflation and the Interest Rate Spread. Paper No. 2. The David Horowitz Institute for the Research of Developing Countries, Tel Aviv University.
5. Demirguc-Kunt, A., Feyen, E., & Levine, R. (2011). The Evolving Importance of Banks and Securities Markets. The World Bank Development Research Group, Finance and Private Sector Development Team, Policy Research Working Paper 5805.e

6. Demirguc-Kunt & Peria, M. S. M., (2010). A Framework for Analysing Competition in the Banking Sector. An Application to the Case of Jordan. The World Bank. Finance and Private Sector Development Team, Development Research Group. Policy Research Working Paper 5499.

7. Folawewo A., & Tennant, D. (2008): Determinants of Interest Rate Spreads in Sub-Saharan African Countries: A Dynamic Panel Analysis. A paper prepared for the 13th Annual African Econometrics Society Conference, 9 – 11 July, 2008, Pretoria, Republic of South Africa, pp, .26.

8. Grenade, K. H. I. (2007). Determinants of Commercial Banks Interest Rate Spreads: Some Empirical Evidence from the Eastern Caribbean Currency Union, Research Department, Eastern Caribbean Central Bank, Working Papers, pp 1-35.

9. Jimenez, G., & Saurina, J (2006). Credit cycles, credit risk and prudential regulation, International Journal of Central Banking, 2, 65-98.
10. Koeva, P. (2003). The performance of Indian banks during financial liberalisation. IMF Research Department, July.
11. Kwakye, J. K. (2010). High Interest Rates in Ghana, A Critical Analysis. The Institute of Economic Affairs.
12. Moore, W., & Craigwell, R. (2000, November, 2). 'Market Power and Interest Rate Spreads in the Caribbean', Paper Presented at the XXXII Annual Monetary Studies Conference, Kingston, Jamaica.
13. Navneet, S., Boopen, S., Sawkut, R., Shalini, R., & Binesh, R. (2009). Interest Rate Spread Determination in an Error Correction Model.
14. Ngugi, R. W. (2001). An empirical analysis of interest rate spread in Kenya. Nairobi: African Economic Research Consortium, Research Paper 106.
15. Robinson, J. W. (2002) Commercial Bank Interest Rate Spreads in Jamaica: Measurement, Trend and Prospects, www.boj.org.jm/uploads/pdf/papers pamphlets.pdf.
16. Rose, P. S. & Hudgins, S.C. (2008). Bank Management & Financial Series 7th Edition; McGraw Hill/Irwin.
17. Sarpong, D., Winful, E. C., & Ntiamoah, J. (2011). Determinants of Wide Interest Margins In Ghana. Panel EGLS Analysis pp. 3.
18. Sologoub, D. (2006). The determinants of Bank Interest Margins and Profitability: Case of Ukraine. www.bof.fi/bofit/seminar/bofcef06/sologub.pdf.
19. Tandelilin, E. (2007). "Corporate Governance, Risk Management Bank Performance: Does Type of Ownership Matter?", EADN working paper No. 34.
20. Tennant, D. & Folawewo, A. (2009). Macroeconomic and Market Determinants of Banking Sector Interest Rate Spreads. Empirical Evidence from Low and Middle Income Countries; Applied Financial Economics, vol. 19, Issue 6 March, 2009 pp. 489-507.