Interest Rate Spread in the Banking Sector of Bangladesh

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Abstract: *This paper aims at analyzing interest rate spread (IRS) in banking sector in Bangladesh for the period 2010 to 2015 using panel data on 47 commercial banks. The long-term bidirectional causality among deposit rate, lending rate and spread and their trend have also been investigated. Interest rate in the banking sectors has been persistently high over the years until recently. High interest rate spread has been considered by many as institutional inefficiencies of financial intermediation. The data are from the annual reports and financial statement of individual banks, Bank and Financial Institutions Division's annual reports, and various publications of the Bangladesh Bank and Bangladesh Bureau of Statistics. The present study investigates the effect of the variables on spread by applying Feasible Generalised Least Squares (FGLS) method. The long-term trend of the deposit rate, lending rate and spread-their causal relationship has also been investigated. In the time series annual data for the period 1975-2016 the least squares annual growth rate of deposit was found to be 0.60 per cent, the annual growth rate of lending rate was -0.10 per cent and the rate of change of spread was -0.70 per cent. The Granger causality test showed that there is no bidirectional causality between spread and lending rate, spread and deposit rate, and even between lending and deposit rate. The banking industry concentration-measured by the level and trend of the Herfindahl-Hirschman Index for both deposit and credit for the period 2008-2015 suggested declining trend in concentration in both deposit and credit-at about the same rate- suggesting competitive atmosphere in banking sector in recent years. In the panel regression analysis on 47 banks for the period*

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2010-2016, it appears that non performing loans, concentration of market share of deposits and credits, non interest income, capital ratio and statutory regulatory requirement all had significant effect on the spread. The effects of the determinants of pread was not uniform in models fitted for different bank groups as it is expected.

Keywords: *Interest rate spread. Panel regression analysis, Bangladesh*

JEL Classification. C23 G21, G30, O6

Introduction

The interest rate spread has been considered as an important determinant of the efficiency of the financial system. The IRS is expected to decline over time with the development of the financial sector. The large IRS spread works as an impediment to the expansion and development of the financial intermediation. Like in many developing countries IRS has been perceived to be high in Bangladesh. It has often been argued that the higher the IRS, the higher would be the cost of credit to the borrowers for any given deposit rate. Alternatively, a high IRS could mean unusually low deposit rates discouraging savings and limiting resources available to finance bank credit. In a country like Bangladesh, a high IRS raises the cost of credit restricting the access of potential borrowers to credit markets thus reducing investments and limiting growth potential of the economy. IRS has been considered as a measure of bank efficiency and determinant of intermediation cost and profitability of the banks. In Bangladesh studies concerning the analysis of IRS, its movements and determinants have been very recent and few. Due to various measures taken by the Bangladesh Bank, the IRS has shown declining trend in recent years and for 2016 it was 4.85 per cent.

Review of Literature on Bangladesh

Ahmed and Islam (2006) while making an analysis on the IRS observed that in Bangladesh spread in the banking sector has been persistently high over the years. The inefficiency originated from the government's 'interventionist policies' of the past and inadequate technical skills in the arena of risk and portfolio management, which caused the high spread in the banking system. If this situation continues indefinitely, private sector investment may be jeopardized. Therefore, lowering of the high banking spread would require substantial improvement in the current situation of limited competition, overstaffing, high administrative costs, the burden of NPLs, and above all, congruence between monetary and fiscal policy stances.

Mujeri and Younus (2009) using panel data of 48 scheduled banks for the period 2004-08 found that the higher the non-interest income as a ratio of total assets of a bank, the lower its spread. Similarly, market share of deposits of a bank, statutory reserve requirements, and NSD certificate interest rates affect the IRS. The analysis in terms of bank groups shows that IRS is significantly influenced by operating costs and classified loans for state owned commercial banks (SCBs) and specialised banks (SBs); while inflation, operating costs, market share of deposits, statutory reserve requirements, and taxes are important for the private commercial banks (PCBs). On the other hand, non-interest income, inflation, market share, and taxes matter for the foreign commercial banks (FCBs).

Suzuki and Adhikary(2009) found a varied level of high nominal lending rates, high nominal spreads and too low or negative real spreads as per different clusters of banks both in the pre-liberalized and liberalized regime, and concludes that this persistent varied performance is largely the outcome of a high amount of non-performing loans, inefficiencies in managing credit risks, and fragmentation and distorted competition in the banking system. This varied level of performance of the banking clusters also results from the government's intervention in the activities of nationalized commercial banks and specialized banks for mediating credits to priority sectors at a subsidized rate. The study suggested that a more coordinated use of monetary and fiscal policies is required with a view to creating appropriate rents for banks for redressing their current dismal performance.

Hossain (2012) analysed interest rate spreads and margins in banking in Bangladesh by applying the Arellano-Bover/Blundell-Bond dynamic panel regression model to a panel of 43 banks for the period 1990-2008. It revealed persistency in interest spreads and margins. The model also identified that high administrative costs, high non-performing loan ratio and some macroeconomic factors are the key determinants of persistently high interest rate spreads and margins. These factors together imply a lack of competition and efficiency in the banking sector of Bangladesh despite financial reforms. In addition, aggregate time-series data analysis reveals the fact that spread is sensitive to deposit rates, not the lending rate, meaning that any shock to spread eventually transmits to the deposit rate. This finding suggests that recently imposed control on the lending rate may not help reduce the level of spread in the medium-to-long run as envisaged by the Bangladesh Bank. This implies that any shock to spread is supposed to translate to deposit rate in the long run. Thus, the factors that appear to propel high spreads and margins are distortions in the loans market, institutional impediments and the policy environment. All these factors together

imply that banking sector in Bangladesh is not efficient and competitive despite a certain degree of financial reforms.

Nguen, Islam and Ali (2010) found Asymmetric adjustments in the Bangladeshi lending-deposit rate spread. The deposit rates adjust faster when the spread is widening than when it is narrowing. These findings seem to support the customer reaction hypothesis as articulated by Stiglitz and Weiss (1981). A plausible interpretation of the asymmetries is that they are likely due to the efforts to maximize the personal gains of bank management. Strong political will would be needed to establish a more competitive and efficient banking sector that would be conducive for economic progress in Bangladesh

Afroze (2013) analyzing time series data for the period 1974-2011 found statistically significant correlation between IRS and deposit rate but no correlation with the lending rate. The data series for IRS, deposit rate, and lending rate contained a unit root and were integrated of order one. However, the Granger causality test failed to indicate any bilateral causal relationship between IRS and deposit rate, IRS and lending rate, and also to deposit rate and lending rate. The study also found that IRS prevailing in the Bangladeshi banking sector was high compared to that in its neighboring countries.

Studies conducted have attributed the existence of high spread in developing countries to several factors, such as high operating costs, financial repression, lack of competition and market power of a few large dominant banks enabling them to manipulate industry variables including lending and deposit rates, high inflation rates, high risk premiums in formal credit markets due to widely prevailing perception relating to high risk for most borrowers, and similar other factors (Agu 1992, Aryeetey, Hettige, Nissanke and Steel 1997, Barajas et al. 1999, Brock and Rojas-Suarez 2000, Smirlock 1985, Chirwa and Machila, 2004 Beck and Hesse, 2009, Khan and Khan, 2010, Khawza and Din, 2007). A substantial body of theoretical and empirical literature has explored various determinants of interest spread including: (i) market structure of the industry; (ii) bank specific factors; (iii) macroeconomic variables; and (iv) financial regulations.

Objective of the Study

The study aims at analyzing the movement, trend and determinants of the interest Rate Spread (IRS) of the commercial banks in Bangladesh. The banking system structure, industry concentration, behaviour of deposit and lending rates shall also be studied.

Data and Methodology

Data of all bank specific variables were obtained from the Websites of the respective banks. The annual data of 47 commercial banks for the sample period 2010 to 2015 have been used to estimate the model involving panel data. The data were compiled from Annual Reports and Financial Statements of individual banks, Annual Reports of Bank and Financial Institution Division (BFID) and publications of Bangladesh bank and Bangladesh Bureau of Statistics. The online data maintained by ADB, OECD, World Bank and IMF have also been used. All ratios are estimated by the author. The panel variable (Banks) was balanced. The Feasible Generalised Least Squares (FGLS) model for panel data has been applied to estimate the effect of the explanatory variables (White, 1980). The estimation of the regression equations has been carried out using the STATA12 package. The list of banks selected for the present study is given in Annex I.

Model Specification and Variables

In this section, we develop a simple model to analyse the interest rate spread (IRS) in Bangladesh. In the literature, the determinants of IRS have often been modeled within a framework incorporating profit maximising behaviour of the banks.

The regression model is specified as follows:

Where $IRS_{it} = \alpha_0 + \beta\ X_{it} + \varepsilon_{it}$ $i = 1 \ldots\ldots N$ (1)

IRS_{it} is the is the interest rate spread of the *ith* bank in the period *t*

$(\alpha_0,\ \beta)$ is a vector of parameters

X_{it} is a vector of explanatory variables, ε_{it} is a stochastic error term

Banking Sector in Bangladesh

The formal financial sector of Bangladesh includes all regulated institutions like Banks, Non-Bank Financial Institutions (FIs), Insurance Companies, Capital Market Intermediaries like Brokerage Houses, Merchant Banks etc.; Micro Finance Institutions (MFIs). It thus consists of money market (comprising operations of the banking system, microcredit institutions, nonbank financial institutions, interbank foreign exchange market), the capital market (stock markets), bond market and the insurance market. The formal financial sector in Bangladesh mostly consists of banks. According to a recent estimate (Mansur, 2015) banking sector assets accounted for 63 per cent of the total assets of the

The description of the variables is given in table 1.

Table 1: Description of the variables used in the regression models.

Variable	Description	Hypothesised Relationship
Dependent		
IRS	Difference between WALR and WADR	
Independent		
Bank specific characteristics		
NPLTL	Ratio of non-performing loans to total loans	+
OC_ASSET	Non-interest expenses over total assets	+
WADR	Weighted average deposit rate	+/-
NONII_ASSET	Non-interest income over total assets	+
NONII_ININC	Non interest income to interest income	-
MSD	Market share of deposit	+/-
BANK LIQUIDITY	Total advances to total deposits	-
CAPITAL RATIO	Total book value of shareholders equity over total assets	+
SIZE	Log natural of Total assets	+
Bank industry specific characteristics		
NSD3YR	National Saving Deposits 3yr Interest rate	+/-
SRR	Statutory Regulatory Requirmnents	+/-
HHI_CR	HHI for loans and advances	+/-
Macroeconomic variables		
GDP	annual gdp growth rate	+/-
INFL	annual CPI inflation rate	+/-

formal financial sector in 2013. Mujeri and Younus (2009) observed that banking sector accounts for around 96 per cent of the assets of the financial sector. WB (2006) recorded the banking assets as percentage of total financial assets as 87 per cent for the year 2004 in Bangladesh. However along with the development of the capital market the share of the assets of the banking sector shall have to be compromised. There is paucity of data in this aspect. The ratio of banking sector assets to GDP in 2016 was 71.13 per cent.

After independence in 1971, all commercial banks (except the foreign owned banks) were nationalised and the government-imposed controls over deposit rates in order to keep the lending rates low. Afterwards, six private commercial banks were allowed to operate in 1983 and the number of private banks has now risen to 39. For most of the period after independence, Bangladesh inherited a repressed financial system in which the banks and other financial institutions were used as cheap sources of credit for export processing and import substituting industrialisation. During the period, measures like control over interest rates, selective credit allocations, rules and regulations suppressing the development of

money and capital markets, and maintenance of overvalued domestic currency contributed to financial repression, inefficiencies in investment, and non-repayment of loans by the borrowers (Rahman 2007).

Interest Rate Reform

Bangladesh began to implement financial sector reform measures in the 1980s and the interest rates were partially deregulated in November 1989. Prior to the initiation of reforms in the 1980s, Bangladesh's financial system constituted typical examples of what economists dubbed 'financial repression'. Competition between banking institutions remained stifled and banks had little incentive to develop their activities. As a result, the institutional capacity of banks to manage the systemic and idiosyncratic risks in financial systems has failed to develop sufficiently. Under the financial sector reform programs, a new system of interest rate determination was established with deposit & lending rates that better reflects market conditions. The main objective of the new interest rate policy is to introduce flexibility into the deposit rates permitting individual banks to establish their own rates fixed by themselves. Banks are now free to adjust their own rates effective from February 19, 1997. Furthermore, flexibility in the interest rate policy introduced from July 12, 1999 permits banks to differentiate interest rates among individual borrowers except for lending to exporters only. For other sectors, lending rates would be decided by the banks themselves. Apart from the conventional deposit and lending rates, the Islamic banks in Bangladesh have been carrying on their banking transactions in line with the Islamic Shariah systems of interest-free policy. Under this policy, investment-income of the bank is shared with the mudaraba depositors according to a pre-agreed profit-sharing ratio to ensure a reasonably fair rate of return on their deposits (Mujeri and Younus 2009, Hossain, 2010, Rahman, 2012, (BB, 2017).

Banking System Structure

As on June 2016, there are 56 commercial banks operating in Bangladesh comprising six state owned commercial banks (SCBs), two state owned specialized banks (SBs), 39 private commercial banks (PCBs), and nine foreign commercial banks (FCBs). Table 2. As of June, 2016, the 39 PCBS are in the ownership of 63.0 per cent of industry assets and 64.1 per cent of industry deposits. The six SCBs are in the ownership of 28.4 per cent of industry assets and deposit. The 2state owned specialized institutions (SBs) also known as Development Financial Institutions are in possession of 2.9 per cent of assets and

3.1 per cent of assets and deposits. The 9 FCBS had the ownership of 5.4 per cent of industry assets and 4.4 per cent of industry deposits. It may be mentioned here that 9 PCBs and 1 FCB run their business on the basis of Islamic Shariah. The list of banks is given in Annex I.

Table 2: Banking System Structure (As on June, 2016)

Bank Type	Number	Number of branches	Total Assests (billion Tk)	% of industry assets	Deposits (billion Tk)	% of deposits
State owned Commercial banks(SCBs)	6	3770	3219.1	26.1	2447.4	29.0
Development Financial Institutions(DFIs) Specialized Banks (SBs)	2	1407	302.2	2.5	247.4	2.9
Private Commercial banks (PCBs)	39	4271	8254.6	67.0	5382.3	63.8
Foreign Commercial banks (FCBs)	9	75	550.6	4.5	358.9	4.3
Total	56	9453	12326.4	100.0	8436.0	100.0

Source: Bangladesh Bank. Annual Report 2015-16.

Movements in WADR WALR and IRS: 1975-2016: Long Term

rate regime of the preceding period under which the level as well as the structure of interest rates were controlled in order to limit the cost of financial intermediation and ensure a reasonable structure of lending and deposit rates Since the implementation of reforms, interest rates in Bangladesh's financial sector have largely been freed relative to the administered interest. The movements in lending and deposit interest rates in nominal since the 1975 are shown in Figure 1. In general, nominal interest rates were fixed at relatively low levels in the 1970s. The nominal deposit rate varied between 3.51 per cent in 1975 and 4.27 per cent in 1979, while the nominal lending rate was 11.28 per cent in 1975 and 11.12 per cent in 1979 and the interest rates maintained a slowly rising trend throughout the 1980s. With liberalisation in the banking sector policies, interest rates started to decline in 1992 which continued till 1996. Afterwards,

another trough in interest rates can be noticed in 2004. The Interest rate spread having a value of 7.77 per cent in 1975 gradually decreased to 5.80 per cent in 1990 followed by an increase to 7.88 per cent in 1993 after which it gradually decreased to 4.86 per cent in 2009. The interest rates started climbing afterwards followed by another trough in 2010 which started to increase again with some fluctuations. For the year 2010, the WADR was 6.01 per cent, the WALR was 11.31 per cent and the IRS was 5.21 per cent. The interest rates started increasing again and reached another crest in 2014- where the WADR was 8.54 percent, WALR was 13.67 per cent and the IRS was 5.31 per cent. For the last 3 years the interest rates are showing slow down and in the year 2016 the value of WADR was 5.54 per cent, WALR decreased to 10.39 per cent, thus having a IRS of 4.85 percent. With little fluctuations the value of IRS was found to be 4.85 for the year 2016.

For the total period under consideration the average value of WADR, WALR and IRS per year was found to be 6.75 per cent, 12.95 per cent and 6.20 per cent respectively. The least squares trend line fitted to the data gives indication of slight downward symptoms in the WALR. The fitted trend line for the WADR on the other hand shows some upward directions. The fitted line for the IRS suggests decline in its value in years to come. The factor time had significant positive effect on WADR and it had significant negative effect on IRS. It did play any significant role in determining the WALR. In the time series annual data for the period 1975-2016 the least squares annual growth rate of deposit was found to be 0.60 per cent, the annual growth rate of lending rate was -0.10 per cent and the rate of change of spread was -0.70 per cent. Table 3 and Figure 1.

Table 3: Least Squares Growth Rate of WADR, WALR and IRS :1975-2016.

Indicators	N (Mean)	Regression Coefficient (β^*)	t-ratio	P-value	R square	Least Squares Growth Rate(%)	D-W
WADR	42(6.75)	.006	2.14	.038	.10	0.60	.30
WALR	42(12.95)	-.001	0.52	.606	.01	-0.10	.33
IRS	42(6.20)	-.007	5.07	.000	.39	-0.70	.46

Source and Notes: Bangladesh Bank. Author's Computation
The Regression line is $\ln X_t = \alpha + \beta T$. The average annual growth rate
 $r = [\exp^{\beta^*} - 1] \times 100$,   where β^* is the least squares estimate of β.

Granger Causality Test

In order to understand the long-term behavior of the IRS and its components-WADR and WALR, Vector Autoregression Analysis (VAR) and Granger

Fig 1. WADR, WALR and IRS:1975-2016
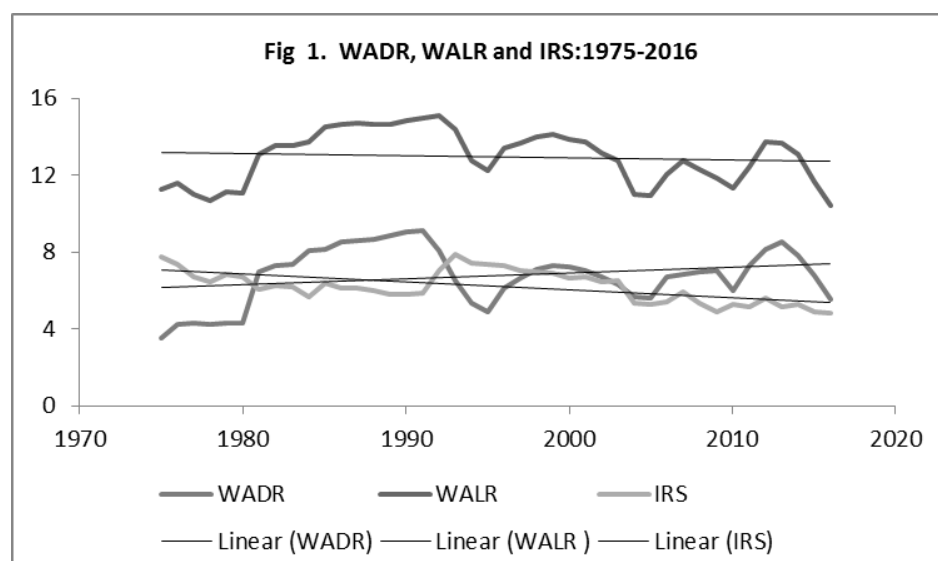
Causality test have been performed. The Granger causality test refers to the effects of past values of one variable on the current value of another variable. The purpose of performing Granger Causality test is to examine whether the change in spreads is associated with deposit rate or loan rate. The Granger causality model is used to test the causality amongst the variables-WADR, WALR and IRS. The result shows that there is no bilateral directional relationship between IRS and WADR, IRS and WALR, and even WADR AND WALR. Table 4.

Table 4: Granger Causality Tests, 1975-2016

Null hypothesis	Obs.	Wald χ^2	Probability	Decision
lnWADR does not Granger Cause	40	1.2702	0.5307	Accept the
lnIRS	40	2.0644	0.356	null
lnIRS does not Granger Cause				hypothesis
lnWADR				
lnWALR does not Granger Cause	40	1.6785	0.432	Accept the
lnIRS	40	4.2874	0.117	null
inIRS does not Granger Cause				hypothesis
lnWALR				
lnWALR does not Granger Cause	40	3.9586	0.138	Accept the
lnWADR	40	3.3919	0.183	null
lnWADR does not Granger Cause				hypothesis
lnWALR				

Note. Sample 1975-2016, lags 2

Recent Movement of IRS by Types of Bank

In June 2010, for the SCBs the value of IRS was 3.64 per cent which showing an increasing behavior to 5.07 per cent in June 2012 started declining with fluctuations to 3.98 in December 2016. The SBs having a lower IRS of 2.26 per cent in June 2010 reached its highest value of 3.28 in December 2012, then proceeded with fluctuations to its value of 2.49 per cent in December 2016. The PCBs had a IRS of 5.49 per cent in June 2010 reached its highest value of 5.95 per cent in June 2014, afterwards gradually declining to 4.74 per cent in December 2016. The FCBs having its highest value of IRS of 9.33 per cent in June 2010 reached a low value of 5.56 per cent in December, 2016 experiencing some fluctuations on the way**.** For the banking industry the value of IRS was observed to be 5.30 per cent in June 2010 which reached its highest value of 5.79 per cent in June 2012 which with minor fluctuations gradually decreased to 4.71 per cent in December 2016.

As in December 2016 WADR, WALR and IRS – all came down further. For the 6 SCBs the WADR was found to be 5.13 per cent, the WALR was 9.19 per cent and the IRS was found to be 4.06 per cent. For the 2 SBs the WADR was 6.44 per cent, WALR was 8.90 per cent and the IRS was 2.46 per cent. For the 40 PCBs the WADR was found to be 5.42 per cent, the WALR was 10.42 per cent, thus giving an IRS of 4.82 per cent. For the 9 FCBs, the WADR was very low to 1.79 per cent, the WALR was high to 8.21 per cent thus giving a IRS of 6.42 per cent. For the banking industry as in the WADR on 31 December The WADR stood as 5.22 per cent and WALR as 9.93 per cent- thus having a IRS of 4.71 per cent. Table 5 and Figure 2.

Overall interest rate spread in the country's banking sector fell further recently as the commercial banks slashed their interest rates on both deposits and lending, in recent months the reduction on deposit rate have been heavy and unbearable for the helpless depositors   The Bangladesh Bank is now working to bring down the spread to nearly 4.0 per cent in the near future from the existing level of 4.71 per cent in December 2016. Bangladesh Bank have already advised the banks to reduce their IRS through improving efficiency as well as profitability instead of slashing interest rates on deposits.

The central banker expects that the spread will decrease in the coming months, as Bangladesh Bank is persuading the banks continuously.

Table 5: Recent Movements in IRS by Types of Bank.

Period	Weighted Average of all banks				IRS by bank groups		
	Deposit rate	Lending Rate	IRS	SCBs	SBS/DFIs	PCBs	FCB
Jun 2010	6.01	11.31	5.30	3.64	2.26	5.49	9.33
Dec 2010	6.07	11.19	5.12	4.17	2.31	5.22	8.83
Jun 2011	7.27	12.42	5.15	4.52	2.37	5.41	8.83
Dec 2011	7.55	13.01	5.46	5.01	2.18	5.40	8.89
Jun 2012	8.09	13.88	5.79	5.07	2.95	5.85	9.09
Dec 2012	8.47	13.80	5.33	3.99	3.28	5.77	8.84
Jun 2013	8.54	13.67	5.13	3.66	3.06	5.34	8.59
Dec 2013	8.49	13.58	5.09	2.96	2.53	5.87	8.79
Jun 2014	7.65	13.15	5.50	3.56	2.97	5.95	7.93
Dec 2014	7.25	12.46	5.21	4.19	2.29	5.44	7.84
Jun 2015	6.70	11.68	4.98	3.38	2.91	5.32	7.78
Dec 2015	6.34	11.18	4.84	3.70	1.78	5.39	7.15
Jun 2016	5.54	10.39	4.85	4.23	1.90	4.96	6.80
Dec2016	5.22	9.93	4.71	3.98	2.49	4.74	5.56

Source. Bangladesh Bank Quarterly.

Fig 2. IRS Jun 2010-Dec 2016.
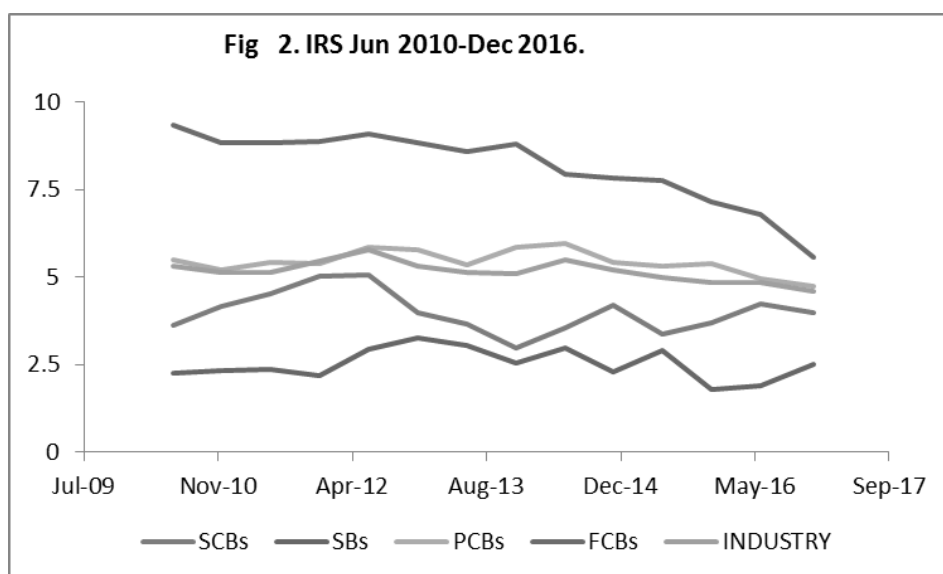
Industry Concentration of Deposits Loans and Advances

The Herfindahl-Hirschman Index (HHI) is used to study the extent of concentration prevailing in any market. We analyse the HHI for market share by

types of banks and of the industry as well for both deposit and credit for last 8 years-from 2008 to 2015. Market share of banks is determined by both the deposit and credit. The HHI for deposit indicated a declining tendency for SCBs, SBs and PCBs, while for FCBs an increasing tendency was observed. The compound average growth rate of HHI for deposit was found to be -1.03 per cent for SCBs, -4.00 per cent for SBs, -2.12 per cent for PCBs, and 2.20 per cent for the FCBs. The HHI for credit indicated a declining tendency for only SCBs, while for SBs, PCBs and FCBs an increasing tendency was observed. The annual growth rate of HHI for credit was found to be -1.45 per cent for SCBs, 5.70 per cent for SBs, 0.98 per cent for PCBs, and 2.32 per cent for the FCBs. Table 6 and Figure 3.

Table 6: Herfindahl-Hirshman Index(HHI) for the Industry on concentration of Deposit and Credit.

Year	HHI for Deposit					HHI for Credit				
	SCBs	SBs	PCBs	FCBs	Industry	SCBs	SBs	PCBs	FCBs	Industry
2008	3187	5040	487/a	2589	482/c	3072	2535	394/a	2638	403/c
2009	3246	5903	472/a	2644	459/c	3093	2558	443/a	2739	387/c
2010	3194	4463	460/a	2860	444/c	2982	3859	476/a	2865	385/c
2011	3104	4485	450/a	3281	426/c	2993	4049	459/a	2984	377/c
2012	3044	4226	444/a	3500	406/c	2978	3742	462/a	3343	368/c
2013	2982	3916	439/b	3352	403/d	2858	3640	453/b	3260	348/d
2014	2960	3828	431/b	3064	396/d	2773	3651	435/b	3099	335/d
2015	2964	3786	419/b	3016	393/d	2773	3738	422/b	3098	325/d
Rate of Change/e	-1.03	-4.00	-2.12	2.20	-2.87	-1.45	5.70	0.98	2.32	-2.03

a/ based on 30 PCBs, b/ based on 39 PCBs (including newly ventured 9 PCBs). c/based on 47 banks, d/ based on 56 Banks including newly ventured 9 PCBs). e/ compound average annual growth rate (per cent).

For the industry HHI for deposit was 482 in 2008 which gradually decreased to 393 in 2015. The least squares annual growth rate for HHI for deposit was -2.95 per cent and the mean value of the HHI for deposit was 426. The value of HHI for credit was found to be 403 in 2008 which also gradually decreased to 325 in 2015. The least squares annual growth rate of HHI for credit was also found to be -2.95 percent. The mean value for the HHI for credit was found to be 366 per year.

The findings suggests that the banking industry is becoming more competitive from 2008 to 2015 considering the market concentration of deposits and credit. For both the cases, HHI has decreased which indicates an increased competitive environment within the banking industry. Furthermore, the rate of decrease has been same for both the characteristics. There is higher concentration in deposit while compared to credit- difference in mean HHID-HHIC is 60. The linear trend lines for deposit and credit run parallel and downward keeping a distance of 60 index points along the ordinate in figure 3.

Fig. 3. HHID and HHIC: 2008-15
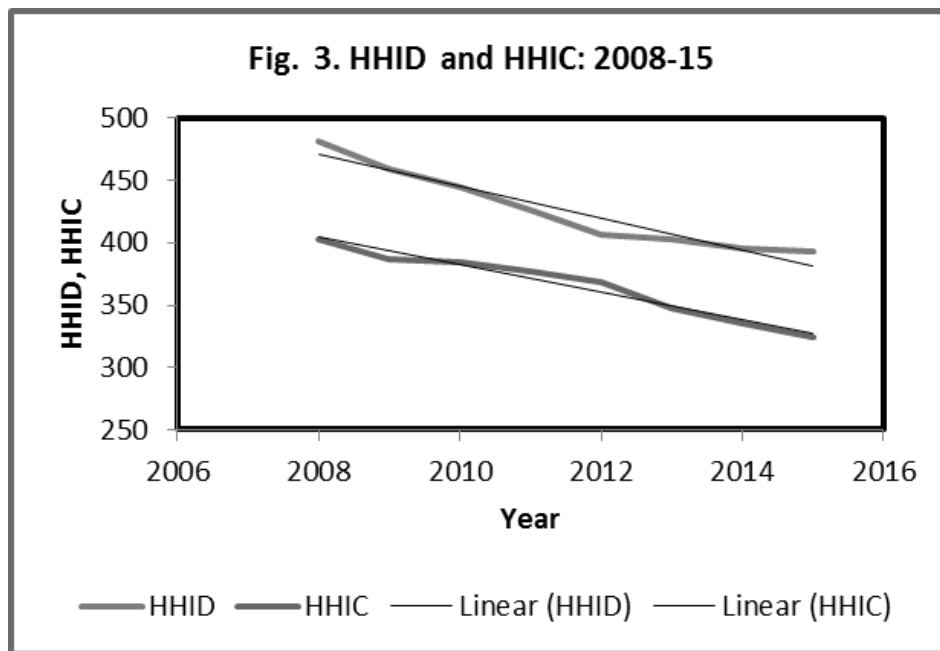
Findings on IRS: Panel Regression Analysis

Correlation Analysis

The correlation matrix of the explanatory variables used in the multiple regression analysis was examined. In general the correlation between the bank specific variables is not strong thus suggesting that multicollinearity problems are not severe.

Regression Analysis

The result of the Multiple Regression Analysis under Feasible Generalised Least Squares model is given in table 7

Table 7:   Multiple Regression Analysis Result of IRS Under Feasible GLS Estimation.

Independent variables	Model 1 8 SCBs	Model 2 30 PCBs	Model 3 9 FCBs	Model 4 47 Banks: industry
NPLTL	.005(.016)	-.001(.012)	.021(.020)	-.018(.007)**
OC_ASSET	-.718(.240)	.180(.138)	-.036(1.083)	-.088(.087)
MSD	-.036(.135)	-.070(.107)	-.312(.427)	-.212(.063)***
WADR	-.170(.119)	-.601(.076)***	-.790(.077)***	-.484(.045)***
NONII_TA	.484(.266)*	.358(.170)**	.195(.076)**	.179(.057)***
NONII_ININC	-.001(.012)	-.018(.009)*	-.001(.001)***	-.005(.001)***
LIQUIDITY	.017(.006)	.009(.010)	.002(.007)	.001(.003)
CAPITAL	-.039(.025)***	-.005(.011)	.008(.007)	-.015(.005)***
SIZE	-.292(.522)	-.239(.287)	.521(.390)	.118(.137)
SRR	-1.465(1.582)	2.703(.851)***	1.273(1.551)	2.302(.792)***
NSD3YR	1.157(1.486)	-2.148(.900)**	-5.226(1.574)***	-1.05(.718)
HHI_CR	-.052(.024)**	.065(.014)***	.139(.028)***	.041(.012)***
GDP	-.353(.758)	-.441(.391)	.074(.684)	-.526(.364)
INFL	.483(.220)**	-.215(.108)**	-.337(.193)*	-.126(.102)
Wald χ^2(14)	32.37 (P= .0000)	146.79 (P= .0000)	266.39 (P= .0000)	239.44 (P= .0000)
Panels	homoskedastic. No autocorrelation	:homoskedastic. No autocorrelation	homoskedastic. No autocorrelation	:homoskedastic. No autocorrelation
Banks	8	30	9	47
Year	6	6	6	6
Obs.	48	180	54	282

Note: The figures in parentheses are standard error). ***, **, * indicate statistically significant at 1 per cent, 5 per cent and 10 per cent respectively.

Non-Performing loans

Non-performing loans to total loans ratio (NPLTL) is used as an indicator of credit risk or quality of loans. An increase in provision for loan losses implies a higher cost of bad debt write offs. Given the risk-averse behaviour, banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads. Hence the higher the risk, the higher the pricing of loans and advances to compensate for likely loss. Historically, Bangladeshi banking sector is characterized by high non-performing loans, majority given out by state-owned

banks. Although private banks have on average 5 percent NPL of their total loans, the ratio is still around 20 percent for SCBs. Banks tend to offset the cost of screening and monitoring due to bad loans and/or the cost of foregone interest revenue by charging higher lending rates (Barajas et al., 1999). Randall (1998), and Brock and Rojas-Suarez (2000) find support for the positive and significant association between spreads and nonperforming loans.

The variable non-performing loan (NPLTL) did not have any significant effect on the spread in models fitted separately for bank groups e.g. SCBs, PCBs and FSBs, but it had significant(P<.05) negative effect on spread in the model fitted for the industry.

Operating costs:/Overhead costs

Computed as operating costs as a ratio of total assets (OC_ASSET). Overhead cost is the ratio of administrative costs to total assets. Banks with higher operating costs are expected to have higher interest spreads. High overhead cost may result from inefficiency in bank operations that may be shifted to bank customers. Banks incur costs of financial intermediation such as screening loan applicants to assess the risk profile of borrowers and monitor the projects for which loans are advanced. An increase in operating costs is expected to have positive influence on interest rate spreads. High operating costs are likely to include costs due to inefficiency leading to higher spreads and hence this variable is commonly used as an indicator of operational inefficiency. A higher cost of financial intermediation will drive up interest rates on loans while depressing interest rates on deposits. The operational cost had significant negative effect on spread in the models for SCBs, FCBs, and Industry, while its effect on spread in PCBs was positive but insignificant

Deposit Rate

Studies have shown that the spread is sensitive to deposit rate meaning that any shock in spread will eventually transmit to deposit rate (WADR). The effect of deposit on spread was found to be negative in all the models, but its negative effect in the models for SCBs was insignificant, while its negative effect on spread in the models for PCBs, FCBs and Industry was highly significant(P<.01).

Non- interest income

Non-interest income consists of commission, service charges and fees, guarantee fees, net profit from sale of investment securities and foreign exchange profit. It

is likely that banks that have higher non-interest income have less incentive to reduce spread. Two different measures have been used-namely Non-interest income as the ratio of total assets ((NONII_TA) and Non-interest income as the ratio of interest income (NONII_IINC). Non-interest income asa ratio of total assets (NONII_TA) had significant positive effect on spread in all the different bank groups considered-SCBs (p<.10), PCBs (p<.05), FCBs (p<.05) and the Industry (p<.01).

Non-interest income to interest income

It is the ratio of non-interest income to interest income (NONII_ININC). It is likely that banks that have higher non-interest income have less incentive to reduce spread. Non-interest income as per cent of interest income had significant negative effect on spread in all the models estimated for different bank groups, but its negative effect was insignificant in model for SCBs and moderately significant (P<.10) for PCBs and highly significant for FCBs (P<.01) and the Industry (P<.01).

Market Share of Deposit

The market share for deposits and loans is used to assess small financial system view of interest rate spread. The market share of deposits (MSD) is the share of individual bank's deposit in a year in terms of total deposits in banks. The market share of loan is the share of individual bank's loans to total loans in a year. This indicator acts as a proxy for the existence of economies of scale and efficient market. While a negative relationship between market share and interest rate spreads predicts the small financial system view, a positive relationship would predict a monopolistic/oligopolistic market structure. The market share of deposits (MSD) had highly significant negative effect on spread in the model for banking Industry (p<.01) and its effect on the models for other bank groups was also negative but insignificant.

Market share of loans and advances

Herfindahl-Hirschman Index (HHI) is the commonly used measure of market concentration. HHI has been computed on the basis of concentration of loans and advances. Market concentration could measures the degree of competition each bank faces in the market. Theoretically, competitive pressures lead to competitive pricing, thus leading to higher efficiency of intermediation process and lower spreads. On the other hand, higher market concentration implies more market

power and less competition and hence is likely to be associated with higher interest rate spreads. Market concentration can also result in oligopolistic market tendencies such as collusion. The industry concentration variable HHIC-measured by Hirshman-Herfindhal Index turned out to be a influential variable in determining spread in all the models. The effect of HHIC on spread in SCBs was negative and significant at 5 per cent level. But its effect on spread in the models for PCBs, FCBs and Banking industry was positive and highly significant (P<.01).

Liquidity risk

Computed as the ratio of bank's liquid assets to total loans and advances (LIQUIDITY). The degree to which banks are exposed to liquidity risk varies across banks. A bank with higher liquidity faces lower liquidity risk hence is likely to be associated with lower spreads due to a lower liquidity premium charged on loans. Banks with high risk tend to borrow emergency funds at high costs and thus charge liquidity premium leading to higher spreads. This variable is expected to be negatively related to interest spread. An increase in liquidity reduces the bank liquidity risk, which reduces the interest spread due to a lower liquidity premium charged on loans. The effect of liquidity - ratio of advance to deposits in all the models were positive but insignificant

Capital Ratio

Capital ratio has been obtained as the ratio of shareholders' equity to total assets (CAPITAL). Saunders and Saunders and Schumacher (2000) provide evidence of the positive and generally significant relationship between spreads and capital ratios in developed countries. For developing countries, if there are limited channels for raising capital, such as thin or underdeveloped equity markets, banks will be in a strong position to keep the IRS high. Thus, the capital ratio is expected to be negatively associated with the IRS. Capital ratio had highly significant negative effect (P<.01) on spread in the model for SCBs and Industry. Its effect on spread in PCBs was negative and insignificant and its effect on FCBs was positive and insignificant.

Bank size

Bank size is measured as the logarithm of bank's total assets. Ideally one would expect bigger banks to be associated with lower interest rate spreads, arguably because of large economies of scale and ability to invest in technology that would

enhance efficiency. However, to the extent that bank size connotes control of the market in the deposit and loan markets, a positive relationship between interest rate spreads and bank size should not be surprising. The bank size did not exert any significant influence on spread in any of the our bank groups shown in table 2. The effect of bank size on spread was negative and insignificant in the models for SCBs and PCBs, while its effect on spread was negative and insignificant in the models for FCBS and banking industry.

Statutory Regulatory Requirement (SRR)

An increase in the value of statutory regulatory requirement (SRR) of the commercial banks would create a reserve deficiency or decrease in available reserve of depository institutions. If the banks are unable to secure new reserves, they would be forced to contract both earnings and deposits which would result in a decline in the availability of credit and increase the market interest rates. The reverse would happen if the central bank lowers its reserve requirements. The reserve requirements could also lead to disintermediation if the spread between lending and deposit rates widens as a result of its heavy use and may disrupt banks' asset/liability management. The Statutory Regulatory Requirement (SRR) consists of Statutory Liquidity Ratio (SLR) and Cash Reserve Ratio (CRR). The Statutory Regulatory Requirement (SRR) had significant positive effect on spread in PCBs (P<.01) and banking Industry (P<.01). Its effect on spread in SCBs was negative and insignificant and its effect on spread in FCBs was positive and insignificant.

NSD3yr Interest Rate

The National Saving Deposits 3 yr interest rate (NSD3YR) rate had significant negative effect on spread in the model for PCBs(P<.05) and FCBs(P<.01). Its effect on spread in SCBs was positive and insignificant while its effect on spread for the model for industry was negative and insignificant.

Macroeconomic variables

The variables used to capture the impact of the macroeconomic factors are real GDP growth and inflation rate. Increased economic activity can heighten demand for loans leading to higher lending rates. On the other hand, increased economic activity can make projects more profitable, reduce defaults, and increase deposits, all of which reduce the spreads. For both variables, negative as well as positive parameters have been observed. The rate of growth of real GDP did not have any

significant effect on spread in any of the four models fitted for different bank groups. The inflation rate had significant positive effect on spread in SCBs (P<.05), had significant negative effect on spread in PCBs (P<.05) and moderately significant negative effect on spread in FCBs (<.10). Its effect on spread in the model for banking industry was negative but insignificant.

Conclusions

The study identifies several determinants of spread in the commercial banks of Bangladesh. The long-term trend of the deposit rate, lending rate and spread-their causal relationship has also been investigated. In the time series annual data for the period 1975-2016 the least squares annual growth rate of deposit was found to be 0.60 per cent, the annual growth rate of lending rate was -0.10 per cent and the rate of change of spread was -0.70 per cent. The Granger causality test showed that there is no bidirectional causality between spread and lending rate, spread and deposit rate, and even between lending and deposit rate. The banking industry concentration-measured by the level and trend of the Herfindahl-Hirschman Index for both deposit and credit for the period 2008-2015 suggested declining trend in concentration in both deposit and credit-at about the same rate- suggesting competitive atmosphere in banking sector in recent years. In the panel regression analysis on 47 banks for the period 2010-2016, it appears that non performing loans, concentration of market share of deposits and credits, non interest income, capital ratio and statutory regulatory requirement all had significant effect on the spread. The effects of the determinants of spread was not uniform in models fitted for different bank groups- as it is expected. The IMF (2016) in one of its country report on Bangladesh observed:

"Bangladesh's average nominal and real lending rates, and banks' interest spreads, are not exceptionally high by international standards. However, both lending rates and spreads are much higher than those for advanced economies, indicating that there is scope for bringing them down. The above cross-country analysis suggests that the main drivers of lending rates and interest rate spreads in Bangladesh are inflation, low credit quality (high NPLs), low recovery ratios for bad loans, and the practice of devolvement.

- Reduce inflation on a sustained basis through prudent monetary and fiscal policies.

- Strengthen bank governance, particularly in the state-owned banks, to help improve asset quality. The very high stock of nonperforming loans in state-owned banks is a cause for concern. Improvements in bank

governance could also help strengthen management practices and reduce operating costs.

- Improve credit information sharing (for instance, through economy-wide credit bureaus) to help banks better assess borrowers' creditworthiness.

- Improve contract enforceability and judicial proceedings for loan collections, foreclosures and the recovery of collateral.

- Minimize or eliminate the practice of forced subscription of Treasury bills and bonds, replacing it with a fully-functioning auction-based approach.

- Automate bank branches, particularly at the state-owned banks – a plan for which is currently under implementation – would help reduce operational risks as well as operating costs."

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Annex I

List of Scheduled Banks (Total 57 Banks) as on 31 December 2016.

A. STATE OWNED BANKS:
1. Agrani Bank Limited.
2. Janata Bank Limited.
3. Rupali Bank Limited.
4. Sonali Bank Limited.
5. Bank of Small Industries and Commerce
   Bangladesh Ltd.
6. Bangladesh Development Bank Limited.

B. SPECIALSED BANKS:
1. Bangladesh Krishi Bank.
2. Rajshahi Krishi Unnayan Bank.

C. PRIVATE BANKS:
a) Foreign Banks:
1. Standard Chartered Bank
2. State Bank of India
3. Habib Bank Ltd.
4. Citi Bank, N.A.
5. Commercial Bank of Ceylon Ltd.
6. National Bank of Pakistan
7. Woori Bank
8. The Hong Kong & Shanghai Banking
   Corporation Ltd.
9. Bank Al-Falah Ltd.
b) Private Banks (Incorporated in Bangladesh
   excluding Islamic Banks):
1. AB Bank Ltd.
2. National Bank Ltd.
3. The City Bank Ltd.
4. International Finance Investment and Commerce Bank Ltd.
5. United Commercial Bank Ltd.
6. Pubali Bank Ltd.
7. Uttara Bank Ltd.
8. Eastern Bank Ltd.
9. National Credit and Commerce Bank Ltd.
10. Prime Bank Ltd.
11. Southeast Bank Ltd.
12. Dhaka Bank Ltd.
13. Dutch Bangla Bank Ltd.
14. Mercantile Bank Ltd.
15. Standard Bank Ltd.
16. One Bank Ltd.
17. Bangladesh Commerce Bank Ltd.
18. Mutual Trust Bank Ltd.

19. Premier Bank Ltd.
20. Bank Asia Ltd.
21. Trust Bank Ltd.
22. Jamuna Bank Ltd.
23. BRAC Bank Ltd.
24. NRB Commercial Bank Ltd.
25. South Bangla Agriculture and
   Commerce Bank Ltd.
26. Meghna Bank Ltd.
27. Midland Bank Ltd.
28. The Farmers Bank Ltd.
29. NRB Bank Ltd.
30. Modhumoti Bank Ltd.
31. NRB Global Bank Ltd.

c) Islamic Banks
1. Islami Bank Bangladesh Ltd.
2. ICB Islamic Bank Ltd.
3. Al-Arafah Islami Bank Ltd.
4. Social Islami Bank Ltd.
5. EXIM Bank Ltd.
6. First Security Islami Bank Ltd.
7. Shahjalal Islami Bank Ltd.
8. Union Bank Ltd

The following 9 banks in the private sector which started their operations in FY 2013 were not covered in the present study as their data for the years 2010-2013 would be missing.
1. NRB Commercial Bank Ltd.
2. South Bangla Agriculture and
   Commerce Bank Ltd.
3. Meghna Bank Ltd.
4. Midland Bank Ltd.
5. The Farmers Bank Ltd.
6. NRB Bank Ltd.
7. Modhumoti Bank Ltd.
8. NRB Global Bank Ltd.
9. Union Bank Ltd

Shimanto Bank Ltd (57th Bank. Listed as scheduled Bank on July 21, 2016.)

Source: Bangladesh Bank. Scheduled Bank Statistics. October 2016. and Website WWW.bb.org.bd