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What Drives Interest Rate Spreads of Commercial Banks in Pakistan? Empirical Evidence based on Panel Data

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Abstract: *This study analyses the determinants of interest rate spreads of commercial banks operating in Pakistan by using a balanced panel of 28 banks from 1997 to 2009. A one step linear regression with fixed effect across banks is estimated to take into account the impact of bank-specific, industry-specific, and macroeconomic factors on banking spreads. The results indicate that spreads of commercial banks are primarily driven by the banks' low cost of funding; operating expenses; and opportunities to earn income from non-core business activities. Specifically, the share of non-remunerative deposits in total deposits and administration expense in total expense are positively correlated with banking spreads, while the share of non-interest income in total income negatively affects banking spreads. Further, market concentration and macroeconomic variables, such as real GDP and interest rates also have a positive influence on commercial bank spreads in Pakistan. We also analyze the impact of the recent imposition of a regulatory floor on savings deposit returns on banking spreads. Using a difference-in-difference approach we find that in the absence of subsequent tightening in monetary policy, banking spreads would have been lower as a result of the policy measure.*

JEL Classification: *C230, D400, G210*
Keywords: *interest rate spread, panel data, competition*

1. Introduction

Being a proxy for efficiency of financial intermediation, banking spreads merit close scrutiny. High banking spreads raise important policy issues related to the development of the financial system; they are considered to be an indication of inefficient financial intermediation, lack of competition, financial repression, high taxation, and a weak macroeconomic environment (Barajas et al 1999). At a

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macro level, high spreads impede financial intermediation by discouraging potential savings with low returns on deposits, and constraining investment activities with a high cost of funding.[1] Low savings and investment reduce the growth potential of the economy. This is particularly relevant for developing countries like Pakistan, where banks are the primary source of funding for private sector businesses.[2]

Pakistan is an excellent candidate to study issues related to high banking spreads. Its banking sector is characterized by high spreads and strong profitability. The governor of the State Bank of Pakistan (SBP) noted in 2006 that "extraordinary banking spreads in Pakistan in recent years are evidence of a lack of competition and efficiency in Pakistan's financial markets."[3] Moreover, the Competition Commission of Pakistan also observed that banks are operating like "an organized cartel and are involved in fixation of spreads and interest rates on different products in consultation with each other, and there is no competition among them."[4] This situation forced the SBP to introduce a minimum rate of return on savings deposits in May 2008, which is still in place. These developments amply highlight the concerns of policymakers and experts on the subject.

The SBP, as the regulator and supervisor of the banking sector in Pakistan, explored some of these issues in detail and shared its findings with the public through its flagship publications. Specifically, the Financial Stability Review (FSR) of 2006 explains the behavior of spreads and competition in the banking sector. Khawaja and Din (2007) also explore major determinants of the banking spreads, while, Khan (2009) investigates the degree of competition in the banking sector of Pakistan. At the same time, a number of studies by independent researchers have directly focused on the efficiency of the banking sector (Ansari, 2006, Qayyum and Ahmed, 2007, Akmal and Saleem, 2008, Akhtar, 2010, Burki and Niazi, 2010 and Mathews, 2010).

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[1] High interest rates on loans create problems of adverse selection as borrowers with riskier profiles are willing to take bets. Moreover, borrowers in developing countries know that it is difficult for creditors to recover their collateral.

[2] In developing countries, financial systems are bank dominated, and the role of capital markets in financing viable investment projects is limited. Pakistan also fits in the list of these countries. Private sector loans from the banking sector stood at Rs 3.6 trillion by end CY09 compared to an outstanding amount of Rs 69.8 billion in Term Finance Certificates (TFCs), and Rs 781.8 billion of listed capital at the Karachi Stock Exchange (KSE).

[3] Addressing an international conference on "Fixed income market development in emerging market economies" on December 18, 2006, cited from an article http://www.opfblog.com/3353/the-sbp-and-the-banking-cartel-dr-farrukh-saleem/.

[4] Cited from an article at http://www.opfblog.com/3353/the-sbp-and-the-banking-cartel-dr-farrukh-saleem/

This paper seeks to address two important questions related to banking spreads in Pakistan. First, what drives banking spreads? This issue is explored by providing an econometric account of major determinants of commercial banking spreads in Pakistan. [5] Second, what has been the impact of the minimum rate of return on savings deposits on banking spreads?

The paper is structured as follows: following the introduction, section 2 provides a review of the literature on the determinants of banking spreads. Stylized facts on banking spreads in Pakistan are the subject of Section 3. Section 4 briefly explains the methodology of the paper. Section 5 presents the results and our findings, and the final section concludes the paper.

2. Review of literature

The starting point for empirical studies on the determinants of bank margins (spreads) is often the seminal study by Ho and Saunders (1981). The model, as well as its extensions by authors such as Allen (1988), Angbazo (1997) and Maudos and Guevara (2004) forms the basis of numerous contemporary studies on the subject.

Ho and Saunders (1981) view the bank as a risk-averse dealer in homogenous deposits and loans, acting as an intermediary between borrowers and lenders. The bank sets interest rates for one period on deposits and loans to maximize profits, and faces asymmetry between the timing of deposit supply, and demand for loans. This asymmetry forms the basis of the 'transactions uncertainty' due to which the bank will always demand a positive interest spread as the price of intermediation; this is known as the 'pure spread'. Ho and Saunders (1981) show that the optimum 'pure spread' depends on four factors: degree of risk aversion, industry market structure, average size of bank transactions, and variance of interest rates on loans and deposits.

Subsequent studies have relaxed some restrictive assumptions of the model and extended it to include additional costs and risks faced by banks. Allen (1988) relaxes the homogeneity assumption by taking into account the existence of different types of credit and deposits. Angbazo (1997) includes the risk of loan defaults, while Maudos and Guevara (2004) explicitly incorporate operating costs in their model.

[5] It is an extension of earlier work on the determinants of banking spreads by Mahmood-ul-Hasan Khan in the Financial Stability Review of 2006.

Empirical studies based on the Ho and Saunders (1981) model often consider the impact of additional variables that are considered to affect actual or observed bank margins, but are not explicitly included in the theoretical modeling of the 'pure spread'.[6] These include institutional and regulatory costs faced by banks e.g. implicit interest payments[7] and the opportunity costs of regulatory reserves. Based on the empirical treatment of these additional variables, the literature stemming from Ho and Saunders (1981) can be divided in two categories; studies that use the two-stage estimation methodology following Ho and Saunders (1981), such as Saunders and Schumacher (2000) and Brock and Rojas-Suarez (2000), and those that employ a single-stage regression, as in Angbazo (1997), Maudos and Guevara (2004) and McShane and Sharpe (1985), among others.

The primary motivation for the two-stage approach is to decompose the actual interest margin into a 'pure spread', and premia for various risks banks undertake. Two-stage models, following Ho and Saunders (1981), use the first stage regression to obtain an estimate of the theoretical 'pure spread' by controlling for the additional explanatory variables that affect actual bank margins. In the second stage, the intercept from the first regression is taken as an estimate of the 'pure spread', and appears as the dependent variable in a second regression to identify the influence of the theoretical determinants of the 'pure spread'. Ho and Saunders (1981) use the first stage to control for bank-specific variables by regressing actual bank margins against implicit interest payments, the opportunity cost of reserves, and default probability.[8] They take the intercept from this regression as an estimate of the 'pure spread'. In the second stage they estimate a regression of the 'pure spread' as a function of their theoretical variables: interest rate volatility and market structure.[9] Brock and Rojas-Suarez (2000) apply this two-stage procedure to seven Latin American countries, and find that micro factors e.g. administrative and other operating costs, as well as macro considerations e.g. reserve requirements and macroeconomic volatility explain high spread levels. Saunders and Schumacher (2000) apply the procedure to seven OECD countries and find that 'pure spreads' are sensitive to market structure.

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[6] Ho and Saunders (1981) consider the impact of opportunity costs of reserves, as well as default probability. While these variables are not explicitly incorporated in the theoretical model, they are included in their estimation of the pure spread.

[7] These are generally defined as net non interest income to earning assets in the literature. See Ho and Saunders (1981) and Angbazo (1997) among others.

[8] Ho and Saunders (1981) use the ratio of net loan charge offs to earning assets as proxy for the probability of default.

[9] While their theoretical model also include risk preferences of the banks' management and average size of bank transactions as determinants of the pure spread, they do not include these in the estimation as they argue that these variables are unlikely to change rapidly.

Alternatively, studies such as Angbazo (1997), Maudos and Guevara (2004) and McShane and Sharpe (1985), among others, use a single-stage regression, incorporating variables of the theoretical model and other factors. In this line, Angbazo (1997) extends the Ho and Saunders (1981) model to include the risk of loan defaults, and interest rate risk. Including bank-specific factors such as liquidity risk and the capital base, he finds that US banks with riskier loans and higher interest-rate risk exposure have higher net interest margins. In addition, he notes that net interest margins are positively related to risk preferences of banks - as embodied in choices relating to capital structure – and management quality; but negatively related to the proportion of bank funds in liquid assets, due to a lower liquidity risk premium.

Maudos and Guevara (2004) build on the work of Angbazo (1997) to explicitly incorporate operating costs in their theoretical model. Further, in their study on European banks, they use the Lerner Index, a more direct measure of market power than the concentration ratios used in previous studies. They find that the interest margin depends on competitive conditions, interest rate risk, credit risk, average operating costs, risk aversion of banks, as well as other variables not explicitly incorporated in the theoretical model e.g. opportunity cost of reserves, payment of implicit interest and the quality of management.

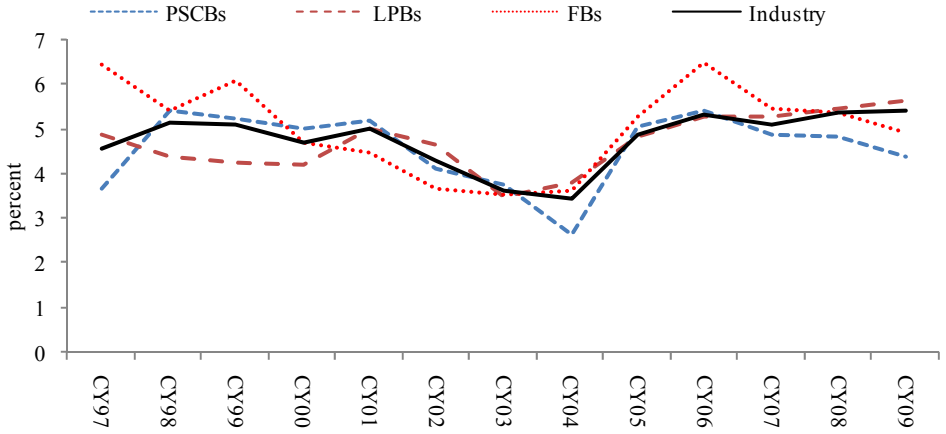
More recent studies, such as Williams (2007) find evidence in support of Maudos and Guevara's (2004) inclusion of operating costs in the model for the case of Australia, as well as the impact of bank market power, as suggested in an earlier study on Australian bank net interest margins by McShane and Sharpe (1985). Wong and Zhou (2008), in a study on commercial bank net interest margins in China, also find evidence to support the extension of the Ho and Saunders model with operating costs.

In case of Pakistan, Financial Stability Review by the State Bank of Pakistan (2006) observes that bank-specific factors such as, provisioning, administrative expenses, and ownership (e.g. foreign or domestic), as well as industry factors e.g. market concentration, all positively influence the level of banking spreads in Pakistan. In terms of macro variables, GDP has a positive relationship with spreads; explained by a higher demand for advances. In line with the literature, interest rate volatility is observed to be positively associated with banking spreads. Khawaja and Din (2007) also find evidence to support the view that administrative costs and market power have a positive influence on banking spreads in Pakistan. In addition, they include the share of current and savings account deposits in total banks deposits, and find that in the case of Pakistan, an interest-insensitive supply of deposits has a significant positive impact on banking spreads, rather than the

market concentration per se. In addition, they find that, GDP has a negative relationship with banking spreads. They see this as the result of the business cycles effect, whereby recessions lower the creditworthiness of borrowers, and consequently, banks extend credit at higher interest rates, increasing the spread.

This paper contributes to existing literature on banking spreads (in Pakistan) in three ways. First, detailed bank-level panel data provides an opportunity to refine the definition of variables used for analysis. Specifically, we use the share of non-remunerative deposits in total deposits to study the impact of deposit structure on banking spread.[10] Second, we explicitly take into account the impact of non-interest income as it is an important source of banks' overall earning. Third, the paper also analyzes the impact of the SBP's recent policy measure, i.e. introduction of minimum rates of return on savings deposits. Finally, we use the most recently available data based on banks' annual audited financial statements for the period 1997 to 2009. This extends the period of analysis considerably compared with earlier studies.[11]

Figure 1. Banking Spreads in Pakistan



3. Banking spreads in Pakistan: stylized facts

Banking spreads[12] of commercial banks in Pakistan have witnessed considerable variation over the period of analysis (Figure 1). Specifically, spreads for the

[10] This is in contrast to the definition used in Khawaja and Din (2007), where the share of current and savings deposits in total bank deposits is used as a proxy for interest-insensitive deposits.
[11] Khawaja and Din (2007) analysis is based on unaudited data on banks and their period of analysis is 8 years from 1998 to 2005; in comparison our analysis is based on data for 13 years.
[12] Specifically, banking spread is defined as the difference between returns on average earning assets, and cost of average funds.

overall banking sector were the lowest in CY04 at 3.4 percent and the highest for CY08 & CY09 at 5.4 percent. A sharp rise in banking spreads during CY04 to CY07 attracted considerable attention from policy makers and banking experts as mentioned in the introduction.

In order to understand these developments in banking spreads, it is useful to study the structure of the banking industry. As of December 2009, commercial banks operating in Pakistan are classified into three groups in terms of their ownership: the 4 public sector banks (PSCBs), 25 local private banks (LPBs), and 7 foreign banks (FBs).[13] Figure 1 shows that among the three groups, foreign banks had the highest spreads in the late 1990s, and maintained higher spreads for the longest duration over the period of analysis. Specifically, the spreads of foreign banks were higher than the overall industry for 7 of last 13 years.

Table 1. Summary of Banking Spread

	Mean	Std. Dev.	Min	Max
Overall	4.22	2.14	-3.50	14.49
Between		1.27	2.35	6.31
Within		1.74	-1.83	12.70

Table 2. Regression with Ownership Dummy

Dependent Variable: Banking Spread

	Coefficient	t-Statistic
Constant (PSCB)	2.42	3.95
Local Private Banks	1.87	2.62
Foreign Banks	2.67	3.12

To further explore changes in banking spreads, we use a panel of 28 banks operating from 1997 to 2009, as the industry and group averages conceal considerable heterogeneity across banks. Table 1 shows that banking spreads have seen considerable variation over this period. Specifically, the value of the spread ranges from negative 3.5 to positive 14.5 percent. Moreover, the variation is also visible within (over time) and between (across cross sections) banks (Figure A1 & A2 in Annexure). As a next step, we use ownership dummies to confirm these trends in banking spreads across major ownership-based groups. The results clearly indicate that foreign banks enjoyed considerably higher spreads in Pakistan (Table 2); the difference from the base group (public sector commercial banks) is statistically significant at the 1.0 percent level of significance. However, a comparison between foreign and local private banks indicates that spreads of the

[13] We use data of 28 commercial banks which remained in operation from 1997 to 2009.

former group are 80 bps higher than the latter; though this difference is not statistically different from zero at the conventional 5 percent level of significance.

Extending this analysis, we use average spreads for 2008-09 and rank banks by spreads. This supports the group-level insights; the 5 largest banks are among 15 banks with the highest spreads in the industry. However, since the list includes banks from all three groups (2 public sector banks, 9 local private banks, and 4 foreign banks), we rank all banks based on average returns on their earning assets and average cost of funds to determine the source of high spreads at these banks. This bank-level ranking highlights the role of bank size, and consequently funding costs in determining spreads.

In the case of local private banks, larger banks in general, and the 4 largest in particular, appear to have a competitive advantage; they benefit from low cost funding. Despite being among banks with the highest spreads, only one of these banks has high returns on earning assets; all four are among banks with the lowest cost of funds. This low cost of funds that explains their higher spreads, is mainly due to access to a stable and low cost deposit base;[14] a result of their vast branch networks, and public confidence built over the years. In contrast, smaller local private banks, despite having higher returns on earning assets than their larger competitors, suffer from higher cost of funds that explains their lower spreads. These findings lend support to the view that higher spreads at the group of local private banks over the past couple of years are driven mainly by a few large banks.

In addition to variation across banks, within the sample (over time) changes in banking spreads are explored by using a year specific dummy variable. The year 2000 is selected as the base year because the spread in this year is close to its average level of 4.22 percent for the period under review (Table 1). Results in Table 3 reveal that there were few abrupt changes in banking spreads over time. Specifically, changes from the base year (i.e. 2000) were statistically significant for only 4 of the12 years. In addition, results regarding variation in spreads across major bank groups were also reconfirmed.

Bank level information also shows that the Pakistani banking industry has traditionally been dominated by the 5 largest banks by asset size.[15] Originally under public ownership, four of these banks were privatized during the 1990s and in 2004; the largest bank remains publicly owned. Figure 2 shows that in the post-

[14] Deposits constitute the largest funding source for banks in Pakistan; by end Dec-09, deposits formed 83.5 percent of total commercial bank liabilities.

[15] Together these five banks accounted for 69.7 percent of total assets of the banking industry. This declined to 52 percent by 2009.

privatization period, spreads at the four large privatized banks have outpaced their peer group of local private banks; suggesting that these banks seems to be driving the high spreads recently observed at local private banks.

Figure 2. Rising Spreads at 4 Large Banks in Recent Years

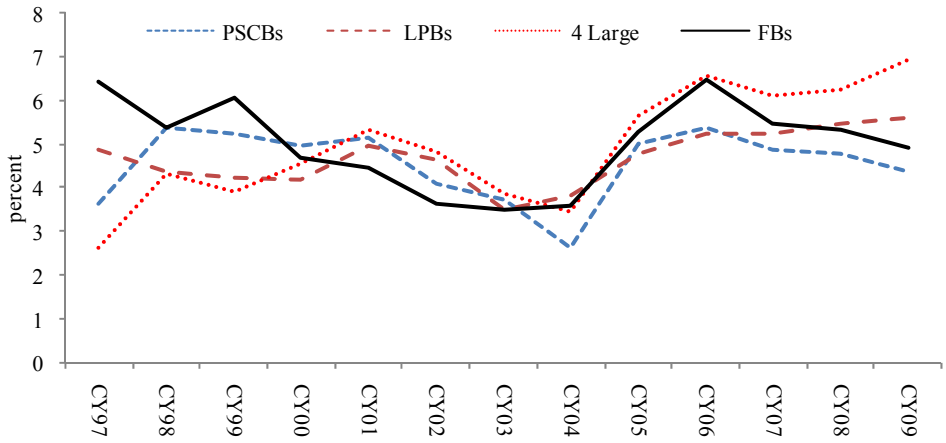


Table 3. Regression with Time and Ownership Dummies

Dependent Variable: Banking Spread

	Coefficient	t-Statistic
Constant	1.97	3.03
CY97	1.05*	2.32
CY98	0.51	1.13
CY99	0.97*	2.14
CY01	0.19	0.42
CY02	-0.19	-0.41
CY03	-0.95*	-2.09
CY04	-1.24*	-2.71
CY05	-0.32	-0.71
CY06	-0.18	-0.4
CY07	-0.22	-0.84
CY08	0.24	0.53
CY09	-0.001	-0.01
Foreign Banks	2.99	3.67
Local Private Banks	2.57	3.67

* Statistically Significant at 5 percent

All foreign banks with high spreads also have high returns on assets, with the exception of one bank that has low cost of funds. This suggests that in the case of foreign banks, higher lending rates may be more important in explaining high spreads than low cost funding.

4. Methodology

Stylized facts and the review of the literature suggest that banking spreads are influenced by a host of factors, which can be classified into one of three categories for the sake of clarity.

First, bank specific factors (BSF), e.g. financial risks, administrative cost, composition of bank' assets and liabilities, and non-core services provided by bank etc. Second, there are industry specific indicators (ISI), namely the degree of competition and regulatory and supervisory requirements e.g. minimum capital, cash reserve and statutory reserve requirements etc. All banks operating in Pakistan are subject to the same regulatory and supervisory environment. And finally, we have macroeconomic indicators (MEI) including real GDP growth, inflation and interest rates, etc.[16] Mathematically, we can summarize these factors as follow:

$$SP_{i.t} = f(BSF_{i,t}, ISI_t, MEI_t) + \varepsilon_{i,t} \qquad (1)$$

Where $SP_{i,t}$ denotes the banking spread of bank i at time t; $BSF_{i,t}$ stands for bank specific indicators of bank i at time t; ISI_t are industry specific indicators in time t; and MEI_t stands for macro indicators in time t. The subscripts attached to the indicators show that bank specific factors are allowed to vary over time and across banks, as these indicators generally depend on the operational policies of the banks. The banks are free to devise their businesses strategies and develop a market niche depending on their perceived comparative advantages. However, industry specific and macroeconomic indicators are allowed to vary over time only, as all banks face the same industry regulations and macroeconomic environment.

[16] A similar exercise was carried out in 'Pakistan: Financial Sector Assessment 2005', State Bank of Pakistan. We build on the regression analysis by extending the data up to 2009 and refining the definition of variables. It may also be noted that the year 1996 has been dropped from the analysis, as banking spread for CY96 cannot be calculated due to data constraints for 1995.

5. Results and interpretation

A single step linear regression[17] is estimated by using a balanced panel of 28 commercial banks operating in Pakistan from 1997 to 2009. The bank-wise information is collected from annual audited accounts of the banks and information on macroeconomic indicators is gathered from the Economic Survey of Pakistan, and various issues of the Statistical Bulletin of the State Bank of Pakistan.

Table 4. Estimates of Fixed Effect Panel Regression
Banking Spread: Dependent variable

Variable	Coefficient	t-State
Intercept	-.3077	-0.36
Bank Specific Indicators		
Share of Non-int. in total income	-0.0463*	-4.86
Share of Non-remunerative deposits	0.0238*	3.45
Admin. expense to total expense	0.0246*	2.86
Industry Specific Indicator		
Herfindhal Index	0.0013**	2.03
Macroeconomic Indicators		
Real GDP growth$_{t-1}$	0.0691	1.60
Interest Rate	0.1001*	2.98
Lag of dependent Variable	0.3966*	8.73
Correlation (errors, regressors)	0.3693	
R-squared-Overall	0.5878	
R-squared-Between	0.8239	
R-squared-Within	0.3894	
F-statistic (7,273)	24.87	
Modified Durbin-Watson	1.65	
No. of Observations	308	

* and ** indicate 1 and 5 percent level of significance respectively.

Among various options for panel estimation, we select a liner regression with an autoregressive term and fixed effects. This selection is based on both theoretical considerations and statistical tests. The fixed effects option is used as bank-specific business strategies play a key role in determining interest rate spreads for

[17] As discussed in the literature review, the two step estimation procedure is preferred to decompose banking spreads into a pure spread and premia charged to compensate for risks arising from the banking businesses. This does not serve our purpose as our aim is to identify factors that determine overall banking spreads.

the banks and we need to control for this.[18] Moreover, the model also allows controlling for all time-invariant differences across banks. In addition to these theoretical considerations, we also used the Hausman test to decide between fixed or random effects.[19] We also used the option of 'robust' (in STATA) to account for heteroskedasticity as we expect different error variances for each bank. Finally, an AR term is included to capture autocorrelation in errors, which generally leads to a large bias in the standard errors of the coefficients. With these options, the results of the best-fitted panel regression are presented in Table 4. The results indicate that the explanatory variables accounts for 58.8 percent variation in banking spread over the estimation period. A detailed interpretation of the coefficients is given below.

Bank specific factors and banking spreads:
Within bank specific explanatory variables, the share of non-interest income to total income is negatively related to banking spreads. This is an interesting result, as banks' overall business activities are classified into two categories; core and non-core businesses. Following this classification, overall income can be classified into two categories: the income stemming from core businesses activities is known as interest income, while income from other sources is named as non-interest income. Although non-interest income does not directly affect banking spreads, it has an indirect role as banks tend to focus on overall profitability. Strong earnings from non-core business activities (income from advisory services, commission, brokerage activities, foreign exchange transactions etc.) allow banks to compensate for any shortfall in expected interest income. It also helps banks in funding a portion of their administrative expenses and provisioning requirements. It is therefore expected that an increase in non-interest income is negatively correlated with banking spread.

The regression results support this argument. While the coefficient is statically significant at the 1 percent level of significance, its economic importance seems to be on the lower side. Specifically, a 100 (bps) increase in the share of non-interest income to total income is likely to reduce the spread by less than 5 bps. This is deceptive at face value because of two reasons. First, the presence of an AR term in the regression implies that the value of the coefficient represents the marginal impact of non-interest income on banking spread. Second, the share of non-interest income in total income ranges from 4.1 percent to 76.6 percent in our

[18] Fixed effects regression allows this possibility by assuming correlation between error term of a bank and its predictor variables. The results indicate the correlation is 0.3693.
[19] The value of χ^2 is 65.21, which is statistically significant at 1 percent.

sample. The same is also visible from deviations of the share from their means over time (within) and across banks (between) (Table A1 in Annexure).

The share of non-remunerative deposits in total deposits is also positively associated with banking spreads. Specifically, a 100 bps increase in the share of non-remunerative deposits will positively contribute towards banking spread by 2 bps. This result, along with the earlier discussion in section 3 highlights that the deposit structure of banks plays an important role in determining their overall spreads.[20]

Non-remunerative deposits are extremely low cost deposits.[21] These deposits account for a quarter of total deposits of the banking system, and have significant role in reducing banks' average cost of funding. Simple arithmetic reveals that the average cost of deposits for 2009 would increase from 6.1 to 8.2 percent (a difference of 210 bps) if we exclude the impact of non-remunerative deposits (Figure A3 in Annexure). In addition to this, the deposit structure of banks indicates that savings deposits account for another 30 to 40 percent of banks' deposits. These are also low cost demand deposits. Khawaja and Din's (2007) definition of interest-insensitive includes current (generally non-remunerative) and savings deposits. They also observe that "inelasticity of deposit supply has a positive and significant impact on spread" (p. 7).

Administration expense is at the heart of banking spread, as it is considered to be the cost of financial intermediation. It forms the basis of banking spreads in the absence of any other expense to banks. Due to this very reason, all studies employing the single stage regression analysis take into account administration cost as an explanatory variable [Maudos and Guevara (2004), Williams (2007), Wong and Zhou (2008)]. Our regression results indicate that a 100 bps increase in the administrative expense to total expense ratio is likely to increase banking spread by 3 bps over the estimation period.

Competition and banking spreads:
Banking spreads are believed to be negatively related to competition in the banking system; a lack of competition facilitates banks to extract abnormal profits through high spreads. As noted in the introduction, there are strong concerns among policymakers regarding competition in the Pakistani banking sector. However, these concerns generally lack empirical evidence. Widely used

[20] Khawaja and Din (2007) also observed that an interest-insensitive supply of deposits is a major determinant of banking spreads in Pakistan.
[21] Banks generally offer financial services (e.g. free demand draft facility, free funds transfer facility etc.) on these accounts, which entail costs to the banks.

measures to proxy competition, i.e. concentration ratios and the Herfindahl index (HHI), suggest a visible improvement in competition in recent years (FSA 2004, FSR 2006). Khan (2009) also finds that the banking system of Pakistan falls in the monopolistically competitive market structure. Moreover, literature on the efficiency of the banking system of Pakistan also suggests some improvement since 1990 (Ansari, 2006; Qayyum and Ahmed, 2007; Akmal and Saleem, 2008; Akhtar, 2010; Burki and Niazi, 2010; and Mathews, 2010).

In our panel regression analysis, we use the Herfindahl index (HHI) to analyze the the relationship between competition and banking spreads. A positive coefficient for HHI indicates that an increase in HHI (higher concentration represents low degree of competition) is positively related with banking spreads. The small magnitude of the coefficient must be seen in the context of the value of the HHI, which ranges from 1 to 10,000. Specifically, a change in HHI during 2009 leads to 3 bps decline in banking spread. In other words, banking spreads should have increased by 3 bps had there been no improvement in HHI during 2009. This result is in contrast to the findings of Khawaja and Din (2007), who conclude that "concentration does not cause a statistically significant influence upon interest spread". One of the possible explanations for this conclusion is the presence of market share as an explanatory variable in their regression, which has overshadowed the impact of concentration.

Banking spreads and macroeconomic factors:
Among macroeconomic indicators, we include real GDP growth and interest rates. Both these factors can affect banking spreads through various channels. While the link between interest rates and banking spreads is straightforward, the relationship with GDP growth is less so. In the case of GDP, increased level of income not only strengthens the repayment capacity of the borrowers, but also the supply of credit by contributing positively towards deposit growth. At the same time, booming economic activities increase the demand for credit, which ultimately increases banks' exposure towards the private sector (credit risk). The results indicate that GDP growth in time t is positively related to banking spreads in time $t+1$.

Interest rates positively affect banking spreads. An increase in interest rates directly impacts the repayment capacity of borrowers by increasing the cost of funding. This increased element of credit risk generally shows up in the form of rise in NPLs, which have to be provided for under the prudential regulatory requirements. As a result, a positive relationship between interest rates and banking spreads is expected. The same is visible from the regression estimates. The interest rate has a strong positive impact on the banking spreads over the

estimation period. Specifically, a 100 bps increase in average interest rates in Pakistan contributes towards 10 bps rise in banking spreads.

In regression analysis, a portion of variation in the dependent variable remains unexplained. Diagnostic tests on error terms are applied to ensure there is no systematic variation left in dependent variable, which can be captured by including any missing variable. Our regression results indicate that there is variation in banking spread which is yet to be explained. Some potential explanatory variables, which could not surface in the regression analysis, include non-remunerative cash reserve requirements and the sectoral distribution of banks' loan portfolios.

Minimum rate of returns on savings deposits and banking spreads:
One of the two objectives of this paper is to analyze the impact of introducing minimum rate of return on savings deposits[22] on banking spreads. Specifically, the SBP introduced a minimum rate of return of 5 percent on all savings deposits of banks with effect from 1st June 2008. In our regression analysis, we introduced a dummy variable (1 for 2008 & 2009, 0 otherwise) to capture the impact of this policy intervention. This turns out to be statistically insignificant. However, this is hardly surprising due to just two observations for the policy intervention in regression analysis using annual data.

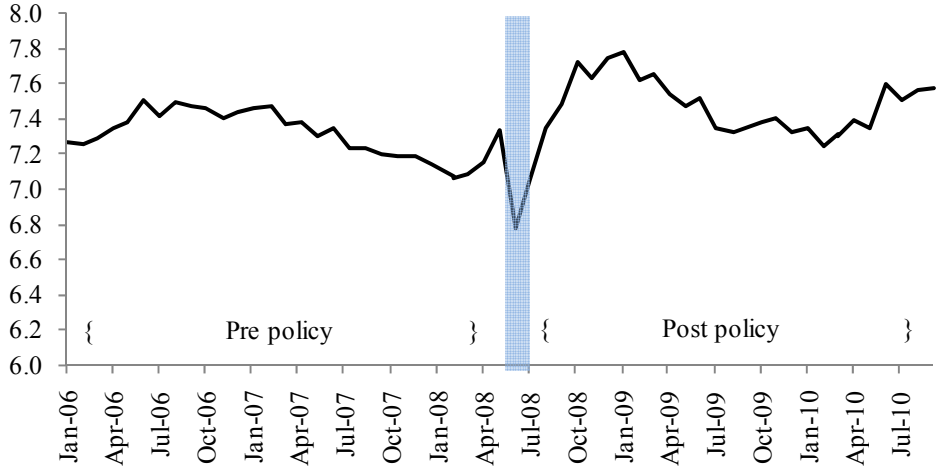
To explore this issue further, we rely on descriptive analysis of monthly data on weighted average lending (WALR) and deposits rates (WADR) of the banking system. Banking spread is defined as the difference between WALR and WADR. Although this is a narrow definition of banking spreads as compared to the definition used in our regression analysis, we believe this could be a good proxy, as deposits account for around 85 percent of funds, while loans constitutes over 60 percent of banks' earning assets in recent years.

A look at trends in monthly data reveals that spreads declined by 56 bps to 6.78 percent (lowest since Jan-06) following the introduction of the minimum rate of return on savings deposits (Figure 3). This sudden dip in banking spreads is an indication of the adjustment lag in banks' lending and deposit rates. Specifically, while deposit rates instantaneously jumped in response to the policy measure, banks took some time to adjust their lending rates and absorb the increased cost of funding in other business activities. The figure also shows that banking spreads climbed back to May-08 levels (pre-policy intervention) in Aug-08, and reached the highest level ever of 7.78 percent in Jan-09. However, this is not the whole

[22] SBP, BPRD Circular No. 7 dated May 30, 2008.

story as interest rates in the economy were also inching upward over the same period.[23]

Figure 3. Trends in Monthly Spread (WALR-WADR)



Given our findings in the previous section that interest rate changes have a significant impact on the level of banking spreads, we need to control for this rate hike, as well as other factors that impact banking spreads. While this is extremely difficult in descriptive analysis, we account for this by adjusting the WALR and WADR for the pass-through effect of a change in the benchmark policy rate. Specifically The Financial Sector Assessment Report of SBP for 2005 noted that a 100 bps increase in the benchmark rate tends to increase the WALR and WADR by 98 and 44 bps respectively.[24] Using this information, we calculate difference-in-difference estimates to gauge the net impact of the policy change.

For this analysis, we use 4 year monthly data on WALR, WADR and the benchmark rate (using PKRV rates as a proxy). The first difference in pre and post-policy intervention indicates that banking spread increased by 14 bps on average in post-policy period (Table 5). Specially, the WALR and WADR (outstanding) have jumped up by 266 bps and 251 bps respectively. The benchmark rate has jumped by 344 bps over the same period. The use of pass-through estimates from benchmark rates to WALR and WADR indicates that

[23] SBP was implementing tight monetary policy in 2008. The SBP Repo rate was revised upwards in May and July 2008. In totality, the SBP repo rate saw an increase of 500 bps to 15 percent during 2008.

[24] SBP, Financial Sector Assessment 2005, Box 3.2, p.55.

these rates should have increased by 337 bps and 151 bps respectively in post-policy period. These adjustments with actual changes indicate a decline of 71bps in WALR and an increase of 100bps in WADR. These results imply that banking spreads would have declined by 171 bps had there been no change in overall interest rates in the economy. This reduction can largely be attributed to the introduction of the minimum rate of return on savings deposits of the banking system.[25]

Table 5. Difference in Difference Estimates

		Before*	After^	Change after Intervention (bps)	Net Impact (bps)
WALR	Outstanding	11.1	13.7	266	-71
	Fresh	10.6	14.0	332	-5
WADR	Outstanding	3.7	6.3	251	100
	Fresh	5.4	7.8	240	89
Spread	Outstanding	7.3	7.5	14	-171
	Fresh	5.3	6.2	92	-105
Benchmark rate-PKRV		9.0	12.5	344	

*: Average of monthly data in pre policy period (from Apr-06 to Apr-08)
^: Average of monthly data in post policy period (from Jun-09 to Jun-10)

6. Conclusion

This paper extends the literature relating to the determinants of commercial bank spreads to Pakistan. Extensions of the Ho and Saunders (1981) dealership model of the bank have been considered, and it has been determined which of those extensions are relevant in the context of Pakistan. In particular, in order to identify the major determinants of commercial bank spreads in Pakistan, we consider three broad categories of explanatory variables; bank specific factors (e.g. administrative costs, composition of banks asset and liabilities etc.), industry specific indicators (e.g. degree of competition, regulatory framework etc.), and macroeconomic indicators (e.g. real GDP growth, interest rate etc.).

Among bank specific factors, the share of non-interest income to total income is negatively related to banking spreads, as banks compensate for any short-fall in expected interest income by fee and commission based activities from non-core businesses. Since deposits constitute the main funding source for banks in Pakistan, we consider the share of non-remunerative deposits in total deposits and find that an increase in this share is positively related with banking spreads. Further, in line with studies on banking spreads in different countries (Maudos and

[25] It may be noted that this calculation only accounts for a change in the interest rates.

Guevara, (2004); Williams, 2007; and Wong and Zhou, 2008), and Khawaja and Din (2007) for Pakistan, we find that administrative expense is particularly important in explaining commercial bank spreads in Pakistan.

The level of competition in the banking industry in Pakistan remains a key concern for policymakers, and has widely been considered as a key factor in explaining high spreads. In contrast with Khawaja and Din's (2007) earlier findings, our results support this view; we find evidence that concentration is positively associated with banking spreads. In particular, in the absence of an increase in competition in Pakistan's banking sector over recent years, banking spreads would have been higher.

Considering the impact of the macroeconomic environment, we find that both real GDP growth and interest rates positively affect the level of banking spreads in Pakistan. Again, in contrast with Khawaja and Din (2007), it appears higher demand for credit during times of strong economic activity enables banks to charge higher spreads. However, a rise in interest rates increases the credit risk premium, and hence the spread that banks demand, as higher rates hamper the repayment capacity of borrowers.

The introduction of a minimum rate of return on savings deposits has contributed to a visible increase in returns on deposits, which has ultimately helped in narrowing banking spreads. Difference-in-difference estimates suggest that banks were unable to increase their lending rates to compensate for the higher cost of funding due to this policy intervention. Specifically, the increase in banks' lending rates could not keep pace with the rise in benchmark rates in the post policy intervention period; while over the same time, rates offered on deposits saw a visible rise.

Finally, in term of policy implications, our analysis highlights certain areas where targeted policies are most likely to be effective in influencing the level of banking spreads. In particular, in so far as the macroeconomic environment banks face is concerned, the regulator in its capacity as the monetary authority should aim to limit interest rate volatility; this is a key factor explaining high level of spreads. Our analysis reaffirms the role of the banking regulator in fostering market competitiveness; this is likely to encourage more aggressive pricing of deposits and loans, and lower the spread. However, our findings also highlight the role of agents' liquidity preferences in determining banking industry spreads in Pakistan. In particular, the willingness of agents to hold financial assets in the form of non-remunerative deposits, perhaps due to facilities associated with transactional access to savings provided by banks, are a key source of high spreads; as they

keep banks' funding costs low. This highlights a role for the regulator in creating awareness among banks' customers about the substantially higher rates of return offered on fixed deposits compared with call, current and even savings deposits. Ease of access to this information may encourage customers to place their surplus funds (balance in excess of transactional requirements) in longer-tenor fixed deposits with higher rates of return, thereby limiting banking spread.

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Annexure. Variation in Bank Spreads

Figure A1. Banking Spreads-Hetrogeneity across year

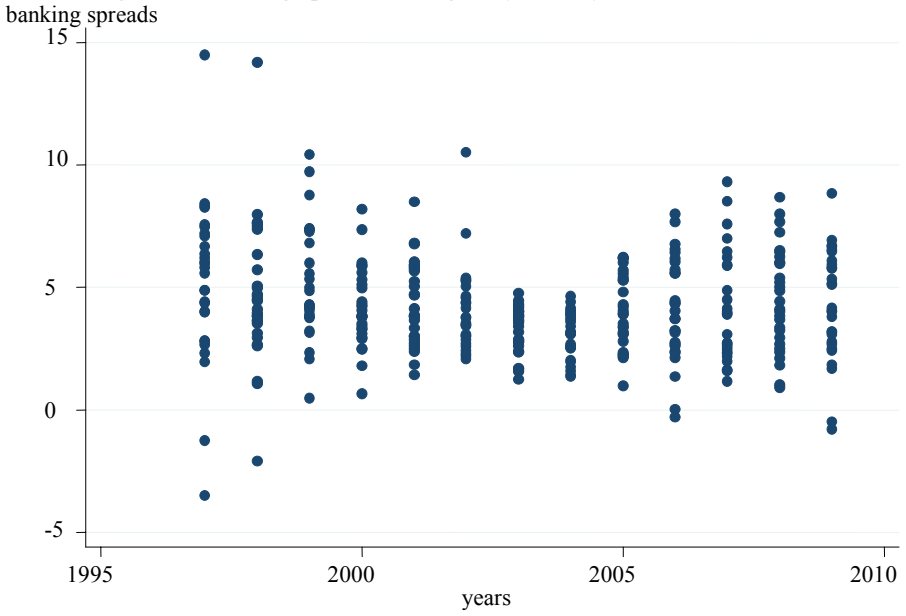

Figure A2. Banking Spreads-Hetrogeneity across banks

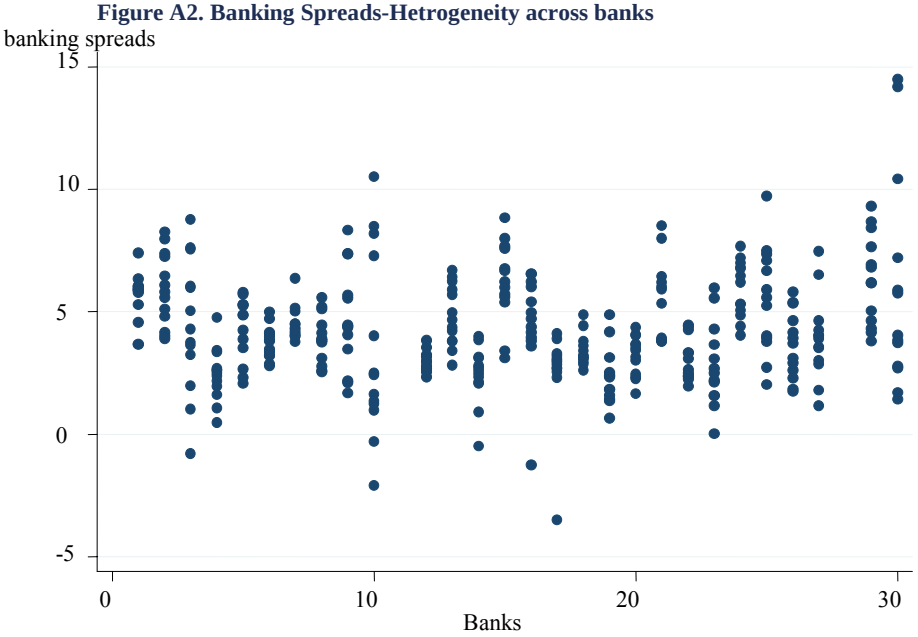

Figure A3. Average Cost of Deposits

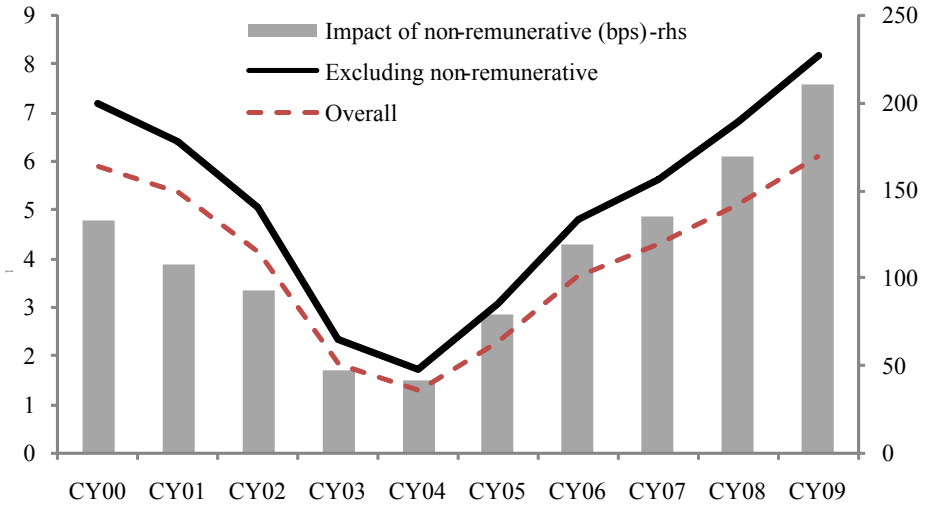

Table A1. Summary Statistics of Bank-Specific Indicators

	Mean	Std. Dev.	Min	Max
Non-interest income to total income				
Overall	20.22	11.55	4.10	76.64
Between		5.91	9.38	43.71
Within		9.98	-15.47	67.57
Admin expense to total expense				
Overall	34.41	16.12	7.2	98.6
Between		9.14	18.34	61.15
Within		13.38	0.06	76.09
Share of Non-remunerative deposits to total deposits				
Overall	23.43	13.37	0.47	69.57
Between		5.85	10.54	32.52
Within		12.07	-6.29	73.01