

## Competitive Structure and Bank Loan Rate in Pakistan’s Banking Industry

AMIR JAHAN KHAN

This paper estimates the relationship between loan price and the number of banks in the corporate loan markets of Pakistan. An original data set is constructed that includes loan price (interest rate) and market structure (number of banks) in more than 300 geographical markets across Pakistan. Variation in market structure (number of banks) along with variation in borrower and lender characteristics is employed to identify the factors that affect interest rates in loan markets. The findings based on regression result show that a competitive structure influences market price as loan rates decline when the number of banks increase in a market. Although the statistical evidence goes in favour of the structure conduct hypothesis, the findings are not robust across various functional forms. The detailed analysis of the Credit Information Bureau data and institutional details documented in this paper will be a useful reference for further research on the Industrial Organisation of Banking in Pakistan.

*JEL Classifications:* L10, L11

*Keywords:* Price-concentration, Loan Price, Industrial Organisation, Banking

### 1. INTRODUCTION

In this paper, I estimate the relationship between the loan price and number of banks in the corporate loan market of Pakistan. I have constructed an original data set that includes loan price (interest rate) and market structure (number of banks) in more than 300 markets across Pakistan. The constructed loan data set is based on a loan level universe, which includes all loans issued to the corporate borrower between 2006 and 2012 in Pakistan. I utilised variations in market structure (number of banks) along with variations in borrower and lender characteristics to identify the factors that affect interest rates in the loan markets.

The existing literature in the context of developing countries focuses primarily on policy interest rate pass-through and the impact of monetary policy on the interest rates (Edwards and Khan, 1986). However, there is limited information available on how market structure and related characteristics affect loan prices in geographically isolated markets. The analysis in this paper bridges that gap by employing market-level loan data

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to study the price-concentration relationship in the banking industry of Pakistan. To the best of my knowledge, this is the first effort to measure a price-concentration relationship in the Pakistani banking industry at a geographical market level. The findings of this paper can be useful for policy analysis and further research in the industrial organisation of banking in Pakistan and South Asia.

The structure conduct (SC) hypothesis says that an oligopolistic structure of markets results in higher concentration and higher prices for loans or lower prices for deposits (Berger and Hannan, 1989). Therefore, borrowers will face higher loan prices in markets where there are fewer banks, or a smaller number of larger banks, compared to markets with a larger number of banks with less market power. On the other hand, efficient structure (ES) logic says that a few banks with a larger share of the market reflect the efficiency of these banks as they capture the market due to lower cost and thereby lower loan prices (Demsetz, 1973).

In Pakistan both forces can be in operation, as post liberalisation experience shows an improved efficiency of the banking industry (Burki and Niazi, 2010). However, the outreach of the new private banks is limited to large cities, with negligible banking operations in fringe markets (Patti and Hardi, 2005). This results in a higher concentration of banks in smaller, geographically isolated markets compared to large cities.

The positive correlation between market concentration and bank performance is well documented in OECD countries (Weiss, 1989). However, since researchers have had limited access to micro-level loan data from developing countries, research was restricted to aggregate data only. The availability of micro-level data in developing countries has improved in the last decade (Khawaja and Mian, 2008) making it possible to work on the industrial organisation of the banking industry in these countries.

Liberalisation reforms in the banking industry started in Pakistan in the 1990s. The post liberalisation changes require an inquiry into the banking industry as the new local and foreign entrants changed the structure of the market, which potentially affected operations of large incumbent market players in the banking industry. The financial market reforms included interest rate liberalisation reforms, which allowed banks to offer multiple products at different price levels across different markets in the country (State Bank of Pakistan, 2004).

The entry and price liberalisation reforms in the banking industry of Pakistan is of potential research interest, but that research is restricted due to the lack of availability of disaggregated data. The availability of market-level business loans Credit Information Bureau (CIB) data have made it possible to measure the price-concentration relationship.

As the liberalisation and regulatory reforms since 1990 have changed the market structure of the banking industry, it is interesting to explore the connection between competitive structure and loan prices. Previous research on post reforms banking industry shows a substantial improvement in banks performance and reduction in market concentration at the country level (Mahmood, 2009; Patti and Hardy, 2005).

The entry of new banks in the market potentially changed the strategic behaviour of the large incumbents as they were facing less competition before liberalisation reforms.<sup>2</sup> In the early period of the reforms, operations of incumbent large banks were on

<sup>2</sup>The banking reforms also have direct impact on performance, for instance privatisation changed ownership and potentially management practices in incumbent banks.

a wider geographical scale. Later, the central bank encouraged small banks to enlarge their market and open new branches in locations other than large cities.

Loan data for each corporate borrower and regional market, and information about the branch network at a local level, is used in this paper to estimate the relationship between competitive structure and market prices in the banking industry. The simple model estimated in the paper shows that interest rates charged by banks decrease as the number of banks increase in a market, and the loan price is substantially less in the markets where post liberalisation entry has occurred.

The paper is comprised of seven sections:

2. Literature review of selected industrial organisations.
3. Structural change in the Pakistani banking industry.
4. Data and related issues.
5. Econometric specification.
6. Summary statistics and findings.
7. Conclusion and plans for further research.

Additional tables and Figures are provided in the data appendix.

## 2. LITERATURE REVIEW

A number of oligopoly theories predict that price will increase with the increase in concentration in the market. The classic oligopoly theories of Cournot and Bertrand imply a negative correlation between price and number of firms under specific assumptions for cost and demand conditions (Weiss, 1989).<sup>3</sup> According to another set of early theories, firms in the market start acting collusively when their market share reaches a certain level (Chamberlin, 1962). Firms will set a price above minimum average cost once they realise they have reached that concentration level. Weiss (1989) and Newmark (2004) document theoretical intuition behind a number of price concentration studies, and Weiss (1989) includes empirical studies on price concentration conducted in various industries.

The price-concentration studies directly measure the relationship between concentration and pricing strategy of banks. The results from these studies are also employed to test structure-performance hypothesis (Berger and Hannan, 1989). The price-concentration regressions are estimated in literature using various concentration measures depending on the availability of data. The conceptualisation of concentration measures in some studies captures the nature of competition in the market as well (Tabak, et al. 2009). Similarly, the price variable in the estimated econometric equation depends on the availability of the data by researchers. For example, Berger and Hannan (1989) used deposit rates that banks pay to customers, to test negative relationships between price and banking concentration. In this study, price-concentration equations similar to Berger and Hannan (1989) are employed to test for structure conduct hypothesis.

In this paper, the number of banks in a given market are considered exogenous and that is a maintained assumption as discussed in the next sections. However, the concentration or number of firms in the price equations are considered endogenous in

<sup>3</sup>For example, in Cournot model with zero costs, the price will be proportional to  $1/N$  where  $N$  is number of firms.

previous literature (Schmalensee, 1989). In the banking industry the number of banks in a town will depend on demand and cost conditions in that town, while loan prices will also be determined by the same conditions in that town. For example, a large city with high demand will attract many banks as compared to a remote and less commercial town with low demand. As argued in the next section, in this study the number of banks in a market are treated as exogenous because entry conditions are restricted by licencing arrangements made by the central bank.

The endogenous market structure has received attention in modern industrial organisation literature. One approach is to use a panel data method with instrumental variable technique in order to fix the OLS bias [Evans et al. (1993)]. Singh and Zhu (2008) have used a two-step estimation technique where in the first stage the equilibrium model of entry is estimated to predict the number of competing firms in a market, and in the second stage, the correction term (derived in the first stage) is used to correct for correlation between price and competitive structure. Both of these approaches require appropriate data in order to estimate the price-concentration equation.

Studies such as Evans et al. (1993) require a panel data set while the estimation of entry model similar to Singh and Zhu (2008) requires detailed information on demand and cost conditions in the relevant markets. There are limitations to construct panel data or to estimate an entry model by employing loan data provided by the Credit Information Bureau (CIB), the data used in this paper for the analysis.

### **3. STRUCTURAL CHANGES IN BANKING INDUSTRY OF PAKISTAN 1990-2007**

The banking industry in Pakistan was dominated by five large government owned banks until financial reforms started in the late 1980s. Before the reforms, more than 80 percent of the total banking assets were owned by the five government banks.<sup>4</sup> The remaining market was served by 25 foreign banks operating in urban areas and niche markets, and branch operations of these banks were restricted by regulation (Patti and Hardy, 2005). The Government of Pakistan initiated broad range financial sector reforms in the late 1980s and during these reforms privatisation of state owned banks was followed by permission to open 10 private domestic banks and 3 foreign banks in 1991 (State Bank of Pakistan, 2003).

A number of new private banks opened in the following years. The number of domestic private banks increased from 0 to 15 and total banks went up from 25 to 46 between 1986 and 1997 (See Table 1 and Figure 1). During this time period, foreign bank branches increased from 51 to 75, while local bank branches went up from 6,955 to 8,446. During the 1990's the banking industry witnessed substantial growth and changes in governance and corporate structure of banks. The initial banking reforms were followed by an institutional strengthening of the central bank, where the central bank received more autonomy and increased the quality and spread of banking regulations.

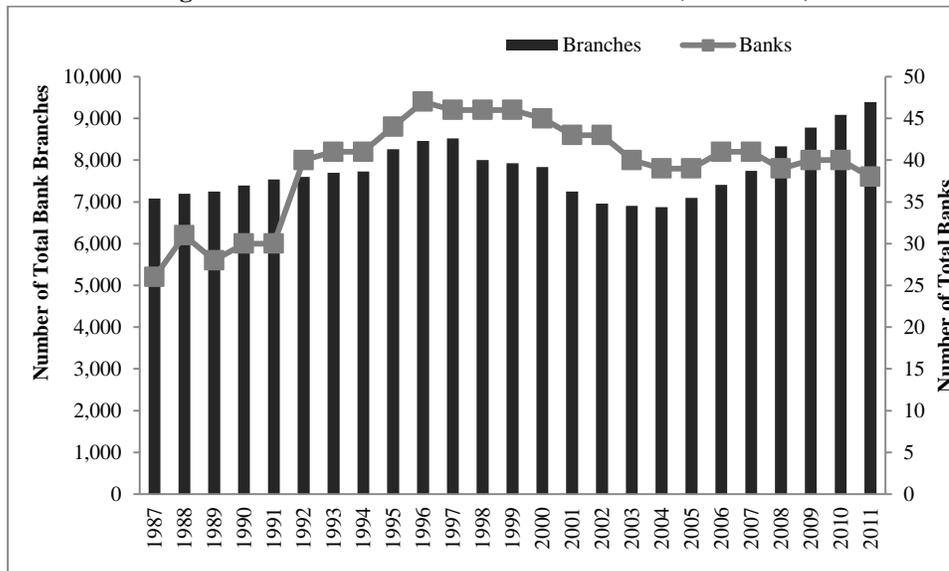
<sup>4</sup>Five Banks are, Habib Bank Ltd HBL (1450 branches), National Bank Ltd (1245 branches), United Bank Ltd UBL (1082 branches), Muslim Commercial Bank MCB (1025 branches), and Allied Bank Limited ABL (760 branches), number of branches in 2008. UBL, MCB and ABL were privatised from 1991 to 1993.

Table 1  
Number of banks in Pakistan 1990-2007

	1990	1995	2000	2003	2007
Government Owned	6	6	6	5	4
Domestic Private	0	15	14	18	26
Foreign Private	21	20	20	14	6
Specialised Banks (domestic)	4	4	4	3	4
Total	31	45	44	40	40

Source: Mahmood (2009).

Fig. 1. Number of Banks and Bank Branches (1987–2011)



Source: State Bank of Pakistan.

Post reforms, market share of the private domestic banks and foreign banks increased, but the foreign banks primarily focused on select clients and multinational companies (Mian, 2004). The private bank entries, mainly domestic banks, occurred during 1991 to 1995. From 1995 onwards, the issuance of licences to open new banks was implicitly suspended<sup>5</sup> and remained in effect during the current analysis period from 2006 to 2012. However, restrictions on opening of private bank branches (local and foreign) decreased, while government banks were restricted in opening new branches. In addition, government banks were encouraged to close unprofitable branches (State Bank of Pakistan, 2003).

The introduction of risk based capital requirements in 1997, and later, an increase in paid-up capital requirements, was followed by a central bank facilitated merger and the acquisition of the banking sector in Pakistan (Mahmood, 2009). All of these

<sup>5</sup>Motivation of moratorium could be due to bad performance of new banks (Mahmood, 2009), proliferation of banks and restricting foreign bank entry (Patti and Hardy, 2005). State Bank of Pakistan issues licence to any bank want to do banking business in the country.

developments rendered the number of banks quite stable during 2006 and 2012, and the number of banks are assumed exogenous in the empirical model.

The Pakistani banking industry is dominated by five banks with more than a 50 percent share of total banking advances in 2008. These banks are considered the dominant banks with a large market share and an extensive branch network throughout the country. The dominant banks owned 5,562 bank branches out of a total of 8,274 domestic bank branches in 2008. Although the big five banks are still widely operating across the country, their market share has gone down since 1999 (Mahmood, 2009). The new entrants have potentially increased competition as the market share of the big five banks is declining. The non-price competition, including quality of services and new product facilities, has motivated the big five banks to catch up with the new entrants. The Credit Information Bureau (CIB) data reveals that the incumbents (big five) and new entrants are selling similar products in the corporate loan market.

The empirical analysis in this paper assumes that the number of banks in the corporate loan market was stable from 2006 to 2012. The consolidation process started in 1997 and negligible new entries in the industry support stagnation in the market structure. The number of total bank branches has gone up since 2006, as shown in Figure 1, but that includes all branches while the price-concentration analysis in this paper is based on bank branches that offer corporate loans to firms. The political situation of the country and capital requirement by the central bank might also have forced an implicit ban on new corporate lending banks in Pakistan between 2006 and 2012, providing further credence to the assumption that a competitive structure is exogenous.

#### 4. THE CREDIT INFORMATION BUREAU (CIB) DATA

One of the key contributions of this paper is to employ a unique loan universe in order to construct market-level data that includes loan prices (i.e. interest rate), and the number of banks for more than 500 markets across Pakistan. The Credit Information Bureau (CIB) at the State Bank of Pakistan (SBP) provides the loan level universe.<sup>6</sup> In addition, the bank branches data published by the State Bank of Pakistan (SBP) is employed for part of the analysis in the paper. Loan level CIB data and bank branches data are collected by SBP to implement “prudential regulation” and are used to regulate and monitor financial performance of the banking industry in Pakistan.

The CIB data used in this paper lists the end of month report for each outstanding corporate loan issued between April 2006 and May 2012, and the universe of loans includes all outstanding corporate loans throughout the country.<sup>7</sup> A corporate loan is given to business organisations; these include listed companies, non-listed companies, and partnerships. Importantly, the CIB universe employed here does not cover single person liability businesses<sup>8</sup> (i.e. the unregistered enterprises owned by individual entrepreneurs).

<sup>6</sup>State Bank of Pakistan (SBP) is the central bank and financial regulator in Pakistan.

<sup>7</sup>Only fund-based loans, where actual amount was disbursed, are included in the sample and non-fund loans including letter of credit or letter of guarantee are dropped from the analysis.

<sup>8</sup>Unregistered businesses owned by individuals are quite pervasive in informal developing economies such as Pakistan; in the CIB data, business loans issued to single person owned unregistered firms are categorised as consumer loans.

The CIB data is of an established quality and has been used in recent banking literature (Khwaja and Mian, 2005; 2008). In this paper, it covers a recent period and includes new fields including borrower and lender identifier, loan size, interest rate, borrower's type, and loan maturity date. The description of selected variables covered in CIB is presented in appendix Table 1A. Khwaja and Mian (2005) augmented the CIB data with additional borrower and lender characteristics. For instance, one of their studies includes information on the political connections of the borrower. Higher confidentiality conditions with the CIB universe employed in this paper restricts the scope of merging external borrower and lender details similar to Khwaja and Mian (2005) with the CIB data.

The CIB data reports a loan in the database until the loan is settled. There is no loan identifier in the data, therefore outstanding loans reported over time cannot be identified with a numeric identifier. However, as each borrower and bank is uniquely identified, I can trace a loan issued by a specific bank to a specific borrower on a given date for a given product. Therefore, the loan is defined by the borrower-bank-product pair for each reported month. The outstanding loan data is reported in the CIB database for each loan until a loan is settled. However, for the analysis, only first time reported entry for a loan is used because the main purpose is to measure the relationship between the loan price offered by a bank and the number of banks in each market. The price of loan and other characteristics can be observed in the first reported transaction. The selection on first transaction entry leaves 36,279 borrowers, 107 lending institutions and 260,332 reported loans in the data.

Defining the loan market is critical for estimating the price-concentration relationship, and this is not free of problems. The loan market in this paper is identified according to the location of borrowers (i.e. business location), I have assumed that firms borrow locally, or borrow from the nearest town, in case the location is a very small village without any bank. There is no published evidence to confirm that firms actually borrow locally. However, unstructured qualitative interviews with bank managers and CIB officials support the notion that firms borrow locally, particularly for working capital loans and other routine services.

Banks issue loans to local firms in order to lower their transaction cost. In most of the transactions, individual guarantees, credit relationships, and physical assets (e.g. land, plant, and other physical assets) are employed as collateral for loans. Bank managers prefer issuing loans to local firms where verifying collateral is easy and past customer relationships can lower the risk of a default on a loan. About 9 percent of total loans issued to the firms that borrow from more than one location are omitted from the analysis.

The market is defined in this paper according to the location of a borrower with one central concentration of population, or urban centre, including small locations at margins, which in some way are economically connected to the main market centre. The notion of market here is similar to the Metropolitan Statistical Area (MSA) in North America with the exception of villages, as villages in Pakistan are also highly populated. In Pakistan, areas resembling MSAs are concentrated around a large town, usually the capital of an administrative district. The large town and district have the same name in most cases.<sup>9</sup> However, each district has other towns and villages with a concentration of

<sup>9</sup>For example, capital of "District Lahore" is the city of Lahore. And the businesses located in industrial belts around district towns are likely to be borrowing from banks in various locations of Lahore.

population, but varying amounts of economic activity. Therefore, a market can be a village, a town or a district capital depending on the location of the market and the isolation of that market from surrounding markets.

The market for a loan can also be identified by the lender's corresponding bank branch. The information about bank name and branch address is confidential in the CIB data, however a bank branch can be uniquely identified by the bank-branch pair code. This information matched with secondary information on total number of branches reveals that a quarter of the total bank branches in the country report data to the CIB. One potential reason for fewer reporting branches could be that another branch (e.g. head office) of the same bank reports data from non-reporting branches. Therefore, the borrower location is a better candidate for designating a loan market than the bank branch location.

### **Loans Sample and Discussion**

There are 260,332 business loans reported in the CIB data between 2006 and 2012 for 36,279 borrowing firms and 107 lending institutions<sup>10</sup> across 563 markets. Figure 1A in the appendix shows the quarterly trend for number of loans. The number of loans declined after 2008 as monetary policy tightened and credit expansion was restricted by banks. There is diversity in the nature of banks and in the products that they offer to the consumers. About 76 percent of the loans are disbursed by private banks, four public banks issue 10 percent of the loans, and two specialised banks command 7 percent market share. A large number of the remaining loans are issued by small lending institutions.

The banks offer a variety of loan products for various business needs; the majority of banks offer more than 10 different types of loans. There are more than 50 types of product offered by banks, but in order to create homogeneity in loan prices for a given product, the number of products can be merged according to the nature of product. For example, loans are classified as working capital and fixed capital loans. In addition, businesses demand some products locally (e.g. to meet routine needs) so that the competitive structure in a given location can potentially affect the price (i.e. interest rate) for that product.

Loans are split into subcategories; 46 percent of loans are classified as working capital loans or credit lines. Firms usually generate working capital locally as borrowing for running finance is quite a regular transaction for a business. Another 25 percent of loans are based on various specialised transactions related to foreign trade and foreign investment. Specific banks, or bank branches in large cities, possibly issue these loans to companies engaged in international trade, and thereby the loan market becomes national for these types of loans. In addition, 10 percent of loans were disbursed for fixed capital or equipment purchase including lease based capital, and 7 percent of loans were issued to businesses related to farming.

<sup>10</sup>In total forty six banks were in operation during 2006 to 2012 thorough the country, the rest of the lending institutions including small leasing companies and Islamic "modarabas" are operational in large markets only. The analysis in the main text is based on the data for the banks only, some regressions in appendix are based on data for all lending institutions.

The disaggregation of loans into different types is useful in order to estimate the price-concentration relationship by nature of localisation of product, and empirical specifications can be estimated separately for various types of loans. In this paper, working capital loans and loans disbursed for miscellaneous routine activities<sup>11</sup> (classified as “other type”) are employed in the empirical analysis.

The key dependent variable, the interest rate, is missing for more than half of the reported loans in the CIB data. One possible reason<sup>12</sup> for the missing observation could be that banks are reporting the figure in “KIBOR<sup>13</sup>+premium %” format in the CIB system. This potentially creates a problem, as the Credit Information Bureau (CIB) might not be aware of the corresponding KIBOR rate for each transaction, which could result in missing values. Although the CIB reports that either the interest rate was unknown at the time of reporting, or the corresponding transaction with missing interest rates are non-fund based loans (e.g. a bank guarantee). The loan size distribution for the missing interest rate cases is quite similar to the distribution of non-missing cases (appendix Figure 2A). Therefore, there is less of a chance that missing loan rate data might follow some selection pattern.

*Interest rate/loan size:* Interest rate data appears to be of good quality based on a consistency check presented in Figure 2. The trend in the CIB reported interest rate follows the trend in the reported private sector rate in published reports by the central bank. The average interest rate during the sample period is 14 percent with a standard deviation of 3.6. The trend depicts monetary policy changes during the period with monetary tightening since 2008 and a relatively steady interest rate period after 2009. The average loan size is PKR 69.4 million,<sup>14</sup> with 75 percent of loans less than or equal to PKR 40 million. Loan utilisation can be determined by the difference of outstanding loan and actual loan amount granted. Both variables can be observed in the CIB data, showing that three quarters of the loans have utilised more than 50 percent of the allocated loan limit.

On the demand side, less than 5 percent of firms borrow from more than five banks at various times, while 75 percent of firms borrow from at most one bank. Private firms are borrowers of 90 percent of loans. The firms that borrow from different banks over the years could be large conglomerates with better access to credit markets. About 88 percent of loans have a maturity date within the sample period, and 95 percent of loans have about four years or less duration, while the median duration is 1 year 2 months.<sup>15</sup>

In light of the above discussion, the sample is restricted to loans for working capital and other routine services, including loans for fixed capital, machinery and other physical capital. Loans for farming businesses and trade related activities are excluded from the sample as both types of loans are concentrated in specific markets and disbursed by specialised banks. In addition, loans with a missing interest rate are not used for the

<sup>11</sup>Mainly physical capital and fixed capital loans.

<sup>12</sup>Confirmed in an interview with an anonymised bank manager.

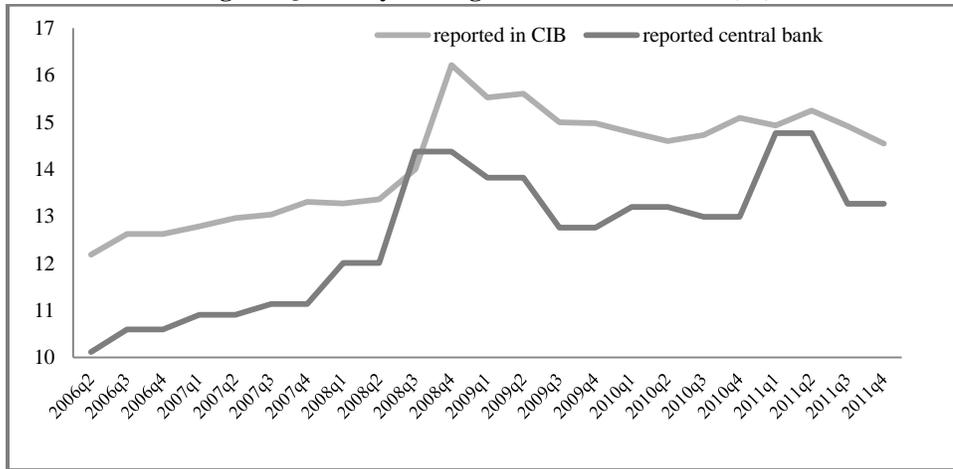
<sup>13</sup>Karachi Interbank Offered Rate (KIBOR).

<sup>14</sup>0.9 million US Dollars.

<sup>15</sup>The duration is calculated on the basis of loan issue date and loan maturity date, in some cases loan maturity date is also loan extension date and for those cases average loan duration will be longer than calculated here.

analysis because no imputation for the missing interest rate is required given a large sample of loans. The final sample includes 61,044 loans reported by 39 banks, in 302 markets, over 25 quarters. Summary statistics for main variables are given in Table 2.

**Fig. 2. Quarterly Average Nominal Loan Rate (%)**



Source: Author’s estimate based on CIB data.

Table 2

*Summary Statistics for the Variables Used in Regression Analysis*

Variable	Observations	Mean	Standard Deviation	Min	Max
Interest rate (%)	61044	14.56	3.08	3	20.7
Number of new banks in a market	61044	29.25	12.64	0	38
More than 5 banks dummy	61044	0.98	0.13	0	1
New private bank/lender dummy	61044	0.89	0.32	0	1
Number of total banks	61044	34.74	12.93	1	44
Loan Size (million Rupees)	61044	74.42	424.58	0.01	23,328.9
Loan duration in months	61044	15.37	18.09	0	367
Private borrower dummy	61044	0.92	0.27	0	1

Notes: The sample is based on loans issued for working capital and loans used for multiple purposes including fixed capital loans, the break up for two categories is give in appendix Table 2A.

**5. ECONOMETRIC SPECIFICATION**

The price-concentration hypothesis has been tested in previous research on the banking industry using a simple econometric specification, where market concentration is treated as exogenous and other exogenous controls are added to basic specification (Berger and Hannan, 1989). The framework shows that the competition in a given market will affect loan price or deposit rate. In the main model, various concentration measures can be employed to proxy competition in a given market. The basic econometric specification presented in Berger and Hannan (1989) looks like Model 1 below.

$$R_{ijt} = \alpha + \beta conc_{ijt} + \lambda' x_{ijt} + u_{ijt} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

Where  $r$  is interest rate charged by bank  $i$  in market  $j$  during time period  $t$ ,  $conc$  is a measure of the market concentration, usually a Herfindahl index or the 3 firm-ratio is used to proxy for the competition in the market, and  $x$  is a vector of exogenous control variables, the coefficient of potential interest here is  $\beta$ . For instance, a high market concentration will result in a lower interest rate offered to depositors by the banks implying  $\beta < 0$ . The model in Berger and Hannan (1989) predicts the interest rate that a bank offers for various deposits. While the loan data employed in this paper reports the rate borrowers were paying for a particular loan, depending on loan characteristics, borrower characteristics and market characteristics, therefore in this case  $\beta > 0$  in Equation 1.

I have conceptualised the price-concentration hypothesis in two models. In the first model, the key variable explaining variation in loan prices according to market competition is a dummy variable, where the dummy takes the value of 1 if the market contains at least one bank other than the large banks (*BIG5*).<sup>16</sup> The cut-off of “five banks” is used to separate markets that only contain old large banks, from the markets that contain at least one new private bank. This model is reported here in Equation 2.

$$R_{ijt} = \alpha_1 + \beta_0 \text{BIG5}_j + \nu \text{NEW}_{ijt} + \lambda \text{private}_{ijt} + \gamma_0 \text{dur}_{ijt} + \gamma_1 \text{dursquare}_{ijt} \\ + \varphi \text{loan}_{ijt} + \theta t_t + \varepsilon_{ijt} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Model 2 controls for the nature of a firm’s ownership where (*private*) is a binary variable that takes value 1 if the loan was issued to a private firm. Duration of loan (*dur*), and size of loan (*loan*), further quarterly dummies vector ( $t$ ) is included to control for time variation, while variable *NEW* takes value of 1 if the lending bank is a private bank.<sup>17</sup>

The nature of competition in different markets is unobservable and it is not clear how the five large incumbents compete with new entrants, so the selection of a concentration measure or cut-off based on the number of banks in a given market may become arbitrary. As discussed earlier, before liberalisation, five government-owned banks dominated the banking industry in the country. During the reforms, four of these banks were privatised. There was also an issuance of licences to new private banks. In this context, the competition in a location can be viewed as the presence of private banks other than large old banks<sup>18</sup> in the market as presented in model 2. However, intuitively, competition in a market increases with the presence of any additional bank; including fringe banks, as the regulator has set a level playing field for all banks in the industry. Therefore, model 2 is modified with the inclusion of the number of total new banks in the market.

The quadratic form is assumed in the Model 3 given below where *BANK* is the number of new banks in a given market.

$$R_{ijt} = \alpha_2 + \beta_1 \text{BANK}_j + \beta_2 \text{BANK}_j^2 + \nu_1 \text{NEW}_{ijt} + \lambda_1 \text{private}_{ijt} + \gamma_2 \text{dur}_{ijt} \\ + \gamma_3 \text{dursquare}_{ijt} + \varphi_1 \text{loan}_{ijt} + \theta_1 t_t + u_{ijt} \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

<sup>16</sup>The large old banks mainly five banks, number of branches given in foot note 4.

<sup>17</sup>Complete list of dependent variable, exogenous variable and controls are given in Appendix Table 4A.

<sup>18</sup>The summary statistics in Table 1 shows 98 percent loans are issued in markets that contain at least one bank other than large old banks, so the result in specifications using *BIG5* should be taken with caution.

In Equation 3, the number of new private banks (*BANK*) in the market measures market concentration. The important assumption here is that the number of banks in a market is predetermined. This assumption is supported by the fact that entry and exit in the banking industry in Pakistan between 2006 and 2012 was quite negligible. In the latter part of the sample, the number of banks goes down, probably because of the closure or merger of small banks, as these banks were struggling to maintain strict reserve capital requirements introduced under banking regulation. The CIB data shows that small banks were mainly operating in very large markets with little impact on market structure in most of the medium and small markets. Ordinary Least Square (OLS) can estimate models 2 and 3. Although standard errors need to be adjusted for the source of variation in data and preferably clustered at market level, the estimation and results are discussed in the next section.

## 6. RESULTS AND DISCUSSION

The price-concentration specifications 2 and 3 are estimated by pooled OLS for the samples of working capital loans and multiple purpose loans. The selection of one specific loan category into a subsample will be useful to group loan type according to the nature of the market for that specific product. For example, working capital is required to maintain routine business activities and therefore usually borrowed in the local markets. The estimates are based on OLS while clustered standard errors are estimated for statistical inference (i.e. clustered at market level). For robustness checks, linear and quadratic functional forms (in terms of *BANK* variable) for equation 3 are estimated after controlling for independent variables. The results are given in Table 3.

The linear and quadratic functional form results for Model 3 are given in column (1) and (2) of Table 3 respectively, while results for Model 2 are given in column (3) of Table 3. In the linear functional form of Model 3, the coefficient for the *BANK* variable measures the effect of the number of banks in the market on average interest rate. The OLS estimated coefficient on *BANK* reported in column (1) of Table 3 shows that loan price for working capital declines by 2.7 basis points<sup>19</sup> with the availability of an additional bank in the market.<sup>20</sup> This statistically significant finding is consistent with the notion that market concentration in a given market is positively associated with the interest rate the banks charge to businesses in that market.

The average effect of an additional bank in the market on working capital loans declines to 1 basis point when a quadratic functional form is employed for estimating Equation 3, the linear and quadratic *BANK* terms are jointly significant in column (2) of Table 3 for the working capital loans. In the case of multiple purpose loans, the estimation of a linear function shows that on average, the loan rate decreases by 3 basis points with the addition of one more bank in the market. However, this effect is not statistically significant when quadratic functional form is used.

Other estimated coefficients in column (1) and column (2) of Table 3 are in line with the corresponding economic intuition that the interest rate increases with loan

<sup>19</sup>1 basis point (bp) is equal to 1/100th of 1 percent.

<sup>20</sup>The average presence of other competing banks in a market is based on observed Credit Information Bureau data. That does not include banks which were present in the market but were not engaged in issuing business loans during 2006 to 2012.

Table 3

*Pooled Regression Results for the Effect of Concentration on Loan Rates*

	Working Capital Interest Rate			Multiple Purpose Interest Rate		
	(1)	(2)	(3)	(1)	(2)	(3)
Number of new Banks	-0.027*** (0.005)	0.029 (0.021)		-0.034*** (0.007)	-0.075 (0.044)	
Squared number of Banks		-0.001* (0.001)			0.001 (0.001)	
BIG5 dummy			-0.268 (0.278)			-1.524*** (0.37)
Private Bank Dummy	-0.841** (0.274)	-0.838** (0.276)	-1.102** (0.338)			
Private Borrower Dummy	-0.154 (0.181)	-0.171 (0.189)	-0.23 (0.189)	-0.455 (0.546)	-0.401 (0.544)	-0.747 (0.543)
Log Loan Amount	-0.245*** (0.044)	-0.239*** (0.041)	-0.291*** (0.048)	-0.080** (0.025)	-0.079** (0.025)	-0.080*** (0.023)
Loan Duration	0.026** (0.009)	0.026** (0.009)	0.028** (0.009)	0.039*** (0.01)	0.039*** (0.01)	0.037*** (0.01)
Public Borrower* Private Bank				-1.620** (0.598)	-1.620** (0.601)	-2.167*** (0.619)
Private Borrower* Private Bank	0.554* (0.257)	0.553* (0.261)	0.705** (0.272)	-0.669*** (0.200)	-0.725** (0.223)	-0.869*** (0.159)
Constant	-20.950*** (1.775)	-21.300*** (1.727)	-19.842*** (1.777)	-21.299*** (2.751)	-20.819*** (2.734)	-17.198*** (2.348)
Sample Size	43363	43363	43363	7317	7317	7317
R Square	0.771	0.771	0.767	0.718	0.718	0.714

*Notes:* Dependant variable real interest rate annual %, results based on pooled sample 2006–2012, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001, standard errors in parentheses clustered at market level, quadratic loan duration terms are included in all specifications, further quarter dummies included in all specifications. R-square for all models is between 0.71 to 0.77, further Ramsey RESET reject the null hypothesis that models have no omitted variables in most of the specifications.

duration, where the loan rate is the lowest for 5 year duration loans for working capital, and 8 year duration loans for multiple purpose loans. The interest rate declines with the loan size, on average the interest rate declines by 2 basis points with an increase in loan size of 10 percent for working capital loans (0.8 basis points for multipurpose loan).

The private banks charge a lower loan rate than government owned banks and the results are significant for the working capital loans sample,<sup>21</sup> where the average gap is above 80 basis points. This potentially has two implications. Firstly, the lower price charged by private banks is consistent with selection of high credit worthy borrowers (i.e. low risk clients) by the private banks, and secondly, the competition will be higher in the markets where private banks are present. The coefficient for private borrower dummy is significant for working capital loans, where on average, private firms pay a 34 basis point higher loan rate than government enterprises, but significance declines as borrower and lender interaction terms are incorporated.

Specifications in column (3) of Table 3 are based on model 2, where *BIG5* is a dummy variable separating markets containing at least one new private bank from the markets with only large old banks. Although arbitrariness cannot be ruled out in the selection of the *BIG5*, but institutional facts support the inclusion of the intercept shift through the *BIG5* in model 2.

The five major government banks in the Pakistani banking industry have dominated the loan market over the years (Mahmood 2009). These are the large banks of the country, with a wide network of branches, and the liberalisation reforms exposed these banks to competition from new private local and foreign banks by the late 1990s. The binary variable *BIG5* is capturing the exposure of the market to new competing banks, and comparing markets with new banks to markets with old large banks, the downside of this variable is that only a few markets contain just large old banks. The mean of the indicator variable *BIG5* is 0.98. However, the estimated coefficient on *BIG5* is statistically significant and shows that borrowers in markets containing at least one new bank pay 27 basis points lower interest rate for working capital and 152 basis points lower interest rate for multiple purpose loans, compared to markets containing only large old banks.

The competitive structure of the banking industry is influenced by the operation of the conventional banks in most of the markets across the country. However, the CIB data shows that other small financial institutions, including Islamic finance companies and leasing companies, are also lending to corporate borrowers mainly located in large cities. In order to incorporate the competitive effect of other financial institutions, model 2 and 3 are estimated for the sample of loans for all financial institutions, the results are presented in appendix Table 3A. The findings that loan rate decreases with the increase in the number of banks in a market stays stable in various specifications in appendix Table 3A, where total number of lending institutions is used to proxy *BANK* variable instead of number of conventional banks. The relationship between number of banks and loan price remains statistically significant in Table 3A.

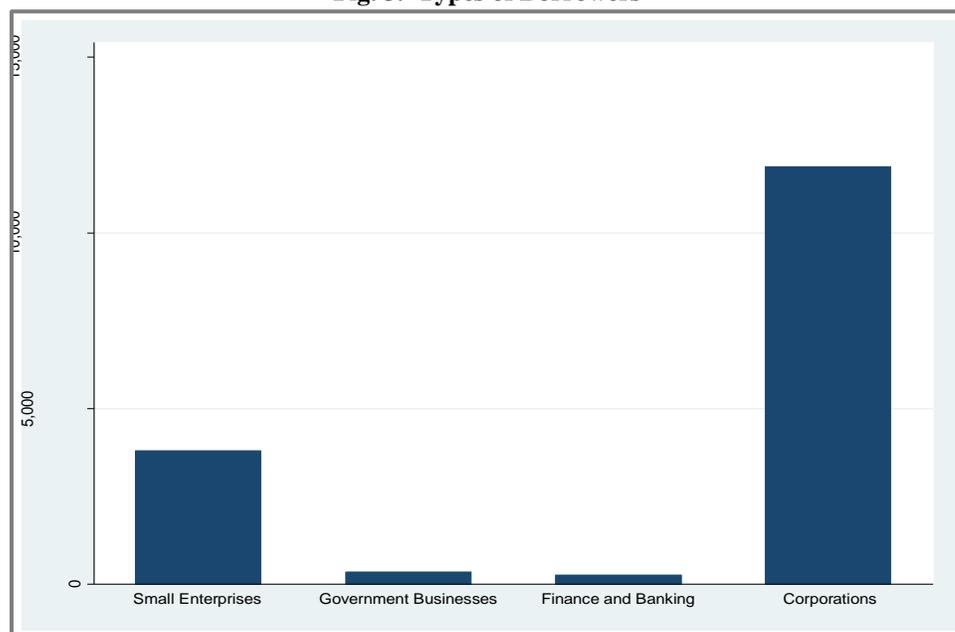
Most of the other coefficients in Table 3A are not much different from Table 3, although the coefficient of a private lender dummy is higher in magnitude, particularly

<sup>21</sup> The effect of private bank dummy cannot be estimated for multiple purpose due to collinearity with some of interaction terms.

for multi-purpose loans. This is likely because smaller financial institutions mostly issue fixed capital loans that fall under the multiple loan category. For example, the coefficient in column (3) of Table 3A for multiple purpose loans shows that private financial institutions charge borrowers 120 basis points lower interest rate compared to government banks, holding other factors constant.

The nature of competition between small financial institutions and large banks is not clear, however the CIB data shows that small institutions are mainly leasing companies and Islamic finance companies. The analysis also incorporated additional interaction terms for lender type and borrower type for public and private market segments. However, a majority of the results are insignificant, although there is some evidence that for multi-purpose loans, government companies get loans from private banks at lower rates compared those offered to private borrowers by private banks.

**Fig. 3. Types of Borrowers**



Source: Author's estimate based on CIB data.

Most of the other coefficients in Table 3A are not much different from Table 3, although the coefficient of a private lender dummy is higher in magnitude, particularly for multiple purpose loans. This is likely because smaller financial institutions mostly issue fixed capital loans that fall under the multiple loan category. For example, the coefficient in column (3) of Table 3A for multi-purpose loans shows that private financial institutions charge borrowers 120 basis points lower interest rate compared to government banks, holding other factors constant. The nature of competition between small financial institutions and large banks is not clear, however the CIB data shows that small institutions are mainly leasing companies and Islamic finance companies.

In markets where large banks are operational, competition is neutralised due to customer relationships of a long duration between the big 5 banks and borrowers (i.e.

brand loyalty or switching cost). Since before liberalisation, most of the businesses were financed by the big 5 banks in virtually all markets of Pakistan. There is a high probability that the client relationship between firms and banks continued, particularly in the local markets where no post reforms entry occurred. In credit markets with long customer relationships, banks can charge marginally higher rates to old customers as switching costs might be higher, while new borrowers/firms in large cities can take advantage of competition in the market and switch to a bank with lower interest rates for business financing.<sup>22</sup> In markets where large banks are operational, competition is neutralised due to customer relationships of a long duration between the big 5 banks and borrowers (i.e. brand loyalty or switching cost). Since before liberalisation, most of the businesses were financed by the big 5 banks in virtually all markets of Pakistan. There is a high probability that the client relationship between firms and banks continued, particularly in the local markets where no post reforms entry occurred. In credit markets with long customer relationships, banks can charge marginally higher rates to old customers as switching costs might be higher, while new borrowers/firms in large cities can take advantage of competition in the market and switch to a bank with lower interest rates for business financing.<sup>23</sup>

One possible solution is to check sensitivity of results by employing different measures of concentration. There is a limitation on selecting other measures of concentration because the other measures of market concentration are available at aggregate level over the sample period, while loans are reported quarterly. Therefore, the additional concentration measure might not capture the actual impact of market concentration on the loan rate. The empirical model can be improved by incorporating the entry of a competitive player into the market, but the required information is not available in the CIB data.

Further, the identification of a geographical market is based on the borrower's address as branch details are confidential in the Credit Information Bureau data,<sup>24</sup> and most borrowers reported their main region as the location rather than the detailed street address. Therefore, there is a risk that the loan was actually generated by a bank located in a market with a high bank concentration, while the loan was reported in the CIB system for an urban market according to the main address, and in that market many banks were in operation. Similar data reporting issues can potentially dilute the influence of the competitive structure of the banking market on the interest rate charged by a bank for a given loan in that market.

Finally, in a large informal economy such as Pakistan, most businesses are unregistered firms or firms with single person liability, particularly family or individual owned small firms in local markets.<sup>25</sup> The CIB data reports loans only for organised large firms including listed companies, and large corporations (See Figure 3A). The variation in borrowing cost for credit is likely to be higher for small businesses across different markets, where borrowing cost depends on the nature of competition in the market. As CIB data covers only established firms and does not include single person liability firm,

<sup>22</sup>This notion is reconfirmed with an unstructured qualitative interview with a leading bank manager.

<sup>23</sup>This notion is reconfirmed with an unstructured qualitative interview with a leading bank manager.

<sup>24</sup>The branch information might not be very useful in identifying market location as well (as discussed in Section 4).

<sup>25</sup>Including farming, transport, trade, retail services, and many other small-scale activities.

the effect of banking concentration on business loans cannot be estimated for all types of firms in the market. Single liability business loans are classified as personal loans in the CIB data. For further research, enlarging the sample of loans by including single liability firms can provide further insight into the analysis of the structure-conduct hypothesis for the loan market in Pakistan.

## 7. CONCLUDING REMARKS

This paper estimates the price-concentration relationship for the banking industry in Pakistan. It bridges an important gap, as there is no substantial empirical literature available on competition and market outcomes of the banking industry in the country at a micro level. The simple model estimated here shows that the interest rate charged by banks decreases as the number of banks grows in a geographical market. The loan price is substantially less in markets where post liberalisation entry has occurred.

The banking efficiency literature shows that new private banks are operating efficiently in the banking industry of Pakistan. This means that low cost entrants are creating competitive pressures for large old incumbents. However, the post liberalisation private bank entry occurred mostly in large cities, so it may be the case that the overhead cost of banks in small-town markets is higher compared to large cities. The increased cost of banking in small towns potentially confounded the negative influence of competition on the loan price with the positive impact of cost on the loan price.

On the policy front, the central bank of Pakistan has encouraged banks to open branches in small towns and local markets in recent years, as the major post liberalisation entry occurred only in large cities, urban centres, and industrial towns. Before any policy prescription can be written, the logical question would be to ask what determines the number of banks in a given market, and what factors are important for a bank to decide entry in or exit from the market. These are important research questions in the field, and future research should be directed in this line.

## DATA APPENDIX

**Table 1A**

*Credit Information Bureau (CIB) selected variables*

- 
- Lending Institution Code, unique bank identifier
  - Borrower's Code, unique firm identifier
  - Borrower's location City, Town or District
  - Name of credit facility, type of loan (e.g. working capital)
  - Date on which the credit facility was given to the borrower
  - Nature of facility (e.g. fund based, non- fund based)
  - Maturity date, or renewal date of the credit facility in case credit line is renewed
  - Limit amount of the credit facility in Rupees
  - Principal outstanding amount against the facility including interest rate in Rupees
  - Nature and value (in Rupees) of collateral against the loan facility provided by the bank
  - Interest rate at charged for the loan (Annual Percentage Rate - APR )
  - Borrower's credit rating if available , including internal and external rating
- 

*Source:* Credit Information Bureau, State Bank of Pakistan.

Table 2A

*Summary Statistics Group Wise*

Variable	Observations	Mean	Standard Deviation	Min	Max
<b>Loans for Multiple Purposes</b>					
Interest rate (%)	7317	14.20	3.46	3	20.68
Number of new banks in a market	7317	26.56	14.12	0	38
More than 5 banks dummy	7317	0.97	0.16	0	1
New private bank/lender dummy	7317	0.79	0.41	0	1
Number of total banks	7317	31.97	14.51	1	44
Loan Size (million Rupees)	7317	120.19	839.10	0.01	23327.97
Loan duration in months	7317	15.54	22.22	0	170
<b>Working Capital</b>					
Interest rate (%)	43363	14.45	3.04	3	20.68
Number of new banks in a market	43363	28.37	13.06	0	38
More than 5 banks dummy	43363	0.98	0.14	0	1
New private bank/lender dummy	43363	0.90	0.30	0	1
Number of total banks	43363	33.84	13.34	1	44
Loan Size (million Rupees)	43363	64.98	289.81	0.01	22820
Loan duration in months	43363	9.97	9.86	0	240

Fig. 1A. Number of Loans (Quarter Wise)

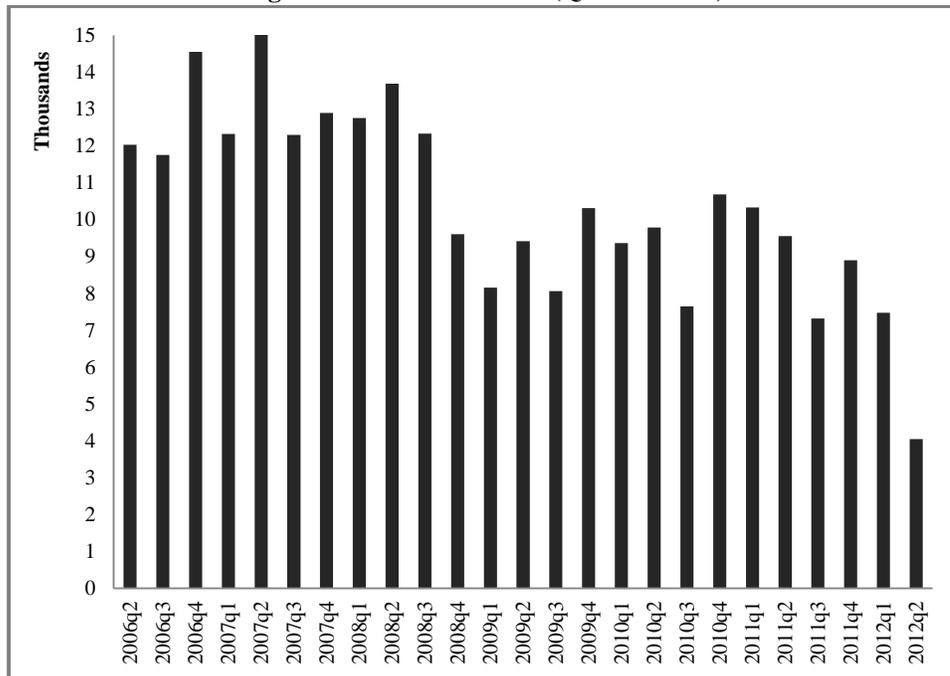


Table 3A

*Pooled Regression Results (All Financial Institutions) for the Effect of Market Concentration on Loan Rates*

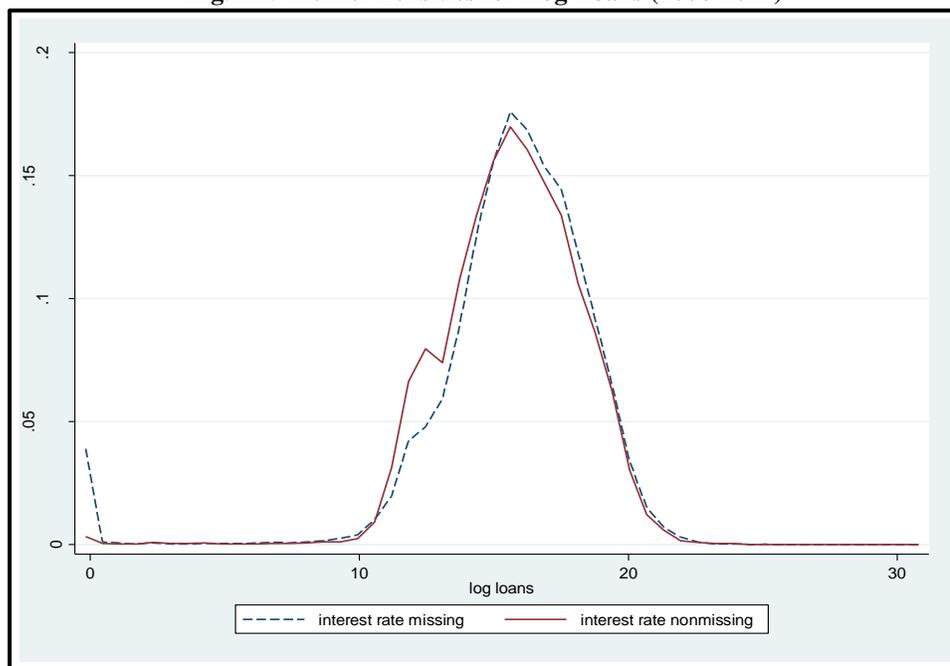
Dependent Variable	Working Capital Interest Rate			Multiple Purpose Interest Rate		
	(1)	(2)	(3)	(1)	(2)	(3)
Number of new Banks	-0.011*** (0.001)	-0.001 (0.006)		-0.007** (0.002)	-0.041** (0.015)	
BIG5 dummy	-0.890** (0.283)	-0.890** (0.284)	-0.466* (0.216)	-1.485*** (0.29)	-1.462*** (0.29)	-1.569*** (0.378)
Private Bank Dummy	-0.187 (0.182)	-0.202 (0.187)	-1.124*** (0.316)	0.27 (0.50)	0.335 (0.500)	-1.597*** (0.295)
Private Borrower Dummy	-0.236*** (0.042)	-0.236*** (0.042)	-0.207 (0.170)	-0.120*** (0.033)	-0.115*** (0.033)	0.225 (0.518)
Log Loan Amount	0.027** (0.009)	0.027** (0.009)	-0.289*** (0.048)	0.039** (0.013)	0.039** (0.013)	-0.117*** (0.031)
Loan Duration	0.027** (0.009)	0.027** (0.009)	0.029** (0.009)	0.039** (0.013)	0.039** (0.013)	0.036** (0.012)
Private Borrower * Private Bank	0.565* (0.276)	0.572* (0.280)	0.685** (0.260)	0.204 (0.332)	0.14 (0.328)	0.265 (0.353)
Constant	-21.234*** (1.751)	-21.276*** (1.749)	-19.812*** (1.719)	-27.276*** (3.706)	-27.046*** (3.699)	-24.416*** (3.217)
Sample Size	43719	43719	43719	8349	8349	8349
R Square	0.772	0.772	0.768	0.728	0.729	0.727

Notes: Dependant variable is interest rate annual %, results based on pooled sample 2006–2012, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001, standard errors in parentheses clustered at market level), quadratic loan duration terms are included in all specifications, quadratic BANK term included in specification (2). R-square for all models is between 0.73 to 0.77, further Ramsey RESET reject the null hypothesis that models have no omitted variables in most of the specifications.

Table 4A

*Description of Variables Used in the Regression Analysis*

Acronym	Variable	Description
$r$	Interest rate (%)	Inter rate charged for each loan
Number of new Banks	Number of new banks in a market	Number of total private bank entered and operating in the market after liberalization
BIG5 Dummy	More than 5 banks dummy	Takes the value 1 if loan is issued in a market where at least one bank other than the large banks operate
Private Bank Dummy	New private bank/lender dummy	Takes value of 1 if the loan is issued by a private bank and 0 otherwise
Loan Amount	Loan Size (million Rupees)	Amount of loan in local currency
Loan Duration	Loan duration in months	Loan contract duration in months
Private Borrower Dummy	Private borrower dummy	Takes value of 1 if loan is issued to a private firm, and 0 if a government owned firm

**Fig. 2A. Kernel Densities for Log Loans (2006-2012)**

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