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Bank Lending and Monetary Shocks: an Empirical Investigation

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Abstract

This paper provides a systematic empirical study of the role of credit market frictions in the transmission of monetary shocks. First, using macro data for a developing economy (Pakistan), we show that banking spreads are countercyclical, even when we control for credit risk, monetary policy and potential maturity mismatches. Moreover, we find that this anticyclical nature is accentuated in the presence of government as an active participant in the private credit market. Then, using a unique dataset on corporate loan agreements for the period 2006-2011, we find evidence that, in times of tight monetary conditions, there is an overall increase in the pass-through of policy impulses to individual loans rates. Furthermore, our evidence suggest that the impact of these shocks is disproportionately felt by borrowers and is especially biased towards less established firms. Moreover, small (weak) banks change their loan conditions the most in tight conditions. Thus, our findings support the view that the existence of a credit channel is particularly relevant for emerging economies, hence emphasizing the need for appropriate stabilization policies.

Keywords: Bank Margins; Credit Channel; Monetary Policy.

JEL Classification: E5, F4, O1.

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1 Introduction

There is now a largely consensual view regarding the importance of financial propagation mechanisms for aggregate activity. Indeed, research on the 'credit channel' of monetary transmission has focused on both the role of banks' asset composition effects (the 'bank lending channel') or, alternatively, the existence of borrowers' balance sheet effects (the 'balance sheet channel') - see Bernanke and Gertler (1995), Cecchetti (1995), Meltzer (1995), Mishkin (1995) and, more recently, Hubbard (2000) for reviews.

In the first case, a monetary contraction induces a fall in bank reserves, thus decreasing bank credit supply, especially when it is costly for banks to use other funds and/or for borrowers to find alternative financing sources. The balance sheet channel, on the other hand, emphasizes that, in the presence of creditworthiness monitoring costs, an adverse shock to borrowers' net worth (due to a decline in cash-flows or a shock to the value of collateralizable assets) raises the premium on external finance. Higher borrowing costs then lead to reductions in spending and production, thus amplifying the effect of the original shock.[3] This effect is expected to be more pronounced for smaller firms, with a more restricted access to alternative finance. Therefore, when the market is tight, such firms are disproportionally affected, facing punitive lending conditions and thus leading to severe and protracted economic swings.

The credit channel rely on two assumptions: (i) borrowers (including the state) are bank-dependent and (ii) banks find access to outside finance more expensive than the traditional deposit mobilization.[4] These conditions, however, have been subject to much criticism in the context of developed economies. Financial market innovations such as secondary markets, investment banking, the ability for banks to issue equity and improvements in financial depth are key objections (see for example Edwards and Mishkin, 1995, Meltzer, 1995 and Bernanke and Gertler, 1995).

Nonetheless, such financial innovations are less relevant for the developing world. In such economies, commercial banks are the dominant form of intermediaries, access to international capital markets is limited and the tax-to-GDP ratio is low (see Agenor and Montiel, 2008). It is precisely in developing economies where conditions for the existence of the credit channels may be ripe.

Understanding the relevance of monetary impulses and their propagation mechanisms is of crucial importance for the design of stabilization policies. We argue that a *credit view* of monetary policy transmission is likely to be more prominent and relevant in emerging market economies such as Pakistan. In fact, the alternative *money view* of the transmission mechanism relies on monetary impulses impacting output through real interest-sensitive spending. In this regard, infrequency of price changes plays a pivotal role. However, this argument is less potent for developing economies, where the degree of price stickiness may be lower, which in turn reduces the real impact of monetary policy actions (Choudhary et al., 2011, for example, provide the first survey-based evidence on this fact).

Thus, this paper empirically evaluates the extent to which credit market frictions in Pakistan play a role in exacerbating financial and monetary shocks. In order to undertake this task, we adopt a comprehensive approach. In a first stage, we use quarterly aggregate data to study the countercyclical nature of price-cost margins in banking, which is a necessary condition for the existence of a financial accelerator mechanism (see Bernanke and Gertler, 1989, Bernanke and Gertler, 1995 and Bernanke, Gertler and Gilchrist, 1994 and 1998). We employ the VAR forecast error methodology of den Haan (2000) to measure the comovement between banking spreads and aggregate activity, controlling for credit risk, changes in the slope of yield curve and monetary policy interventions, as in Aliaga-Díaz and Olivero (2010). However, we introduce a novel aspect in this exercise, by also taking into account the role played by financing of the government budget deficit, an issue largely ignored in the literature.[5] This is an important factor, as it may alter the

[3] This mechanism is also known as the 'financial accelerator'.

[4] Bank-dependent borrowers arise if credit markets function as 'customer-markets' of Phelps and Winter (1970) and Okun (1981), in which customers are held-up with their loan supplier because of information monopoly on credit history, switching costs of clients, formation of habit or a simple lack of an alternative avenue of financing.

[5] This is, perhaps, because most of the literature concentrates on developed economies, where state financing is de-linked

asset composition of banks' balance sheets and, thus, create a 'contraction'-like environment for the private economy. To explain, if the government's financing-gap is met by commercial banks (a scenario more likely in a developing economy), a monetary contraction ensues, in the sense that government paper may crowd out private lending. This further exacerbates the bank lending channel we discussed earlier.

In the second stage, we use a unique micro-level dataset on *actual* loans rates, borrower and bank information electronically reported to the Central Bank by commercial banks under monthly regulatory requirements, from April 2006 to April 2011. We analyze data on fresh loans before and after Sept 2008 BOP shock. After controlling for loan characteristics and macroeconomic conditions, loan pricing conditions are identified with respect to interest shocks engineered by the Central Bank. This will allow us to test the key prediction that when liquidity is tight, loan rate sensitivities to policy impulses increase overall and increase more for held-up customers and for whom information asymmetries are likely to be high. Another way to interpret this is that the interest rate pass-through will differ across borrowers and banks. Furthermore, these effects would be further reinforced by a weak fiscal position of the state, as argued before.

Our findings lend substantive support to the credit view enunciated above. Indeed, we confirm that the co-movement between business cycle fluctuations and banking price-cost margins are countercyclical. Moreover, the intensity of the cyclical nature of the interest-rate spread is influenced by the asset portfolio composition of banks, i.e. the greater the share of government paper the more countercyclical the interest rate spread.

On the other hand, the borrower-level analysis reveals that, in tough times, (i) there is an increase in overall policy pass-through; (ii) policy impulses are unequally distributed and positively biased towards less established firms; (iii) overall lending rate concessions are biased towards more established firms following a liquidity shock and (iv) smaller banks pass-through policy shocks to weaker borrowers to a greater extent.

Thus, our main contribution to the literature is that, using a rich individual loan database with *actual* individual loan rates, we uncover how monetary shocks filter down to banks and their borrowers. Indeed, the distributional effects of a policy impulse for fresh loans are significant. Furthermore, we show that banks' willingness to lend also depends on the debt situation of the country, as argued in Bernanke (1983a). A weak fiscal position reinforces the effects of the credit channel, in that banks' balance sheets tilt in favor of interest-inelastic government, which increase the overall interest-rate spreads in the economy.

The spirit of our work is closest to Hubbard, Kuttner and Palia (2002) and Khwaja and Mian (2008). The former employ a matched sample of individual loans, borrowers and banks, finding that bank clients tend to be 'sticky' and weak banks (from a capitalization viewpoint) offer higher loan rates. Khawaja and Mian (2008), on the other hand, is of direct relevance in that it concentrates on the bank lending channel in Pakistan during a unique credit-crunch that followed the nuclear blast in 1998. As in Hubbard et al. (2002), they match the *universe* of individual loan data of firms that maintain multiple bank accounts with bank information for the period of 1997-1999, largely confirming the predictions of the credit view. However, unlike Hubbard et al. (2002) and the current paper, they do not have information on loan prices.

Other related work exploring cross-sectional bank-borrowers heterogeneity include Kashyap and Stein (1994 and 2000), which assess the role of bank size and liquidity in explaining behavior, using U.S quarterly data. Peek and Rosengren (1992) and Kishan and Opeila (2000), on the other hand, investigate the role of capitalization, finding that smaller and least well-capitalized banks are more sensitive to monetary impulses. These results are important, as they suggest a tension between increasing the soundness of the banking system with capital requirements and the effectiveness of monetary policy actions.

This paper proceeds as follows. Sections 2 and 3 discuss data, the empirical methodologies and macro and micro results on the credit channels, respectively. Section 4 discusses some caveats of our study, while the final section concludes.

from private credit. However, Bernanke (1983b, p. 266) cites the example of Canada, that entered the great depression with a large foreign currency external debt with the consequence that banks shifted away from loans towards safer assets as the currency devalued and the economy deflated. In Bernanke's words, "debt crisis should be added to the banking crises as a potential source of disruption of the credit system".

2 Macro Evidence on Countercyclical Banking Spreads

As suggested above, developing countries such as Pakistan provide the ideal backdrop to study the lending mechanisms of the credit channel. An informal assessment in Table 1 suggests that financial markets and aggregate output fluctuations have become increasingly intertwined. Indeed, there is evidence of a fourfold increase in Pakistan's real GDP volatility in the past three decades. This period coincides with the deregulation of the financial sector. Also, we observe a stronger correlation of real GDP with cyclical components of key financial indicators.

Furthermore, in 2005 commercial banks accounted for 70% of financial sector assets, share of total deposit in bank liabilities stood at 84%, the stock market is only accessible to very large registered corporations, a secondary market for commercial paper is non-existent and banks have restricted access to overseas capital. Moreover, the 2008 balance of payments crisis initially reduced liquidity in credit markets and sent Pakistan to its largest IMF programme to date. Taken all together, these should prove good conditions carriers for the credit channel, especially as the economy transitioned to a tight money period.

Thus, below we outline the methodology for assessing the cyclical direction and the strength of bank margins using the VAR method proposed by den Haan (2000), used in this context by Aliaga-Díaz and Olivero (2010) for the US case. This method is useful because, unlike standard regression analysis, it captures important information on temporal features of the comovement between variables. Also, results encompass any combination of stationary processes or integration processes of any arbitrary order. Therefore, data transformation requirements are minimal.

2.1 Empirical Methodology

The methodology developed in den Haan (2000) relies on correlations of the VAR forecast errors at different horizons. The empirical model used is given by the following VAR

$$X_t = \alpha + \mu_1 t + \sum_{l=1}^{L} \beta_t X_{t-l} + \epsilon_t \tag{1}$$

where X_t is a vector of variables containing measures of banking margins, business cycle indicators and other control variables, t denotes a time trend and L is lag dimension of the VAR.[6]

The procedure involves estimating (1) and obtaining values for K-period forecasts for variables in X_t. These are, subsequently, used to obtain K-period forecast errors which are net of actual values X_t and in-sample forecast values. Finally, correlations between forecast errors of variables in X_t are obtained.

The above procedure is used in four different ways. First, a simple bivariate VAR is estimated where the vector X_t matrix includes alternative banking margins and business cycle variables. However, this VAR may be misspecified if relevant variables are omitted, as factors such as credit risk, the term structure of interest rates and monetary policy may independently affect the cyclicality of banking margins. Consequently, in the second step, we estimate a multivariate VAR. In this case, vector X_t includes the slope of the yield curve and credit risk measures, in addition to the margins and business cycle indicators used earlier. Third, the robustness of estimated correlations are verified by bootstrapping the estimated VAR with 2500 replications (more precisely, we use a moving block bootstrap). This is important, as the sample size is limited. Finally, the above three points are repeated using the share of government paper in total bank assets as an explanatory variable to explain the degree of cyclicality of margins, as discussed next.[7]

[6] We restrict the minimum number of lags to two using Schwarz's Bayesian information criterion, which helps us preserve data length.

[7] This methodology was first successfully applied in an early part of this project in Hussain et al. (2011)

2.2 The Role of Government Debt

An innovative feature in our study is that we argue that the government has a role to play in explaining banking spreads and, therefore, we also control for fluctuations in the financing needs of the government, using the aggregate demand composition idea of Gali (1994). According to Gali (1994), during bad times the share of government expenditure in aggregate output increases. Because this expenditure tends to be less price elastic, the total demand elasticity faced by representative firms falls. As a result, price-markups experienced during recessions tend to be higher. This is then reflected in the composition of assets in the banking system. In an economy with precarious external debt and weak fiscal position, the share of lending-to-the-state in total credit increases during bad times. The assumptions are that government has limited options in the short-run and its demand for money is less interest-rate sensitive. The result is that total demand elasticity for credit falls, increasing spreads for all borrowers.

2.3 Data

We use quarterly asset(loans)-weighted margin averages across all banks, constructed from bank-level data for 2002-2010. This data is obtained from detailed bank balance sheets submitted to the State Bank of Pakistan (the Central Bank). The balance sheets also provide the share of public sector borrowing for each bank, which we then aggregate. High quality data from this source is unavailable prior to 2002 since reporting requirements differed.

Three alternative definitions of margins are drawn from Aliaga-Díaz and Olivero (2006). Margin 1 is defined as the net of interest income on advances and interest expense on deposits. Margin 2 is defined as ratio of interest income and interest costs to total loans. Whereas the first two margins are closely linked to the definition of net-interest margins, the third margin, Margin 3, which is calculated as the difference between lending and deposit rates, measures the banking spread. Net-interest margin is distinct from banking spread in that it is computed as the ratio of the difference between the interest revenues and interest expenses to assets (loans), while the latter is calculated as the difference between lending and deposit rates.[8]

For business cycle indicators, we use data on industrial production, inflation and stock market growth, in line with the literature on business cycles (see Chen, Higgins and Mason, 2005). GDP figures for Pakistan are not available on a quarterly basis, however the growth rate of Industrial Production Index (a quarterly index for the manufacturing industry in Pakistan) can be used as a proxy for aggregate activity. Indeed, the correlation between annualized industrial production index and annual GDP growth rate during 1985-2009 is 0.6. Inflation and stock market series (KSE-100 index) in Pakistan are also good indicators of economic health. The correlations with annual GDP growth using annualized data is 0.4 and 0.6 for the periods of 1985-2009 and 1996-2009 respectively. These have also been used elsewhere in the literature (see for example Stock and Watson, 1998).

In the multivariate VAR, we include measures of credit/default risk and we use data on nonperforming loans obtained from the balance sheets, defined as the value of non-performing loans minus provision for loan losses. As Angelini and Cetorelli (2003) point out, interest rates on deposits exhibit more rigidity than the interest rates for lending. Therefore, it is important to include monetary policy as a control variable in this type of analysis. Furthermore, we use the slope of the yield curve, which is measured as the difference between the ten year and one year rate. This is also used in Bernanke and Blinder (1992) and Aliaga-Díaz and Olivero (2006 and 2010) as a proxy for monetary policy. Moreover, the slope of the yield curve is also used as a measure for maturity mismatch in assets and liabilities of banks' balance sheets, which is another factor that can affect cyclicality of margins. This is especially true if bank assets are of longer maturity than their liabilities. In recessions, when the short term rates are typically driven down more than their long term rates, the fall in bank expenses exceeds earnings. This in turn leads to higher margins during recessions, since these margins are calculated as the difference between bank income and expenses.

[8]For the sake of brevity, the results for the third margin are not reported, but are available on request.

2.4 Results

Simple *unconditional* correlations between the margins and business cycle indicators defined above are presented in Table 2a. All values are negative and significant, indicating some degree of countercyclicality in margins. Introducing other control variables that might affect the counter-cyclicality of margins allow us to arrive at *conditional* correlations.

Results for both bivariate and multivariate VARs are presented in Tables 2a and 2c. For the bivariate VAR, purified correlations of forecast errors are negative across all definitions of our business cycle indicators. The multivariate VAR, on the other hand, controls for term structure of interest rates and credit risk effects. The direction and significance of the coefficients of countercyclicality do not differ, confirming that there are factors other than our control variables which drive the cyclicality of banking spreads.

We now turn to the role of government debt. As explained earlier, when the government participates in the credit markets, spreads should increase more as the composition of the bank balance sheet tilts towards a dominant interest-inelastic player - a straightforward application of Gali (1994) to credit markets. For this purpose, we repeat exercises in Tables 2b, by including the share of government papers on banks' balance sheets as an explanatory variable in bivariate and multivariate models. The results are reported in Tables 2b and 2d. The correlations of forecast errors show that the degree of anticyclical spreads increases a great deal for both the bivariate and multivariate cases, as the bootstrapping shows that all results, without exception, fall within the 95% confidence interval. This finding strengthens the case for the role of a weak fiscal position in developing economies in generating financial accelerator type effects through bank balance sheets.

Thus, we have established that interest rate spreads are generally countercyclical and even more so when the share of government on banks' balance-sheets is introduced as an explanatory variable. Taking this aspect into account worsens overall loan conditions in the economy and complements the importance of the balance sheet and lending channels of policy transmission; a task we turn to next, using micro-level data.

3 Micro Evidence of the Credit Channel

In this Section we examine the extent to which monetary impulses disproportionately pass-through to actual loan rates offered to corporate borrowers, after controlling for borrower peculiarities and economy-wide conditions. We use a variation of the empirical model proposed by Hubbard et al. (2002) and Rosenwald (1998). The model application is done in two stages, by first tracing how policy shocks are distributed across different types of borrowers and then across banks. As discussed above, evidence on asymmetric distribution of policy impulses would strengthen the two channels of the credit view.

3.1 The Empirical Methodology

The textbook price of loans is given by the short run marginal cost of banks for raising funds and a borrower-specific risk premium. Competitive pressures will ensure that any other costs that are particular to banks are not borne by customers, for they can always switch suppliers. In the real world, however, credit markets are imperfect. Frictions such as intermediation costs, evaluation of borrowers' true intentions and the formation of bank-borrower relationships can cause banks to exploit their existence by heavily discriminating on price and even rationing credit across borrowers. The implication is that the impact of an unanticipated shock, leading to a higher overall cost of borrowing to the banking system that is not preceded by a period of monetary contraction, should be unequally distributed across different types of borrowers and banks, once borrower and loan peculiarities have been taken into consideration.

The following basic empirical model captures linkages between actual loans prices, policy decisions, the role

of banks and borrower characteristics,

$$Y_{i,b,t} = \alpha + \gamma_0 Interbank_{i,b,t} + \zeta' Z_{j,t} + \tau' P_{p,t} + \theta' M_{k,t} + \psi' N_{l,t} + \omega' L_{m,t} + \epsilon_i \quad (2)$$

where $Y_{i,b,t}$ and $Interbank_{i,b,t}$ are the annualized rates on the individual loan by borrower i at bank b at time t and the relevant annualized interbank rates of relevant maturity on the date the loan was agreed with the borrower. The vector $Z_{j,t}$ is composed of macro variables, namely: year-on-year inflation of the month in which the loan agreement took place, the nominal exchange rate on the day of the loan agreement. The vector $P_{j,t}$ contains, loan size and its maturity as control variables. It contains three separate dummy variables set to one for when loans are secured, funded and agreed with private parties. Furthermore, it also controls for the interest-rate corridor with the variable *Corridor*. This is a dummy variable set to 1 for all loans transactions for which the corridor was in operation. The idea behind the introduction of the corridor was to reduce overnight market-rate volatility. The variables $Y_{i,b,t}$, $interbank_{i,b,t}$, exchange rate, CPI inflation, loan size, maturity (tenor in days) are in log form. The error term ϵ_i is assumed to be uncorrelated with all the right-hand-side variables. All these variables appear in the top nine rows of Tables 9-11.

The remaining vectors of (2) are as follows: $M_{k,t}$ contains bank size dummies, $N_{l,t}$ is used to capture sixteen borrower type dummies, while $L_{m,t}$ consists of fifty loan type dummies. These vectors are key to our exercise to tease out the credit channel. They essentially control for bank and borrower types and facility specifications, which we discuss next.

First, in line with literature that followed the work of Bernanke and Blinder (1992) and that is summarized in Hubbard (2000), we assume that the policy stance of the central bank is captured by the discount rate, known as the repo-rate in Pakistan. Second, this repo rate, in turn, determines the price of money in the interbank market, which is the main policy variable $Interbank_{i,b,t}$. The justification for using the interbank rate to proxy for policy impulses is that the unconditional correlation between the discount rate and the six-month Karachi Interbank Offered Rate (KIBOR/interbank) is close to 0.90 (see also Figure 1 in the Appendix), i.e. the interbank rate tracks the policy stance one for one. Moreover, the advantage of using interbank rates is that, unlike the discount rate, the interbank rate is a continuous variable. Our confidence in the interbank rates as a policy transmitter to individual loans is reinforced by the State Bank of Pakistan (SBP) circulars (BPD Circular No.1 of 21st January 2004 and BPD Circular Letter No. 04 of 2006), which stipulate that all credit providers would benchmark loan pricing with the relevant tenor (maturity) of the Interbank.[9]

Each loan transaction is matched with the size of the crediting intermediary. There are three bank size categories: small, medium and large and is captured by Big Bank, Medium Bank and Small banks dummies. Each size has a separate dummy set to 1 for the respective category and captured in vector $M_{k,t}$. The classification of bank size is based on the average of daily excess liquidity positions with the central bank and its consistency is checked by using each bank's asset size in the banking sector for the period of our analysis. The choice of variable to depict individual bank size does not affect the rank of the banks during the period of our analysis. Bank size is meant to capture the ability of banks to absorb shocks which, in turn, reflect their cost of funding, cost of intermediation and customers-mix. Therefore, policy pass-through to loan transactions should differ by bank type, which would provide evidence on the financial intermediaries being a non-neutral agent during business swings.

We control for borrower type in vector $N_{l,t}$ using a uniform definition set by the Central Bank on the basis of corporate borrower status with SECP (a regulatory organization for firms). Banks slot borrowers into 16 categories at the time loan applications are being processed.[10] The top five categories of borrowers are: (1) firms listed in the stock market (2) registered general firms (3) public sector firms (4) large, but non listed,

[9] This policy marks a shift towards a more transparent and consistent credit market making in the country, understandable and appreciable given the lack of neat market-making transpired in the study of Khawaja and Mian (2005), which documents the use of unfair market practices (e.g. the use of political ties) for credit allocation, during the period 1996-2000.

[10] These borrower types are Autonomous body, Bank/DFIs, Federal Government, Foreign Constituents, Listed company, Local Body, Modaraba, Multilateral development bank (IBRD, IFC, ADB, AfID, EBRD, IADB, EIB, EIF, NIB, CDB, IDB, CEDB), Non-Bank Finance Company (NBFC), Non-listed company-other than SME, Partnership-other than SME, Provincial

firms and (5) small and medium sized firms as defined in the prudential regulation. Knowledge of borrower type allows to assess switching costs, as well as intermediation costs of borrowers. Finally, we also control for the type of facilities, of which there are 51 types in $L_{m,t}$.[11] The facility type is captured by 50 dummy variables. Overall, in (2) we have three types of controls namely: bank size (in the particular bigger banks), borrower and loan types. The use for each of these are highlighted in Table 9, 10 and 11.

This empirical setup is similar in the spirit of Hubbard et al. (2002), with subtle differences. There, the objective is to study spreads and their linkages with bank health and borrower type. Here, the focus is on the response of actual loan rates to policy shocks by bank and borrower type. We are able to do this exercise because, unlike other studies, we have access to actual loan rates for a large number of transactions. For example, in the context of loan rates by size during a period of tightening, Ronsewald (1998) uses a similar specification to ours. Moreover, our focus on loan rates, rather than spreads, is also important insofar as information on loan application fees and charges related to loan disbursement are not disclosed. Furthermore, deposits rates in Pakistan are non-market determined, as there is a fixed floor on these rates set by the Central Bank.

Our identification strategy of gauging the impact of shocks is very much in the spirit of Khawaja and Mian (2008) and it consists of examining individual loan transactions, before and after the balance of payments shock of Sept 2008. Therefore, (2) is estimated for the periods of April 2006-Aug 2008 and Sept 2008-April 2011 separately (see Figure 1). While the former period is a relatively stable period, the latter is recessionary, as Pakistan signed up to an IMF program in Sept 2008, having revised discount rates and, hence, banks' short run cost of funding, nine times. This event is interesting, in that as part of the package, and given that fiscal reform was a medium term objective, the financing of government deficit was shifted away from the central bank to commercial banks. This shift created a *de facto* monetary contraction, in the sense that only a fraction of the banks deposits were available for sale.

3.2 Data Description

Our database is drawn from the universe of corporate loans during the period of April 2006-April 2011. The information on these loans is reported to the State Bank of Pakistan by commercial banks. The database helps banks assess the creditworthiness of firms on a historical basis.

Data has sensitive borrower information and, therefore, is not publicly available. We focus on fresh, as well as repriced corporate loans agreements, across all types of various loan facilities offered by commercial banks. This enables us to extract *contemporaneous* effects of policy shocks. Table 3 in the Appendix shows the various stages of our data cleaning. Removing transactions of subsidized facilities and for those where loan and borrower information are incomplete, leaves us with 37,481 observations from a population of 141,902 of bank transactions (we dropped subsidized products to focus on policy transmission on market products).

We further restrict our sample to non negative interest-rate spreads in view of central banks circulars. This

Government, Public Sector Enterprise, Securities/Brokerage Firm, SME (as defined in the Prudential Regulations for SME), and Other.

[11] The top facilities are working capital, running finance, overdraft, project finance, term finance, commodity finance, letter of credit and foreign bills; others include Agricultural-Production Loans, Agricultural-Development Loans, Agricultural-Non farm credits, Auto Loan/Car Ijara, Balance Transfer Facility, Consumer durable Loans, Credit Card-Corporate, Credit card-Consumer, Diminishing Musharika, Foreign Bills Purchased, Ijara- Equipment, Ijara-Plant and Machinery, Ijara-other, Import Bills Purchased, Inland Bills Purchased, Istesna Finance, Lease facility, Letter of Credit, Letter of Guarantee, Micro Credit Other, Micro Credit-Live Stock, Mortgage Loan/House, Loan/Diminishing Musharika, Mudaraba Finance, Murabaha Finance, Musawah finance, Musharika Finance, OD (Running Finance),Other Islamic mode of finance, Other Non-fund based facility, Other working Capital Loans, Personal Loan, Project Finance-Individual, Project Finance-Corporate, Project Finance-SME, Object Finance-Individual, Object Finance-Corporate, Object Finance-SME, Commodity finance-Corporate, Commodity finance-Individual, Commodity finance-SME, Income-producing real estate financing-Corporate, High-volatility commercial real estate financing-Corporate, Running Finance/Cash line, Salam finance, Syndication Mudaraba, Term Loan/Finance, Loan/Finance against Foreign/Local Bills, Import Loan/Finance (other than LC and LG), Consumer Loan/Finance for Vehicles, Consumer Loan/Finance for House, Other Agricultural Loan.

implies a further removal of 18% of the observations, which is unevenly distributed across borrowers types. We also lose some observations because the loan tenor was not reported. Clearly, this loss of observations highlights weaknesses in data reporting to the central bank in a developing economy. The final sample is distributed across of 4,715 unique borrowers, holding 29,908 individual loans from 35 banks during 2006-2011.

A valid question about the representativeness of our sample comes to the fore. Table 4 shows that a large majority of these loans are based on products that are distributed across mainly five types of identifiable borrowers. The interesting point in Table 4 (Columns 1 and 2) is that the borrower distribution of loans moving from the universe to our final sample is not too different. In fact, there is a correlation of 0.95. In subsequent columns, we show the same holds true when we further disaggregate the data by bank size. Thus, we are confident that our sample is a good representative of the population of transactions for the period we study.

For the interested reader, in Tables 5, 6, 7 and 8 we present the summary statistics of our loan data by banks, volume, borrowers and a mixture of these three, respectively. It is clear that our sample is sufficiently rich with observations across borrowers and banks. A few important features deserve mention. First, the lion share of loan transactions are conducted by large banks. A large proportion of facilities have a value below PKR 20 mln ($0.23 mln) and the average maturity is close to one year. Most loans are securitized. Moreover, the largest average spread, defined as the difference of interest rate on loan and interbank rate, is found to belong to small and medium sized firms category and is 342 basis points. Finally, and perhaps surprisingly, on average, spreads are fairly similar across banks of different size. Nevertheless, medium size banks tend to be slightly on the higher side. However, as we discover later, these similarities appear to mask behavioral differences.

3.3 Results

3.3.1 General Regressions

In Table 9 we present the OLS estimation of (2). The first column has no controls and shows that the sensitivity of all loans types to policy shocks is positive (0.454) and statistically significant. This result validates our use of the interbank rate as a transporter of policy decision to individual loan rates.

Five results deserve mention. First, inflation and nominal exchange rates, which capture domestic and external uncertainties, respectively, tend to raise loan rates. In terms of point estimates, the depreciation of the exchange is the second most important factor that raises individual loan prices after policy rates. This suggests that the macroeconomic situation, in particular external, affects loan pricing. Second, loan collateral matters. Indeed, unfunded and unsecured loans are costlier, which is intuitive, and the coefficients capture that. Third, the estimated coefficient on loan maturity is negative and significant in most specifications. This is an unexpected result, but it is quite possible that better borrowers get better rates and get more time to pay back their dues. Forth, the estimated coefficient on loan size is negative and significant in all specifications, implying that the larger the amount borrowed, the lower the price, which is intuitive. Five, the introduction of an interest-rate corridor - captured by the dummy variable *Corridor* and set to one for loan transaction after 2009 - has generally resulted in marginally pushing down all loans rates, but this effect is small. This is due to increased market rate certainty of banks on returns on excess liquidity.

In column two, we add facility type. As explained earlier, this amounts to adding 50 dummy variables The results for each dummy is not reported, however, but it is plain that this addition does not create significant changes in the estimated coefficients.[12] In column three, we control for overall bank size and the pass-through of policy decisions by bank size. First, the dummy *BigBank* is a bank size dummy and is set to one for big banks. The result is that, generally, loan agreements with bigger banks tend to have lower

[12]The top five products have positive and statistically significant coefficients, however, for the sake of completeness we include facility type as a control variable in the estimations, henceforth.

prices. This result is true for any specification. This strong-bank effect is consistent with both the idea that better banks work with better borrowers (reference) and have lower cost of funds. Second, we answer the question of whether or not bigger banks respond more to policy decisions, when compared with other banks. The interaction dummy '*Big Bank interaction with Interbank rate*' (the product of $BigBank$ and $Interbank$ variables) modifies the effect of policy decisions and bank-size considered individually. The result is that the pass-through coefficient of 0.078 is small, but statistically significant. Overall, our results show that bank size is likely to be an important variable in terms of policy pass-through and pricing of individual loans.

The purpose of column four is to document lending behavior and policy pass-through by type of borrower. There are sixteen borrower categories. Tabular logistics imply that in Table 9 we only report the result of top five borrower types: (i) listed firms, (ii) public sector enterprizes (PSEs), (iii) non-listed firms, (iv) general firms, and (v) small and medium sized firms (SMEs). First, controlling for borrower type changes substantially the estimated coefficient on the interbank rate, which tells us that borrower type is an important variable in our study. Second, the bank-borrower interaction is also going to be key, because when we also control for bank size together with borrower type, as in column 5, the estimated coefficients change again. Therefore, it is preferable to analyze borrowers and banks together and not separately. At this point we turn to the last column in Table 9, which takes into consideration bank size, borrower type and facility. Including facility type is important, as can be observed when we move from results in Column 5 to Column 6. Therefore, we control for this in the remaining regressions.

The result on pass-through of policy decisions by borrower type are given by the interaction of borrower type with the interbank rate in the last column of Table 9. The result are striking. For example, the pass-through effect to small and medium sized enterprises (SME-interbank) is strong (0.0917) and significant, compared to any other category of firms. For the general firm category (gen-interbank), the pass-through is negative and significant, while for all other categories it is insignificant. Therefore, this is the first evidence that policy pass-through is unequally distributed across borrowers.

The results of individual pure borrower-type effects (a level effect) on loans are mixed. Less risky firms (listed firms) are generally offered loan rates lower than riskier ones (general or non listed firms). These effects are also significant, while the former are not. However, the SME sector, a risky sector, also gets concessions, while public sector firms (PSEs) pay more. We resolve this issue by considering who is lending to whom and at what point in time. For example, a SME firm with a big bank can potentially get a lower loan price than an SME firm with a weak bank. There are many such cases in our database implying that one would obtain the type of results we just described (see Table 4).

To summarize, we have found that bank size and borrower type effects matter considerably in determining loan prices. Also, there is initial evidence that bigger banks offer better rates and have small, but positive, pass-through, and policy pass through is largely biased towards small and medium sized firms. Therefore, we observe evidence of bank and borrower balance sheets effects on loan pricing.

3.3.2 The Regime Effect

In our opening exercise, we do not say anything about aspects of the credit view between regimes, i.e. before and after sharp monetary contractions. This is now explored in Table 10, where we split the data before and after September 2008 BOP crisis, which was followed by a marked rise in interest rates.

In the post-monetary tightening scenario, there is a considerable rise in loan price elasticities with respect to policy decisions. This implies that a 1% change in policy rate raises individual loans rates by more during a period of monetary contractions. Indeed, after controlling for heterogeneities the pure transmission effect increase from 0.357 to 0.574 (See Table 10, last two columns). This supports the macro evidence on anticyclical spreads we saw in Section 2.

Noticeably, we also find that, after controlling for facility and borrower type, big banks switch their behavior

towards policy pass-through between regimes. Indeed, in bad times the estimated policy pass-through coefficient of big banks (Big Bank-interbank) is negative, small and insignificant. This is probably because their own cost of funding and borrower mix is better than smaller and medium sized banks, which allows them to absorb policy shocks. This 'strong bank' effect is in line in with Hubbard et al. (2002).

The monetary policy pass-through effect by borrower carries important lessons. This effect is captured by adding the coefficients of overall policy pass-through and the dummy of interaction between borrower type and our policy decision variable. For example, take the post crisis period (Column 8): the pass-through to the weakest borrower - the small and medium sized firms - is the strongest (0.57-0.06), while it is the weakest for listed firms (0.57-0.25). This effect holds for all categories of borrowers and is quite significant.

Thus, the results clearly demonstrate that after controlling for loan, borrower and bank-type heterogeneities, policy shocks are unequally distributed between borrowers, a result that bodes especially well with the idea of the balance-sheet channel. These findings are in line with the credit view literature, which show that well established firms face better loan conditions following monetary impulses (see, for example, Hubbard et al., 2002 and Gertler and Ghilcrist, 1994).

Overall, results from our sample provide evidence that (i) loan conditions are, in general, unevenly pegged with the policy decisions across borrowers, (ii) borrowers get an uneven distribution of policy treatments and (iii) bigger banks tend to absorb policy shocks. The results continue to hold after we control for borrower, product and loan characteristics.

3.3.3 The Bank-Borrower Relationship

Thus far, we have assessed how the impact of policy differs by bank size, borrower type and regime. We now further probe how these attributes interact. This would allow us to capture, to a certain extent, how bank-borrower relations operate for different regimes and banks.

These effects are captured by comparing policy transmission of weak and strong borrowers in weak and strong banks. For this, we create a three way dummy variable. For example, to work out the extent of policy pass-through of small banks to weak borrowers - which are SMEs here - in a recession, we create a new interactive dummy variable defined as the product of dummies of SME and weak bank with the interbank rates $SME - SmallBanks - Interbank$. This variable is then used in pre and post-crisis regressions of (2).

The results in Table 11, last two columns, are remarkable. Indeed, during a contractionary period, weak borrowers at weak banks have higher transmission (0.0143), while weak borrowers at strong banks (*SME-Big Bank-Interbank*) are unaffected by policy shocks. Similarly, in a tight period, strong borrowers - listed firms- at strong banks (*Listed-Big Bank-Inter Bank*) have low pass-through (-0.003) relative to strong borrowers at weak banks, which, in fact, have a negative and statistically significant coefficient of -0.0174.

This like-for-like borrower comparison shows supporting evidence for the bank-lending channel, where the role of banks in intermediation is a non-neutral one. Similar loan clients being treated differently is evidence of customer-market effects in the banking system discussed earlier. Furthermore, smaller banks responding strongly to policy decisions also implies that their balance-sheets are relatively more fragile. One can argue that this effect could also be due to the borrower mix of smaller banks. However, in Table (4) we also show that the borrower mix of a small bank is not too different from that of a bigger bank. This puts emphasis on the existence of a pure bank lending channel.

As striking as these results are, the actual impact of weak bank balance-sheets on firms is likely to be underestimated, in that our data does not take into consideration those firms which were turned down by the banks.

4 Caveats

Literature discussing the credit channel raises three important concerns. First, the identification strategies to tease out a purely supply-driven reduction of credit may be questionable. Second, small banks tend to attract weaker borrowers and, therefore, will punish them more in times of trouble. However, the question of whether or not large banks smooth deposit outflows (by issuing debt to ensure a steady loan growth) is of significance (see Ashcraft, 2006 in relation to this). Third, within the context of the credit view, a clean identification strategy to distinguish the lending-channel with the balance sheet channel remains important. Hubbard et al. (2002) and Khawaja and Mian (2008) are examples of good identification schemes, but data requirements remain an important obstacle.

This study is, naturally, subject to some caveats. The main one is the extent to which our sample - representing 20% observations of the universe - is a good representative of the fresh individual loan transactions and, hence, credit markets. As explained earlier, observations had to be removed due the unavailability of certain types of key information. However, we can draw comfort from the fact there is a similarity between the population and our sample in terms of borrower type and bank size, as shown by Table (4).

Another caveat is that the information on borrowers is limited when compared with similar work of Hubbard et al. (2002). However, our data set is richer in information on loan characteristics, type of borrower (which is assigned by the banks) and the size of banks. Controlling for these thoroughly helps mitigating the weakness on lack of borrower information. The same may be said about the information on banks' balance sheets. Again, ideally, we would like to match loan information with banks' balance sheets on the day the individual loan was agreed. However, such high frequency bank balance sheet is simply not available in Pakistan. Nevertheless, this issue is mitigated by controlling for borrower and bank heterogeneities.

Finally, the main criticism in this literature, which also applies to this paper, is that it is not possible to distinguish between demand and supply shocks in the credit market. This is important, in that the bank-lending channel is a pure supply-side phenomenon, while the firm balance-sheet is a demand side one. First, we have tried to address this issue within our data constraints and by using broad categories of bank and borrower types. Second, instead of concentrating on volumes lent, we have looked at loan pricing conditions.

5 Conclusion

We find uncontroversial evidence that banking margins are countercyclical and the overall pass-through of policy decisions to borrowers is greater during monetary contractions. We also show that the distribution of these policy decisions is disproportionate and biased towards the weaker borrower. Furthermore, while better banks stay more muted in terms of policy impulses, weaker banks pass them on, keenly. Also, weak borrowers at better banks get better loan conditions than similar borrowers at weak banks. These results suggest that there are customer hold-up effects, as well as differences in borrower creditworthiness, both of which serve to amplify shocks. Finally, bank lending to the state, an interest inelastic party, also moves to amplify shocks by making overall banking spreads even more anticyclical as the asset of banks' balance sheet tilt towards government paper.

Indeed, our findings generally bode well with Khwaja and Mian (2008), but there the evidence relates to the quantum of credit, while here the emphasis is on the loan pricing not available to them at that time. Their study on lending volume was based on exceptional circumstances of the 1998 nuclear test. The blast created a panic, draining liquidity out of the banking system and encouraged rationing of remaining credit towards borrowers with firmer bank-firm relationships. Although, their database did not have information on loan-rates, they concluded, using aggregate proxies, that loan rates remain unaffected during the crunch. That is to be expected, as in this period rationing of private credit was an important policy measure.

Our evidence also highlights the importance of the role of banks in developing economies. Research tends to

be scarce for such economies (see Agenor and Montiel, 2008 for an overview), but there are a few exceptions, such as the work of Khawaja and Mian's (2008) discussed above or the paper by Turgutlu (2010) analysing anticyclical banking spreads in Turkey. Furthermore, work on developing countries is gaining importance in the light of the role which developed economies are expected to play in world economic growth. These make the subject of this paper a deserving research topic.

Also, our results concentrate on the direction of the pass-through of policy decisions by borrower, banks and the government. However, the potential impact of these results and their respective importance for the macroeconomy are omitted. The objective of this study has been to discover the transmission channels of policy impulses. The extent of their relative importance is left for future work and we think this would be best studied in a general equilibrium framework. Nonetheless, there is some macroeconomic evidence, such as in Qayyum, Khan and Khawaja (2005) and Agha et al. (2005), that monetary policy has real effects on the economy.

To conclude, we find that monetary policy decisions have important distributional aspects that simply cannot be addressed within the narrow money-view within the traditional IS/LM setting. These aspects are amplified by the presence of the government as a borrower from the banking sector. Moreover, smaller and faster growing enterprises disproportionately share the burden of a shock. Thus, because these firms are likely to be the ones with the higher potential profits and innovation, welfare losses are important. This is, therefore, an important issue for the design of robust stabilization policies.

A Figures

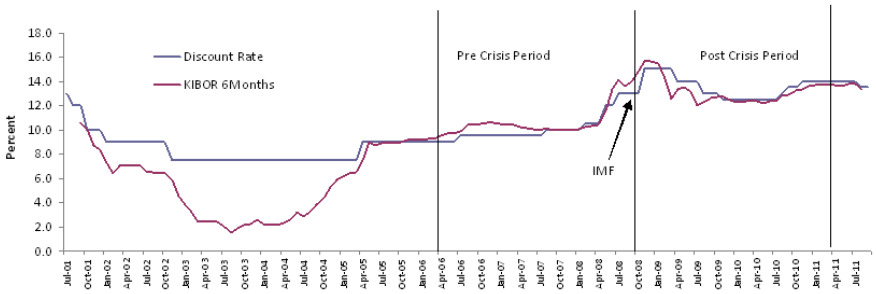

Figure 1: Kibor and Discount Rate Relationship

B Tables

Table 1: Financial Indicators and GDP

	Period		
	1980s	1990s	2000s
Volatility in Real GDP relative to 1980's	–	2.82	4.25
Financial Assets/GDP	12.27	36.75	69.65
Detrended Financial Asset Correlation with GDP	−0.32	0.42	0.60
Detrended M2 Correlation with GDP	−0.26	0.42	0.87
Detrended Private Credit Correlation with GDP	−0.42	0.07	0.90
Share of Commercial Banks in Financial Sector Assets	–	64 (1995)	70 (2005)
Share of Total Deposits in Commercial Bank liabilities	–	81 (1995)	84 (2005)

Source: Annual data from the State Bank of Pakistan, financial sector stability and various financial sector assessment reports for SBP

Table 3a: Bootstrapped and Estimated Correlations for Bivariate VAR

	M1-IPI	M2-IPI	M1-CPI	M2- CPI	M1-KSEI	M2-KSEI
Unconditional Correlations	-0.690	-0.685	-0.096	-0.110	-0.076	-0.117
Estimated Correlation	-0.22*	-0.24*	-0.14*	-0.13*	-0.14*	-0.168*
Lower Limit*	-0.280	-0.272	-0.375	-0.363	-0.360	-0.360
Upper Limit*	0.305	0.343	0.381	0.371	0.366	0.366

Table 3b: Bootstrapped and Estimated Correlations for Bivariate VAR with PS**

	M1-IPI	M2-IPI	M1-CPI	M2- CPI	M1-KSEI	M2-KSEI
Estimated Correlation	-0.578*	-0.584*	-0.15*	-0.16*	-0.15*	-0.169*
Lower Limit*	-0.423	-0.0435	-0.363	-0.371	0.373	-0.372
Upper Limit*	-0.738	-0.740	0.360	0.367	0.321	0.328

Table 3c: Bootstrapped and Estimated Correlations for Multivariate VAR

	M1-IPI	M2-IPI	M1-CPI	M2- CPI	M1-KSEI	M2-KSEI
Estimated Correlation	-0.203*	-0.208*	-0.112*	-0.118*	-0.142*	-0.161*
Lower Limit*	-0.273	-0.253	-0.369	-0.364	-0.388	-0.389
Upper Limit*	0.351	0.353	0.380	0.371	0.387	0.364

Table 3d: Bootstrapped and Estimated Correlations for Multivariate VAR with PS**

	M1-IPI	M2-IPI	M1-CPI	M2- CPI	M1-KSEI	M2-KSEI
Estimated Correlation	-0.444*	-0.467*	-0.15*	-0.16*	-0.18*	-0.19*
Lower Limit*	-0.596	-0.620	-0.384	-0.379	-0.384	-0.374
Upper Limit*	-0.289	-0.298	0.371	0.374	0.371	0.379

*for 95% significance level, M1=Margin 1, M2=Margin 2

**PS: Share of Pubic Sector Credit in Total Credit by Scheduled Banks; IPI: Growth of Industrial Production Index: CPI: Year-on-Year Inflation; KSEI: Growth in Karachi Stock Exchange 100 Index

Table 3: Data span (April 2006-April2011)

	Only Bank Transactions	Total Universe	% age of Total Universe
Total Volume of loans (PKR Million)	7,100,528	7,215,633	98.4%
No of Observations	140,526	152,872	91.9%
No of Borrowers	21,991	23,491	93.6%
Number of Banks	43	-	-
Number of all financial institutions/lenders	-	94	-
Loan information (interest rate, size of loan) and removing of subsidized products loans			
Total Volume of loans (PKR Million)	1,900,380	1,981,800	95.9%
No of Observations	37,481	45,702	82.0%
No of Borrowers	10,199	12,155	83.9%
Number of Banks	35	-	-
Number of all financial institutions/lenders	-	70	
Loan information (interest rate, size of loan) and removing of subsidized products loans and applying restriction of rate $\geq$ kbr			
Total Volume of loans (PKR Million)	1,462,608	1,540,113	95.0%
No of Observations	30,964	39,021	79.4%
No of Borrowers	9,044	11,061	81.8%
Number of Banks	35	-	-
Number of all financial institutions/lenders	-	70	-
Loan information (interest rate, size of loan) and removing of subsidized products loans and applying restriction of rate $\geq$ kbr & tenorlog*			
Total Volume of loans (PKR Million)	1,311,670	1,386,059	94.6%
No of Observations	29,908	37,866	79.0%
No of Borrowers	4,715	5,876	80.2%
Number of Banks	35	-	-
Number of all financial institutions/lenders	-	70	-

*Loans used for a day are dropped from the sample

Table 4: Loans distribution by borrower type and bank type (%)

	by borrower type		Bank Universe	Sample	Bank Universe	Sample	Bank universe	Sample
Borrower type	Total Universe	Sample	BB	BB	MB	MB	SB	SB
Autonomous body	1.9	1.1	2.9	2.0	0.2	0.0	0.6	0.4
Banks/DFis	0.2	0.1	0.2	0.1	0.0	0.1	0.0	0.1
Federal Government	1.4	1.4	2.0	2.4	0.4	0.5	0.1	0.0
Foreign Constituents	1.0	0.1	1.5	0.3	0.1	0.0	0.0	0.0
Listed Company	19.5	10.2	17.7	9.6	23.0	8.5	22.2	15.9
Local Body	0.3	0.0	0.4	0.0	0.3	0.0	0.0	0.0
Modaraba	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
MDB[1]	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
NBFC[2]	0.2	0.1	0.2	0.2	0.2	0.1	0.0	0.0
Non-listed[3]	13.6	16.8	9.3	16.3	18.8	12.6	23.4	27.0
General	33.1	35.4	35.5	25.4	36.7	59.7	16.4	16.5
Partnership[4]	0.9	0.7	0.2	0.2	3.0	0.9	0.7	1.7
Provincial Government	2.0	2.7	2.8	4.3	0.4	0.6	1.1	1.9
Public Sector Enterprise	7.4	11.9	10.8	22.8	1.6	1.0	2.8	0.7
Securities/Brokerage Firm	0.6	2.6	0.1	0.6	2.1	6.8	0.0	0.1
SME[5]	2.3	3.4	2.4	5.7	3.1	1.1	0.4	1.0
Unclassifiied	15.6	13.4	13.9	10.1	9.7	8.0	32.2	34.6
sub total	100.0	100.0	100	100	100.0	100	100	100
No of observations (for calculation of percentages)	152,872	29,908	140,526	29,908	140,526	29,908	140,526	29,908

BB stands for Big Bank, MB for Medium and SB for Small Bank; [1]Multilateral development bank; [2]Non-Bank Finance Company; [3], 4other than SMEs;
[5]As defined in the Prudential Regulations for SME

Table 5: Share of Top 5 borrower type in the Total Volume of loans by Banks (29908 observations)

Corporate Borrower type	Big Banks	Medium Banks	Small Banks	*Subtotal*
Listed	4.8%	2.8%	2.6%	10.2%
Non Listed	8.2%	4.2%	4.4%	16.8%
SME	2.9%	0.4%	0.2%	3.4%
General (other)	15.2%	20.0%	2.4%	37.5%
PSEs	11.5%	0.3%	0.1%	11.9%
Subtotal	43%	28%	10%	**80%**

Table 6: Loan characteristics by loan size

Loan Size (PKR Million)	Number of facilities	Mean Loan Maturity (days)	Average spread*	Fraction Secured
≤ 20	11482	509	3.20	0.78
$20 \leq 50$	5224	252	3.27	0.96
$50 \leq 125$	3768	276	3.04	0.96
$125 \leq 500$	5370	271	2.67	0.96
$500 \leq 1000$	1739	298	2.20	0.97
>1000	2325	396	1.98	0.94
All	29908	371	2.94	0.89

*spread between benchmark interest rate and interest rate on loan

Table 7: Loan characteristics by borrower type

Borrower type	No of facilities	Mean Loan Maturity (days)	Average interest rate	Average Interbank	Average spread*	Fraction Secured
Autonomous body	451	288	15.24	13.09	2.15	0.54
Banks/DFis	1,104	207	14.07	12.34	1.72	0.19
Federal Government	41	411	13.34	11.23	2.11	0.39
Foreign Constituents	12	430	15.18	13.54	1.64	1.00
Listed Company	1,653	268	14.95	12.36	2.59	0.99
Local Body	1	203	11.00	10.20	0.80	1.00
Modaraba	7	363	13.29	10.36	2.93	1.00
MDB[1]	7	178	15.41	12.41	3.00	1.00
NBFC[2]	22	580	13.83	11.86	1.97	0.95
Non-listed[3]	3,345	279	14.68	12.17	2.51	0.97
General	12,469	370	15.44	12.40	3.04	0.89
Partnership[4]	435	237	15.57	12.35	3.22	0.96
Provincial Government	65	201	15.18	12.89	2.29	0.98
Public Sector Enterprise	666	268	14.78	11.98	2.80	0.80
Securities/Brokerage Firm	330	244	15.13	12.64	2.49	0.96
SME[5]	3,819	356	15.15	11.73	3.42	0.90
Unclassifiied	5,481	543	15.63	12.51	3.12	0.98
All	29,908	371	15.25	12.31	2.94	0.89

*spread between benchmark interest rate and interest rate on loan, [1]Multilateral development bank, [2]Non-Bank Finance Company,[3,4]other than SMEs
[5]As defined in the Prudential Regulations for SME

Table 8: Loan characteristics by Borrower type & Bank type

	No of facilities			Mean Maturity (days)			Average interest rate			Average interbank			Average spread*			Fraction Secured		
Borrower type	BB	MB	SB	BB	MB	SB	BB	MB	SB	BB	MB	SB	BB	MB	SB	BB	MB	SB
Autonomous body	212	14	225	352	585	210	16.12	14.90	14.44	13.28	12.59	12.95	2.85	2.31	1.49	0.97	1.00	0.11
Banks/DFis	4	4	1096	686	312	205	12.92	11.49	14.08	12.12	10.78	12.35	0.80	0.71	1.73	1.00	1.00	0.18
Federal Government	38	3	0	401	545		13.19	15.18		11.09	12.92		2.10	2.26		0.34	1.00	
Foreign Constituents	9	2	1	445	559	43	14.60	16.70	17.41	13.55	14.08	12.39	1.05	2.26	5.02	1.00	1.00	1.00
Listed Company	574	733	346	309	217	306	15.07	14.99	14.68	12.60	12.06	12.58	2.47	2.92	2.10	0.99	1.00	1.00
Local Body		1			203			11.00			10.20	12.75		0.80	4.66		1.00	
Modaraba	2	4	1	618	254	288	11.80	13.00	17.41	9.72	10.08		2.08	2.92		1.00	1.00	1.00
MDB[1]		7	0		178			15.41			12.41			3.00	2.52		1.00	
NBFC[2]	7	13	2	305	782	231	11.66	14.85	14.77	10.95	12.29	12.25	0.71	2.56	2.41	0.86	1.00	1.00
Non-listed[3]	1,387	1,384	574	268	290	280	15.31	14.26	14.21	12.76	11.72	11.80	2.54	2.53	2.51	0.93	1.00	1.00
General	4,048	6,563	18,58	320	423	289	15.45	15.71	14.50	12.34	12.56	11.99	3.11	3.15	3.27	0.93	1.00	0.43
Partnership[4]	140	252	43	268	177	485	15.40	15.79	14.83	12.29	12.52	11.56	3.11	3.28	1.95	0.89	1.00	1.00
PG[5]	52	3	10	131	771	396	15.31	14.34	14.75	12.94	12.31	12.80	2.37	2.03	5.03	0.98	1.00	1.00
PSEs[6]	615	38	13	249	526	428	14.72	14.98	17.07	11.96	12.30	12.05	2.76	2.68	2.25	0.78	1.00	1.00
Securities/Brokerage	27	300	3	193	249	247	13.24	15.31	13.90	10.78	12.82	11.65	2.46	2.50	4.32	0.67	0.99	1.00
SME[7]	3094	377	348	335	350	546	14.92	15.61	16.76	11.71	11.23	13.43	3.20	4.38	2.70	0.88	0.99	0.97
Unclassifiied	2410	2,005	1,066	255	970	389	15.24	16.45	14.96	12.19	13.03	12.25	3.04	3.42	2.44	0.99	1.00	0.92
All	12,619	11,703	5,586	301	477	307	15.20	15.60	14.63	12.21	12.47	12.19	3.00	3.13		0.92	1.00	0.60

BB stands for Big Bank, MB for Medium and SB for Small Bank, *spread between benchmark interest rate and interest rate on loan,
[1]Multilateral development bank,[2]Non-Bank Finance Company, [3,4]other than SME, [5]Provincial Government,[6]Public Sector Enterprise
[7]As defined in the Prudential Regulations for SME,

Table 9: Main regression controlling for different characteristics and with restriction rate $\geq$ interbank

Dependent variable is $Y_{i,b,t}$: annualized rates on individual loans						
Interbank[1] (log)	0.454***	0.476***	0.419***	0.473***	0.448***	0.459***
Inflation (log)	0.00168***	0.000885***	0.00158***	0.00145***	0.00142***	0.000648**
Exchange rate (log)	0.300***	0.283***	0.301***	0.319***	0.314***	0.273***
Loan size (log)	-0.0135***	-0.0160***	-0.0136***	-0.0135***	-0.0134***	-0.0148***
Maturity (log)	-0.00103*	-0.00450***	-0.000741	-0.00132**	-0.00138**	-0.00571***
Private	-0.00920***		-0.00953***			
Fund based	-0.0445***	-0.00369	-0.0433***	-0.0303***	-0.0327***	-0.00184
Secured	0.0757***	-0.00641*	0.0750***	0.0495***	0.0502***	-0.00819**
Corridor	-0.0386***	-0.0373***	-0.0380***	-0.0386***	-0.0379***	-0.0368***
Big bank			-0.192***		-0.221***	-0.245***
Big bank intereaction with Interbank			0.0783***		0.0867***	0.0950***
Borrower effect[2]						
Listed				-0.0984	-0.0929	-0.198***
PSEs				0.0176	0.150*	0.0710
Non-listed				-0.109*	-0.117**	-0.188***
General				0.192***	0.217***	0.192***
SMEs				-0.209***	-0.103*	-0.199***
Borrower interaction with Interbank[3]						
Listed-interbank				0.0297	0.0268	0.0735**
PSE-interbank				-0.00340	-0.0560	-0.0257
Non listed-interbank				0.0321	0.0343	0.0658***
Gen-interbank				-0.0768***	-0.0871***	-0.0733***
SME-interbank				0.0918***	0.0494**	0.0917***
Constant	0.474***	0.464***	0.560***	0.361***	0.446***	0.547***
Big Bank control	No	No	Yes	No	Yes	Yes
Borrower type control	No	No	No	Yes	Yes	Yes
Loan type control	No	Yes	No	No	No	Yes
Observations	29908	29908	29908	29908	29908	29908
Adjusted R^2	0.471	0.506	0.472	0.496	0.497	0.524
F	2957.2	567.9	2432.5	754.4	721.3	379.9
df_m	9	54	11	39	41	87
df_r	29898	29853	29896	29868	29866	29820

Every regression report models results of only banks transactions

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[1]Interbank is the relevant interbank interest rate

[2,3] We only report top five borrower types

Table 10: Regressions with rate $\geq$ interbank and Pre and Post Balance of Payments Crisis

Dependent variable is $Y_{i,b,t}$: annualized rates on individual loans

	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Interbank (log)	0.397***	0.482***	0.256***	0.490***	0.291***	0.638***	0.357***	0.574***
Inflation (log)	0.0000483	0.00159***	0.000661	0.00280***	0.000381	0.00227***	0.0000618	0.00150***
Exchange rate (log)	0.343***	-0.253***	0.438***	-0.378***	0.476***	-0.292***	0.344***	-0.223***
Loan size (log)	-0.0232***	-0.0117***	-0.0179***	-0.0116***	-0.0165***	-0.0117***	-0.0213***	-0.0107***
Maturity (log)	-0.00283*	-0.00538***	0.00253*	-0.000542	-0.000832	-0.00151**	-0.00520***	-0.00572***
Private	-0.00681	-0.00372	-0.0139***	-0.00117	-0.0133**	-0.00745**		
Fund based	-0.0119	0.0164	-0.0944***	0.0139***	-0.0926***	0.0312***	-0.0124	0.0185
Secured	-0.0128**	0.0122**	0.0506***	0.103***	0.0416***	0.0647***	-0.0110*	0.00822*
Corridor	0	-0.0113***	0	-0.00654*	0	-0.0113***	0	-0.0131***
Big bank			-0.451***	0.0827	-0.531***	0.190***	-0.377***	0.00853
Big bank intereaction with interbank			0.188***	-0.0287	0.217***	-0.0711***	0.152***	-0.00411
Borrower effect								
Listed					-0.0641	0.891***	-0.136	0.658***
PSEs					-0.265	0.546**	-0.293	0.408*
Non-listed					-0.104	0.509***	-0.133	0.349***
General					0.351***	0.388***	0.270***	0.217***
SME					-0.196*	0.243**	-0.309***	0.201*
Borrower interaction with interbank								
Listed-interbank					0.0108	-0.349***	0.0434	-0.258***
PSE-interbank					0.113	-0.209**	0.129	-0.155*
Non listed-interbank					0.0262	-0.202***	0.0392	-0.141***
Gen-interbank					-0.147***	-0.147***	-0.109***	-0.0819***
SME-interbank					0.0856*	-0.0785*	0.132***	-0.0640
Constant	0.507*	2.702***	0.506*	3.224***	0.287	2.501***	0.586*	2.321***
Big Bank control	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Borrower type control	No	No	No	No	Yes	Yes	Yes	Yes
Loan type control	Yes	Yes	No	No	No	No	Yes	Yes
Observations	11797	18111	11797	18111	11797	18111	11797	18111
Adjusted R^2	0.361	0.366	0.322	0.298	0.346	0.335	0.383	0.384
F	131.6	202.4	560.0	700.8	169.8	229.2	93.66	138.4
df_m	51	52	10	11	37	40	79	82
df_r	11745	18058	11786	18099	11759	18070	11717	18028

See notes to Table 9.

Table 11: Regressions with rate ≥ interbank and interactions

Dependent variable is $Y_{i,b,t}$: annualized rates on individual loans

	Pre	Post	Pre	Post	Pre	Post
Interbank[1] (log)	0.357***	0.573***	0.365***	0.573***	0.365***	0.572***
Inflation (log)	0.0000921	0.00144***	0.0000953	0.00152***	0.000121	0.00146***
Exchange rate (log)	0.341***	-0.236***	0.337***	-0.224***	0.337***	-0.237***
Loan size (log)	-0.0212***	-0.0108***	-0.0212***	-0.0106***	-0.0213***	-0.0107***
Maturity (log)	-0.00521***	-0.00566***	-0.00467***	-0.00572***	-0.00464***	-0.00567***
Fund based	-0.0125	0.0181	-0.0101	0.0183	-0.00985	0.0178
Secured	-0.0110*	0.00785*	-0.0131**	0.00819*	-0.0130**	0.00789*
Corridor	0	-0.0130***	0	-0.0129***	0	-0.0129***
Big bank	-0.377***	0.0195	-0.358***	-0.00561	-0.358***	0.00545
Big bank interaction with interbank	0.152***	-0.00859	0.149***	0.00189	0.149***	-0.00266
Borrower effect[2]						
Listed	-0.115	0.511***	-0.0681	0.660***	-0.110	0.511***
PSEs	-0.293	0.393*	-0.292	0.425*	-0.291	0.410*
Non-listed	-0.135	0.358***	-0.0686	0.353***	-0.0626	0.363***
General	0.269***	0.218***	0.292***	0.227***	0.295***	0.227***
SME	-0.309***	0.190*	-0.260**	0.207*	-0.259**	0.198*
Borrower interaction with interbank[3]						
Listed-interbank	0.0361	-0.196***	0.0158	-0.259***	0.0372	-0.196***
PSE-interbank	0.129	-0.149*	0.126	-0.162*	0.126	-0.156*
Non listed-interbank	0.0398	-0.145***	0.0133	-0.143***	0.0109	-0.146***
Gen-interbank	-0.109***	-0.0820***	-0.119***	-0.0857***	-0.121***	-0.0856***
SME-interbank	0.133***	-0.0598	0.138***	-0.0693	0.138***	-0.0663
Bank borrower interaction with interbank[1]						
Lis-Big Banks-interbank	-0.000127	-0.00277			-0.00620	-0.00323
Lis-Small Banks-interbank	-0.00686	-0.0177***			-0.00560	-0.0174***
SME-Big banks-interbank			-0.0349***	0.00103	-0.0352***	0.00178
SME-Small banks-interbank			0.0111	0.0144***	0.0112	0.0143***
Constant	0.595*	2.384***	0.590*	2.328***	0.592*	2.389***
Big bank control	Yes	Yes	Yes	Yes	Yes	Yes
Borrower type control	Yes	Yes	Yes	Yes	Yes	Yes
Loan type control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11797	18111	11797	18111	11797	18111
Adjusted R^2	0.383	0.385	0.390	0.384	0.390	0.386
F	91.36	136.0	94.06	135.6	91.82	133.2
df_r	11715	18026	11715	18026	11713	18024

See notes to table 9.

[1] We only perform and report bank borrower interaction for Listed and SME type of borrowers

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