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The Transmission of Monetary Policy Through Conventional and Islamic Banks

Abstract

We investigate the differences in banks' responses to monetary policy shocks across bank size, liquidity, and type, i.e., conventional versus Islamic, in Pakistan between 2002:II to 2010:I. We find that following a monetary contraction, small banks with liquid balance sheets cut their lending less than other small banks. In contrast large banks maintain their lending irrespective of their liquidity positions. Islamic banks, though similar in size to small banks, respond to monetary policy shocks as large banks. Hence *ceteris paribus* the credit channel of monetary policy may weaken when Islamic banking grows in relative importance. (93 words)

Keywords: Monetary policy, Islamic Banking, Pakistan.

JEL Classification: E5, G2.

1. Introduction

Islamic banking is one of the fastest growing segments of the global financial sector. It is currently and expanding at a rate of approximately 20% per year. In some countries the share of the Islamic financial sector has now reached a size and a level of development such that the financial arrangements it offers are a full-fledged alternative to those in the conventional financial sector. The countries where this has happened includes Malaysia, Iran and the Gulf Cooperation Countries, i.e., Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. Some Asian countries like Bangladesh, Pakistan and Indonesia are also experiencing a phenomenal increase in Islamic finance. Moreover, a number of western countries are now facilitating Islamic banking. And to tap this growing market, large conventional banks that have fairly recently opened an Islamic window includes Barclays, BNP Paribus, Citi Group, Deutsche Bank, Standard Chartered and the Royal Bank of Scotland.

The total volume of Islamic finance was estimated to roughly equal $1 trillion in 2010 (Standard & Poor's 2010). Commercial banking comprised the largest share, i.e., 74 percent (International Financial Services London 2010). Investment banking accounted for 10 percent. The remaining part consists of *Sukuk* (Islamic bonds) and *Takaful* (Islamic Insurance). Assets of the largest 500 Islamic banks increased by 29 percent to $822 billion in 2009, around the same time when the rest of the world's financial system contracted, and many of the financial institutions were deleveraging their positions. The reason for this starkly different development resides in the fact that Islamic banking tenets do not allow the banks to charge interest and to be involved in the sales of debt instruments. Therefore, Islamic banks did not invest in the kind of instruments that were badly affected during the financial crises, namely derivatives, conventional securities and toxic assets. Banning short selling of shares after the crisis is a further reflection of Islamic finance as it stops dealers selling the assets which they do not own. A key question this brisk growth poses to academics and policymakers alike is whether the transmission of monetary policy through the so-called bank lending channel will be altered in strength when the Islamic segment of the banking sector becomes even more important.[1] Indeed, the potency of the bank lending channel crucially depends on the ability of the central bank to affect bank loan supply, i.e., whether banks cannot attract (time) deposits perfectly elastically or do not consider the loans granted and securities held in portfolio as perfect substitutes.

Islamic banks may be, on the one hand, unable or unwilling to "buy" wholesale time deposits at a fixed rate and may not consider their Islamic loans substitutable for any of the securities they would hold in their portfolio. This may make the transmission of monetary policy shocks through the Islamic segment of the banking sector more potent. On the other hand, Islamic banks singularly attract deposits and lend under interest free arrangements, likely entered for religious reasons by depositors and borrowers (Khan and Khanna (2010); Baele, Farooq and Ongena (2010)). These contractual and motivational features on both their liability and asset sides may allow Islamic banks to shield themselves from monetary policy shocks. Consequently, whether Islamic banks transmit monetary policy differently than conventional banks is an empirical question we aim to address in this paper.

[1] This bank balance sheet channel may be operational because of agency problems between banks and their providers of funds depositors, other debt-holders and equity holders (Bernanke (2007)). Gertler and Kiyotaki (2010) formalize this channel modeling financial intermediation as in Gertler and Karadi (2010) but include liquidity risk as in Kiyotaki and Moore (2008). The agency problems between banks and their borrowers (firms and households) give similarly rise to the firm balance-sheet channel (Lang and Nakamura (1995); Bernanke, Gertler and Gilchrist (1996); Bernanke, Gertler and Gilchrist (1999)). Gertler and Gilchrist (1993) and Oliner and Rudebusch (1996) for example find that, following the dates of monetary contractions identified in Romer and Romer (1989)), the ratio of bank loans to small versus large manufacturing firms falls. Gertler and Gilchrist (1994) show that, even after controlling for differences in sales between these firms, the differences in the behavior of small and large firm debt remain. If for firms bank loans are imperfectly substitutable with public financing, and prices adjust imperfectly, monetary policy affects real activity through the so-called credit channel.

Following Bernanke and Blinder (1992), who find that a monetary contraction is followed by a significant decline in aggregate bank lending, Kashyap and Stein (2000) analyze if there are important cross-sectional differences in the way that banks respond to monetary policy shocks. In this way controlling for loan demand, they find that following a monetary contraction, small banks with liquid balance sheets cut their lending less than other small banks. Brissimis, Kamberoglou and Simigiannis (2003), de Haan (2003), Kaufmann (2003), Loupias, Savignac and Sevestre (2003), Worms (2003), and Gambacorta (2005), for example, also find that liquidity positions of banks play a significant role for the way banks respond to a monetary shock in various European countries. Kishan and Opiela (2000), Jayaratne and Morgan (2000), Ashcraft (2006) and Black, Hancock and Passmore (2009) similarly examine the differentiation across bank capitalization, core deposits, bank holding company status and bank business strategies, for instance.

We follow the seminal paper by Kashyap and Stein (2000) by investigating the cross-sectional differences in the way that banks respond to monetary policy shocks not only across bank size and liquidity, but also across bank type, i.e., conventional versus Islamic, in Pakistan between 2002:II to 2010:I. The country and sample period provide a unique setting to analyze this differential response. Pakistan may be one of the few countries in the world where both well-developed conventional and Islamic banking sectors have co-existed for a considerable period, formally since 2002 when Islamic Banking was re-introduced in Pakistan. Out of 40 banks that grant business loans, six are Islamic.

As in Kashyap and Stein (2000) we find that following a monetary contraction, small banks with liquid balance sheets cut their lending less than other small banks, and that large banks maintain their lending irrespective of their liquidity positions.

Islamic banks, and this is the main contribution of our paper, though similar in size to small banks, respond to monetary policy shocks much like large banks. Hence, *ceteris paribus*, the expected growth in the Islamic segment of the banking sector in many countries may lead to a weakening in the potency of the credit channel of monetary policy there.

Khwaja and Mian (2008) also analyze lending by banks in Pakistan. They examine the drop in lending by different banks to similar firms following shocks to banks' liquidity induced by unanticipated nuclear tests that took place in 1998 in Pakistan. They find that banks pass their liquidity shortages to firms, but firms with strong business or political ties can turn to alternative sources in the credit market. In contrast, we focus on the monetary policy shocks responding to foreign capital inflows that followed this period and assess the differential transmission through the conventional and Islamic segments of the banking sector. Other studies that focus on the banking sector in Pakistan include Khwaja and Mian (2005), Mian (2006), and Zia (2008), for example.

The remainder of this paper is organized as follows. Section 2 discusses the relevant institutional framework in Pakistan after 2001. Section 3 describes the data and introduces the econometric specification and Section 4 discusses the results. Section 5 concludes.

2. Pakistan After 2001

a. Monetary Conditions

Following 9/11 there was a substantial inflow of capital in Pakistan. Workers' remittances especially those from the US, UK, Saudi Arabia and UAE increased tremendously. Spurred by the privatization of major public sector corporations by the Government of Pakistan foreign direct investment (FDI) also boomed.

The growing inflow of remittances and FDI caused an appreciation in the local currency, the Pakistan rupee (PKR), against most other currencies. Prior to 2001, Pakistan had faced severe shortages in foreign reserves because of the nuclear tests in 1998 (Khwaja and Mian (2008)). The inflow of foreign capital was initially therefore welcomed. The State Bank of Pakistan (SBP), the nation's central bank, reacted to the inflow of foreign funds by purchasing US dollars and by increasingly accumulating these and other foreign reserves. Its aim was clearly also to curb the appreciation of the rupee against most other currencies to safeguard the competitiveness of Pakistanis exports. The purchase of dollars by the central bank almost inevitably caused the money supply to expand, despite attempts to sterilize the increase in money supply through the open market sales of government securities.

As a result, the financial markets in Pakistan became saturated with excess liquidity and in August 2003 the interest rate on government securities for example dropped to as low as 1.27 percent. It is only after 2005 that monetary policy started to tighten in response to inflation, inexorably following the relentless monetary expansion during the preceding years.

Since monetary policy during most of the analyzed time-period simply responded to this unique and large external shock, i.e., the concurrent inflow of remittances and FDI, our analysis will rely on the changes in the three-month Treasury bill rate as a most straightforward indicator of monetary policy. The use of variations in the short-term interest rate as a measure that proxies the change in the stance of monetary policy is fully in line with the literature analyzing the credit channel at the micro level.[2] The use of a three-month interest rate follows many articles in Angeloni, Kashyap and Mojon (2003) for example that analyze European data. Replacing the changes in the three-month interest rate with the changes in the overnight interbank interest rate or with the changes in the six-month Treasury bill rate yields very similar results, maybe not surprisingly as the correlation between all interest series is very high.

b. Islamic Banks

Preferably, Islamic banking is equity-, rather than fixed-interest-, based with profit and loss sharing on both the liability and asset side of a bank's balance sheet. Depositors in Islamic banks are for all practical purposes shareholders that receive no guarantee with respect to the face value of their "deposits". In principle, they fully share in the profits and losses of the bank in which they have their deposits. Similarly, on their asset side Islamic banks deploy an array of deferred sales and profit and loss sharing arrangements to finance household consumption or firm investment. In many respects, Islamic banks are not unlike conventional mutual fund banks (e.g., Cowen and Kroszner (1990)).

Islamic banks seek funding through transaction deposits and investment accounts. *Transaction deposits* are similar to conventional banks' demand deposits, i.e., cash can be withdrawn at any time by writing a check or by accessing an automatic teller machine (ATM), and the bank guarantees the nominal value of the deposit. However, Islamic banks cannot lend the funds to projects that are *Haram*, i.e., not permissible under Islamic Jurisprudence and related to alcohol, pork, sex, etc., or that deal with

[2] See Jayaratne and Morgan (2000), Kashyap and Stein (2000), Kishan and Opiela (2000), Ashcraft (2006) and Black, Hancock and Passmore (2009) among others. On the other hand, Bernanke and Blinder (1992) and Christiano, Eichenbaum and Evans (1996) use vector auto regressions to identify monetary policy shocks. However Kashyap and Stein (2000) find very similar results using either the variation in the federal funds rate, the Boschen and Mills (1995) index or the Bernanke and Mihov (1998) measure.

interest payments (*Riba*), gambling (*Maysar*), or excessive uncertainty (*Garrar*). In general, Islamic banks aspire to be more conservative in lending.

Investment accounts are the equivalent of the conventional savings accounts. However, these accounts do not offer a fixed interest rate, but rather involve profit and loss sharing between bank and depositors. Although consequently the face value of the investment deposits is not ensured, Islamic banks invariably observe due diligence in financing various projects.

Joint venture financing arrangements constitute the most principled form of financing households and firms. However, in the early stages of their development, Islamic banks often adopt asset-backed fixed return arrangements, mainly deferred payment sales (*Murabaha*) and operational leases (*Ijara*), to finance household consumption, car purchases and real estate. In Pakistan these two types cover approximately 80 percent of the total financing provide by Islamic banks (as of December 2004), which has decreased to about 60 percent over time (as of December 2009).[3]

c. Monetary Conditions and Islamic Banks

The first Islamic bank in Pakistan was established in 2002 as a response to—the until then— unmet market demand for Islamic financial products (Source: *Financial Sector Assessment*, SBP, 2004). Islamic banking quickly observed a sharp growth, as new and established banks entered the market by designing and offering suitable contracts to collect deposits from and extend credit to households and enterprises.

The main problem immediately faced by the Islamic banks was the absence of a government security designed in accordance with Islamic principles, for use as a safe

[3] These two products are mainly replaced by another fixed-return scheme called diminishing *Musharikah* (i.e., "diminishing partnership"), in which the partner in an asset (a house for example) not only pays rental payments to the bank but over time also buys the share owned by the bank.

investment or to fulfill the liquidity requirements set by the SBP. In the absence of such an Islamic government security, Islamic banks had no immediate base rate to price their *Murabaha* and *Ijara* contracts. Instead, they use the Karachi Interbank Offer Rate (KIBOR) (Source: *Handbook of Islamic Products*, SBP, 2009). However, the KIBOR is largely determined by the rate on short-term government securities such as the three-month Treasury bill, which is set in fortnightly auctions. Because fixed return modes cover a large part of the total financing that is provided by Islamic banks, for the estimation of the strength of a lending channel the three-month Treasury bill rate can also be used as an indicator of the monetary policy stance.

The balance sheet data in Table 1 provide a first glimpse of the crucial differences between large and small conventional banks and Islamic banks in terms of liquidity for example. A large bank is defined as a bank with more than two hundred billion PKR (around 2.5 billion US dollar) in assets. According to this definition there are six large banks, representing around sixty percent of all banking assets. We label the remaining banks as small banks. By assets, all Islamic banks are small banks.

Liquidity is defined as the sum of cash, balances with Treasury banks and balances with other banks (as in Loupias, Savignac and Sevestre (2003) for example). Although the cash reserve requirement for both conventional and Islamic banks remained same through the entire sample period, liquidity varies noticeably across bank type. Small conventional banks are on average more liquid than large conventional banks during the period of easy monetary policy in 2003. However, the situation is reversed during the period of tight monetary policy after 2005. Hence, contractionary monetary policy creates more liquidity problems for small banks than for large banks. This is due to the fact that the large banks have relatively more options for nonreversible financing like debt or equity instruments.

In comparison with conventional banks Islamic banks have the higher fraction of their assets in cash and balances with Treasury and other banks. This is also the case in many other countries where Islamic banks are present (Beck, Demirgüç-Kunt and Merrouche (2010)). The explanation may be straightforward: In the early stages of their existence, Islamic banks had fewer immediate investment opportunities in comparison with their conventional counterparts.

Most of their liquidity remained in the form of cash and balances with other financial institutions. This is mainly due to the absence of a *Shariah* compliant instrument called *Sukuk* (Islamic bond), Islamic banks initially did not have any alternative investment option in securities. This is evident from the low fraction of their assets in investments in 2003 (Table 1). The first compliant instrument was issued by a public sector enterprise only in 2005 but it could not fulfill the large investment appetite of Islamic banks. So until 2008, and in the absence of any Islamic government security, Islamic banks held cash to fulfill the statutory liquidity and cash reserve requirements (SLR).

Holding only cash resulted in higher opportunity costs for Islamic banks than for conventional banks. Realizing that Islamic banks were at a cost disadvantage compared to conventional banks in meeting the SLR, the SBP relaxed it for Islamic banks. While their cash reserve requirements are the same, Islamic banks, on average, have been required to hold ten percent less in SLR than the conventional banks. Currently Islamic banks need to hold nine percent of the total demand and time deposits for SLR purpose, whereas conventional banks are liable to maintain nineteen percent of demand and time deposits (Table 2). Therefore, and in order to make our analysis comparable across bank type, we take the liquidity variable equal to the first two liquidity items, i.e., cash and balances with Treasury and other banks, for which the requirements and the opportunities are likely most similar for conventional and Islamic banks.

In the absence of a risk-free Islamic instrument, Islamic banks also benchmarked their fixed-return contracts, *Murabaha* and *Ijara*, to the conventional interest rate charged in the interbank market, which is usually based on the Treasury-bill rate. However, the loan supply of Islamic banks is less likely to react to changes in monetary policy because as said they have fewer investment opportunities and are more likely to sit on a lot of spare liquidity. In addition, since Islamic banks assets are only indirectly linked to the policy rate, Islamic banks are less affected by the changes in monetary policy.

d. Bank Lending Channel in Pakistan

The structure of a country's banking system is likely to determine the strength of the response of bank lending to monetary policy shocks. The size of the banking sector and its market concentration, the fraction of banking assets that are liquid, and the banks' capitalization could be crucial in establishing the potency of the bank lending channel.

State and foreign ownership of domestically operating banks will also be important in determining the impact of domestic monetary policy on bank loan supply. State owned banks, that are mostly publicly guaranteed, likely attract new funds elastically to offset the impact of monetary contractions for example (Ehrmann, et al. (2003)). Similarly, foreign banks with close links to their parent institutions and global bank networks are likely to absorb the impact of domestic monetary policy without altering their domestic loan supply (foreign banks with most of their funding in their home country may contract lending relatively more following contractionary monetary policy in their home country).

This section presents salient features of the banking system in Pakistan, such as the importance of banks within the financial system and corporate finance, the market structure, the heterogeneity of the banks, their overall performance and the role of the state in the banking system. Each of these features may determine the potency of the bank lending channel. Tables 3 and 4 provide many of the statistics we now discuss, while Table 5 summarizes how the various characteristics we will discuss determine the potency of the bank lending channel in Pakistan.

i. Importance of Banks within the Financial System

Banks play a central and still expanding role in the financial system of Pakistan. In the wake of reforms, that started during 1990s and which included bank privatizations and interest rate liberalization for example, the total assets of the banking system increased during the last decade, both in absolute value and as a share of the total assets of the financial system, from 65 percent in 2002 to 74 percent in 2009.[4]

In contrast, the share of nonbank financial institutions and the Central Directorate of National Savings decreased from 6.2 to 5.6 and from 25 to 17 percent, respectively. The latter category of financial institutions comprises various national saving schemes through which the government mobilizes household savings by offering various debt instruments at varying maturities and constitutes a major source of nonbank borrowing for the government. The minute share of microfinance and insurance institutions increased slightly.

In general, global macroeconomic and political developments remain favorable to the Pakistani banking sector. Yet, total private sector credit granted by banks over gross domestic product (GDP) expanded briskly until 2005, but then leveled off, and for the first time dropped in 2007, corresponding to the tightening of monetary conditions and suggestive of the existence of a lending channel in Pakistan.

[4] The banks also own shares in nonbank financial institutions, insurance companies, brokerage houses, and financial advisory services further underlining their central role in the financial system (Source: *Financial Stability Review* 2007-08, SBP).

ii. Importance of Banks for the Financing of Corporations

Banks around the world are very important in fulfilling the financing needs of the corporate sector. Public debt and equity play, for most firms and even in financially well developed countries, only a minor role in financing corporate activities.

Debt and equity markets are often found to be less developed and subject to more intense market imperfections in emerging economies. This is also the case in Pakistan. The issuance of public debt is very limited, and especially small firms rely heavily on bank debt. Bond market capitalization has even decreased over time in nominal terms. Stock markets continue to play a modest role in corporate sector funding. Stock market capitalization has shown an upward trend, but still the market is relatively thin, dominated by a handful of commercial banks' stocks, and mainly driven by the demand from foreign investors.

In sum, banks play a dominant role as financial intermediaries in Pakistan. If the supply of bank loans to firms changes following changes in monetary policy, firms likely will be affected as for most firms financing alternatives may not be readily available.

iii. Performance of the Banking Sector

The transmission of monetary policy will also depend on the performance of the banks. Stronger banking sector results in a weaker effect of monetary policy on the loan supply (Cecchetti (1999)). The financial strength of the banking system can be measured through asset quality, capital adequacy, liquidity and the earnings of the banking system.

The first half of the sample period is characterized by an increase in the stability and expansion regarding banking system. Banking business remained profitable and return on equity (ROE) for example grew until 2006. Similarly, the cost – income ratio dropped until the same year.

However, after the tightening of monetary policy started in 2005, performance of the banking sector weakened and in subsequent years there was a rise in non-performing loans and a resultant erosion of capital. The banking sector in Pakistan is clearly not immune to contractionary monetary policy shocks, as bank balance sheets are affected by the increasing interest rates.

iv. Relationship Lending

A strong relationship with a bank may insulate an individual firm to some extent from the cut in bank lending that follows a contractionary monetary policy. This shielding may not only be vis-á-vis other firms that have no relationship, but also across time if banks would intertemporally "subsidize."

If firms engage multiple banks, firms can switch if one bank is affected more by contractionary monetary policy than the others (Detragiache, Garella and Guiso (2000)). Large firms are mostly immune from any type of financing shortage by switching among banks when needed (Khwaja and Mian (2008)). Small firms however are often unable to substitute between banks, or between bank and other type financing.

v. Market Concentration and Size Structure

Informational frictions in the banking sector are important for the lending channel to operate. If market players in the interbank markets are facing significant informational asymmetries, then distributional effects are likely to occur between banks that are confronted with informational issues to various degrees. Size criterion is used as standard in literature as a proxy to measure the informational opaque situation of banks. Small banks, in general, are considered to be more exposed to informational frictions than large banks. Therefore, the external finance premium for the former category is probably higher than for the latter group.

The banking market is characterized by a steadily decreasing concentration during the sample period. The Herfindahl-Hirschman Index (i.e., the sum of market shares squared) decreased from 973 in 2002 to 736 in 2008, while the C-5 (the market share of the five largest banks by total assets) dropped from 61 to 52 percent. The group of the largest banks (with total assets more than 200 billion PKR) slipped from 65 percent in 2004 to 52 percent in 2008. As concentration dropped, competition may have intensified, possibly making the bank lending channel more potent.

vi. State Influence in the Banking Sector

Before the financial reforms in 1990s, the Pakistani financial system was mainly characterized by high government borrowing, bank-level credit ceilings, directly controlled interest rates, and directed and subsidized loan supply.

Public ownership of banks was introduced in the 1970s and lasted until the early 1990s, making the state all dominant in the banking sector. In 1990 there was not a single domestic private bank

However, due to additional privatization of state-owned banks during the sample period studied, the influence of the state has been waning. The fraction of assets of state-owned banks over total assets of the banking system halved from 52 percent in 2002 to 26 percent in 2009 potentially strengthening the banking lending channel of monetary policy transmission.

vii. Deposit Insurance

There is no deposit insurance in Pakistan. Rather, deposits are in principle indirectly insured only by the continuous supervision by the regulatory authority. Detailed prudential regulations have been issued to avoid different types of risks a bank could be exposed to. Moreover, stringent liquidity requirements are in place to restrain banks to take excess leverage.

Therefore, in absence of explicit deposit insurance the lending channel may be more potent, because the lack of certainty about the nominal value of deposits makes depositors feel unsafe about their money. Consequently, following a tightening of monetary policy, deposits may be withdrawn and banks compelled to cut lending.

viii. Bank Failures

There were few bank failures in Pakistan during the 1990s. Some institutions became involved in scandals and failed due to imprudent banking. The *Mehran Bank* scandal is well-known, for example. Some banks were involved in a few scandals causing depositors to feel insecure. Furthermore, some cooperative societies also collected deposits from the people with a promise of higher returns than the ongoing market rates. These societies inevitably failed and caused a loss for their depositors.

Due to these incidents in the past, there may be a higher occurrence of rumors and a abrupt contraction in deposits following a tighter monetary policy. Furthermore, fraud and forgeries independently affect deposits, which in turn affect lending of the banks. Data related to such cases indicate a significant increase in such cases during the last few years (Source: *Financial Stability Review* 2008-09, SBP).

ix. Foreign Banks and Bank Networks

In case any liquidity problem arises, due to a decrease in demandable deposits, foreign banks and banks in networks can resort to their head office or holding company to cover the liquidity shortage. Under this scenario, the potency of the bank lending channel of domestic monetary policy transmission becomes weaker. The role of foreign banks has been limited in Pakistan, i.e., they account for only ten percent of total banking sector assets. There are some implicit bank networks in Pakistan in that ownership of some banks is common. There is also foreign ownership in some large banks. However, evidence strongly suggests banks in Pakistan do pass shocks to their liquidity position to their borrowers (Khwaja and Mian (2008)). This evidence, combined with the weak role of foreign banks and bank networks, makes it more likely that tight monetary policy eventually leads to the loss of deposits by the banks and a contraction in lending.

3. Data and Econometric Specification

The main source of data is the Quarterly Report of Conditions (QRCs) of all banks submitted to the State Bank of Pakistan (SBP). The data set covers the whole population of all banking institutions that is operational in the financial system and incorporates their QRCs' figures. The time period is from 2002:II to 2010:I at a quarterly basis. There are 40 banks, of which six are Islamic Banks.

We lose observations because: (1) Some banks start operating after 2002:II; (2) we employ up to four lags of quarterly growth rates; (3) some banks merge and following Kashyap and Stein (2000) we remove banks' observations in any quarter in which they are involved in a merger; (4) we remove observations for which the loan growth rate is more than three standard deviations from its sample mean; (5) there are missing values in the dataset. We are left with 756 bank – year: quarter observations that can be used in the estimations.

The methodology, in general, is based on an assessment of the differences in the response of individual banks to a monetary policy shock according to their liquidity positions. We follow the one-step regression methodology, as in Kashyap and Stein (2000):

$$(1)\ \Delta \log(L_{it}) = c_i + \sum_{j=1}^{m} \alpha_j \Delta \log(L_{it-j}) + \sum_{j=0}^{m} \mu_j \Delta R_{t-j} + \Theta T_t + \sum_{k=1}^{3} \rho_k Quarter_{kt} + X_{it-1}\left(\eta + \sum_{j=0}^{m} \phi_j \Delta R_{t-j}\right) + \varepsilon_{it}$$

whereby,

c_i = bank *i* specific fixed effect,

$\Delta log(L_{it-j})$ = the quarterly change in the logarithm of the total amount of the loans granted to the private sector by bank *i* in year: quarter *t-j*,

ΔR_{t-j} = the quarterly change in the three-month Treasury bill rate in year: quarter *t-j*,

T_t = time trend,

$Quarter_{kt}$ = dummy for quarter *k* in year: quarter *t*, and

X_{it-1} = liquid assets (i.e., cash and balances with the banks) over total assets of bank *i* in year: quarter *t*.

m is set to equal four, i.e., one calendar year. This corresponds to the number of lags used in other papers assessing the potency of the credit channel in other countries.

The main hypothesis is that contractionary monetary policy affects the illiquid banks more than the liquid banks, as the latter can offset any decrease in deposits by reducing their liquid assets. Consequently, our main coefficient of interest is the sum of interaction terms of liquidity X_{it-1} with the monetary policy measure ΔR_{t-j}, i.e., $\sum\phi$.

Equation (1) is first estimated for the entire banking sector to evaluate the potency of the aggregate bank lending channel. Large banks are possibly less influenced than small banks by monetary shocks because of their ability to raise time deposits, which − irrespective of their internal liquidity positions − would make their lending less dependent on monetary policy shocks. Islamic banks may also be less affected. Therefore, we also estimate Equation (1) including dummies both for large banks and Islamic banks. Both dummies are interacted then with all coefficients, except the trend, quarter, and province shares. These shares replace the bank-specific effects and are constructed by calculating for each bank the relative number of branches it has in each province.

In robustness, and to further control for the business cycle and loan demand, we also include change in the industrial production index (IPI). Equation (2) equals:

$$(2) - \Delta \log(L_{it}) = c_i + \sum_{j=1}^{m} \alpha_j \Delta \log(L_{it-j}) + \sum_{j=0}^{m} \mu_j \Delta R_{t-j} + \sum_{j=1}^{3} \phi_j \Delta IPI_{t-j} + \Theta T_t + \sum_{k=1}^{3} \rho_k Quarter_{kt} + X_{it-1}\left(\eta + \sum_{j=0}^{m} \phi_j \Delta R_{t-j} + \sum_{j=0}^{m} \phi_j \Delta IPI_{t-j}\right) + \varepsilon_{it}$$

To check for endogeneity between lag dependent variable and the error term we use a Hausman-Wu test with the 5th to 8th lag in level of the dependent variable as the set of instruments. The result shows that the lagged dependent variable in both equations (1) and (2) is not correlated with the error term.

4. Results

a. All Banks

Table 7 presents the results of the baseline regression, i.e., Equation (1), estimated using the observations of all banks. The purpose is to assess the potency of the bank lending channel for the overall banking sector. The table shows the sum of the estimated coefficients. The coefficients for provinces, quarter dummies and time trend are not shown. All estimates are in percentage terms and robust to White's adjusted standard errors.

The estimated coefficients confirm that the bank lending channel is operational in Pakistan. The sum of the estimated coefficients on the changes in the three-month

Treasury bill rate equal -5.83***.[5] Hence, an increase in the interest rate by one percentage point decreases loan growth by 5.83 percentage points.

To identify that this decrease in loan growth actually represents a contraction in the supply of credit and not a reduction in the demand for credit, we interact the measure for bank specific liquidity with the interest rate (as in Kashyap and Stein (2000)). The sum of the estimated coefficients on this interaction term equals 20.71*. Consequently, banks with a higher level of liquidity contract lending less following a monetary shock (we discuss the economic relevancy of similar estimates in the next table).

To check the robustness of these estimates we replace the three-month Treasury bill rate with the KIBOR in Model (2) and the six-month Treasury bill rate in Model (3). The sum of the estimated coefficients on the changes in the interest rates equal -3.69*** and -5.12***, respectively, while the sum of the estimated coefficients on the interaction term with liquidity equal 20.71 and 15.42. Individual liquidity coefficients are insignificant for all specifications.

To control better regional effects Model (4) replaces the bank fixed effects with bank province shares, i.e., for each bank the number of branches it has in each province divided by the total number of branches it has. To control better for business cycle and loan demand Model (5) includes the change in industrial production. Results are mostly unaffected.

b. *Large and Islamic Banks*

We now assess the role played by large and small (conventional) banks, and Islamic banks in the bank lending channel. We interact dummies for Large and Islamic banks

[5] As in the Tables we star (the sum of) the estimated coefficients according to their significance levels. *** Significant at 1%, ** significant at 5%, * significant at 10%.

with all independent variables (except with for the trend, season and province shares). Table 8 exhibits the results for various specifications.

The baseline Model (1) indicates especially the small banks make the bank lending channel operational, a finding also present in Kashyap and Stein (2000). An increase in the three-month Treasury bill rate of one percentage point decreases the loan growth of small banks by 7.17*** percentage points in a year. The sum of the estimated coefficients on the interaction terms of liquidity and interest rates equal 25.06***.

To assess if the estimated coefficients also have economically relevant implications, we need to calculate the response in lending by similarly sized banks, but different liquidity positions, to a monetary policy shock. Using the liquidity distribution of small banks in 2010:I, we consider a bank at the 9th decile as a 'liquid' bank and at the 1st decile as an 'illiquid' bank. The liquidity ratios according to this criterion are 24 and 5 percent, respectively. Under this scenario, a one percentage point increase in the interest rate reduces the lending by an illiquid bank 4.5 percentage points more than the lending by a liquid bank over one year time period. This is calculated through multiplying $\sum\phi$ by liquidity differential of the liquid and illiquid banks i.e. $25.06 \times (0.24 - 0.05)$.

The estimated results for the large banks are different. The sum of the estimated coefficients on the change in interest rate is positive, i.e., 7.06*, but only marginally significant. Hence, large banks are not sensitive to changes in monetary policy due to their ability to fund their lending from the market other than deposits. The sum of the interaction terms of liquidity and the interest rate is now negative, as in Kashyap and Stein (2000), but insignificant. Using the difference between small banks and large banks coefficient there is 11.6 percent gap in the level of lending across liquid and illiquid large versus small banks one year after a monetary shock.

All in all, these findings are very similar to those in Kashyap and Stein (1995), i.e., tight monetary policy decreases the loan growth of small banks but may actually increase credit granted by large banks in the short run. Romer and Romer (1990), Bernanke and Blinder (1992), and Christiano, Eichenbaum and Evans (1996) also show that credit reacts sluggishly or initially even expands following a monetary tightening. In Pakistan this effect is also present due to the response of the large banks.

Islamic banks are equivalent to small banks in terms of asset size and as Islamic banks use the conventional interest rate as a key benchmark, one can expect that the bank lending channel will also operate through Islamic banks. However, since Islamic banks were expanding during the sample period, their deposit growth may have been less affected by tight monetary policy. Also, share of their fixed deposits in total deposits is higher than conventional banks. Using panel data of bank deposits across all commercial banks in Pakistan, Khan (2010) also found that Islamic banks enjoy substantially higher deposit growth rates than other banks including the crises period of 2008. Moreover, the liquidity position of the Islamic bank makes them less susceptible to a change in the interest rate.

The results indeed show that the loan growth of Islamic banks is not affected by changes in the interest rate. The sum of the estimated coefficients equals, 2.05, positive but not statistically significant. Similarly, the sum of the estimated coefficients on the interaction terms of bank liquidity and changes in the interest rate equal -31.83, negative and insignificant. In both cases Islamic banks are statistically different from small banks with an estimated difference that equals 9.22* for the changes in the interest rate and 56.90*** for the interaction term, but similar to the large banks.

As before, and to check the robustness of these estimates, we replace the three-month Treasury bill rate with the KIBOR in Model (2) and the six-month Treasury bill rate in

Model (3), and introduce bank province shares and the change in industrial production in Models (4) and (5). Results are mostly unaffected and document that even though Islamic banks are small (in terms of asset size), their response in lending to a monetary policy shock is similar to that of the large banks in the sample.

5. Conclusion

We investigate the differences in banks' responses to monetary policy shocks across bank size, liquidity, and type, i.e., conventional versus Islamic, in Pakistan between 2002:II to 2010:I. We find that following a monetary contraction, small banks with liquid balance sheets cut their lending less than other small banks. In contrast large banks maintain their lending irrespective of their liquidity positions. Islamic banks, though similar in size to small banks, respond to monetary policy shocks like large banks. Hence the credit channel of monetary policy may weaken when Islamic banking grows, with their current portfolio under conventional monetary policy, in relative importance.

However, if there are (1) *sukuk* issuance that can be used as a monetary policy indicator for Islamic banks, (2) more investment opportunities available for Islamic banks, (3) an efficient Islamic interbank market, and (4) a competitive Islamic banking industry then the credit channel through Islamic banks may start gaining in potency to the extent that some Islamic banks remain small and hence face funding constraints.

Table 1: Balance Sheet Items for Conventional Banks and Islamic Banks

Balance sheet items for conventional banks and Islamic banks as a percentage of assets and liabilities, and indicated items.

	Conventional Banks				Islamic Banks	
	Large Banks		Small Banks			
	2003	2009	2003	2009	2003	2009
Assets						
Cash and Balances With Treasury Banks	10	10	9	6	12	8
Balances With Other Banks	4	3	4	2	12	7
Lending To Financial Institutions	7	3	11	4	0	16
Call Money	8	*11*	14	*13*	0	*0*
Repurchase Agreements	86	*84*	75	*66*	0	*2*
Other	6	*6*	11	*21*	0	*98*
Investments - Net	36	25	22	31	7	16
Market Treasury Bills	69	*51*	49	*67*	0	*5*
Pakistan Investment Bonds	19	*9*	43	*14*	0	*2*
Other	12	*40*	8	*19*	100	*93*
Advances - Net	37	52	50	45	64	44
Other Assets	6	8	5	12	4	9
Liabilities						
Borrowing From Financial Institutions	5	6	22	17	12	4
Deposits and Other Accounts	84	78	66	64	69	80
Time Deposits	18	*28*	23	*38*	42	*42*
Saving Deposits	50	*36*	54	*33*	46	*31*
Current Accounts	31	*36*	23	*28*	12	*26*
Subordinated Loans	0	1	1	1	0	0
Other Liabilities	5	4	6	7	4	5
Equity	5	10	6	10	15	10

Source: Annual audited bank accounts.

Table 2: Statutory Cash and Liquidity Reserve Requirements

Statutory cash and liquidity reserve requirements as a percentage of time and demand deposits.

	Cash Requirements	Liquidity Requirements	
Dates	All Banks	Conventional Banks	Islamic Banks
Until 2006	5	15	6
Feb 15, 2006	5	15	8
July 18, 2006	5	15	8
July 18, 2006	7	18	8
June 31, 2008	8	18	8
May 22, 2008	9	19	9
Oct 17, 2008	6	19	9
Nov 1, 2008	5	19	9

Table 3: Financial Intermediation in Pakistan in 2002 - 2009

	2002	2003	2004	2005	2006	2007	2008	2009
As a Share of Total Assets of Financial Sector								
Microfinance Institutions	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Nonbank Financial Institutions	6.2	6.6	7.0	7.6	7.8	8.0	7.6	5.3
Insurance	3.8	3.8	3.8	3.9	4.1	4.6	4.4	4.4
Central Directorate of National Savings Institutions	24.9	25.0	21.7	18.0	16.1	14.6	14.8	16.6
Banks	65.0	64.5	67.3	70.4	71.9	72.7	73.0	73.5
As a Percent of Gross Domestic Product								
Microfinance Institutions	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nonbank Financial Institutions	4.6	4.9	5.2	5.6	5.7	5.9	5.0	3.4
Insurance	2.8	2.9	2.8	2.9	3.0	3.4	2.9	2.8
Central Directorate of National Savings Institutions	18.2	18.8	16.1	13.3	11.7	10.8	9.8	10.8
Banks	47.7	48.3	50.1	51.8	52.4	53.9	48.1	47.6
All	73.3	75.0	74.4	73.7	72.9	74.1	66.0	64.7
Private Sector Credit	18.0	19.9	22.6	26.3	27.8	28.5	27.6	22.8

Source: State Bank of Pakistan.

Table 4: Banking Structure in Pakistan in 2002 - 2009

	2002	2003	2004	2005	2006	2007	2008	2009
Public Debt and Stock Market Financing								
Domestic Debt Securities Issued by the Corporate Sector, in % of GDP	0.19	0.05	0.08	0.16	0.04	0.07	0.25	0.02
Domestic Debt Securities Issued by the Corporate Sector, in % of Bank Loans to Corporate Sector	1.50	0.30	0.40	0.60	0.20	0.30	0.90	0.10
Stock Market Capitalization, in % of GDP	14	20	30	42	36	49	14	20
Bank Performance								
ROE (Profit after Tax over Capital and Reserves), in %	21	35	31	37	36	23	11	13
Cost Income Ratio, in %	67	59	63	72	71	68	70	72
Measures of Banking Sector Concentration								
Herfindahl-Hirschman Index	973	912	850	762	745	739	736	712
Coefficient of Variation	1.7	1.6	1.5	1.4	1.4	1.4	1.4	1.4
Assets of Largest 5 Banks, in % of Total Bank Assets	61	59	56	54	52	52	52	51
Assets of Large Banks (Assets > 200 bln. PKR), in % of Total Bank Assets	n/a	n/a	65	64	60	58	59	57
State Ownership								
Assets of the Public Sector Banks, in % of Total Bank Assets	52	49	27	26	26	27	25	26

Source: State Bank of Pakistan.

Table 5: Factors Determining the Potency of the Bank Lending Channel

This table provides the factors that determine the potency of the bank lending channel and the direction of their impact.

Factor	Strengthening	Weakening
Importance of the banking sector		
Importance of bank financing	✓	
Investors protection and capital markets	✓	
Bank dependence	✓	
Structure of the banking system		
Concentration and size		✓
Financial strength	✓	
State influence	✓	
Foreign ownership and bank networks	✓	
Regulatory requirements		
Capital adequacy		✓
Deposit insurance	✓	
Bank failures	✓	

Table 6: Descriptive Statistics

This table provides the definitions, means, standard deviations, minimum and maximum of all variables used in the estimations. All variables are expressed in percent. The number of bank – year: quarter observations equals 756.

Variable Name	Definition	Bank Type	Mean	Standard Deviation	Minimum	Maximum
Small Bank	=1 if the bank has average total assets below 200 bln. PKR and is a conventional bank, = 0 otherwise	28 banks	0.70	0.46	0	1
Large Bank	=1 if the bank has average total assets exceeding 200 bln. PKR and is a conventional bank, = 0 otherwise	6 banks	0.15	0.36	0	1
Islamic Bank	=1 if the bank is classified as an Islamic Bank, = 0 otherwise	6 banks	0.15	0.36	0	1
$\Delta \log(L_{it})$	Change in the log of private sector loans	All Banks	4.2	12.6	-57.7	140.8
		Small Banks	17.4	14.3	-23.6	55.3
		Large Banks	22.5	10.6	7.0	48.0
		Islamic Banks	4.0	13.8	-57.7	140.8
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	Change in the log of private sector loans, sum of last four quarters	All Banks	20.4	36.0	-95.7	280.6
		Small Banks	18.5	38.0	-95.7	280.6
		Large Banks	3.8	7.7	-10.7	31.1
		Islamic Banks	5.9	10.7	-12.4	63.0
X_{it}	Liquid assets to total assets	All Banks	16.0	14.8	3.0	92.2
		Small Banks	16.1	16.7	3.0	92.0
		Large Banks	12.3	3.3	5.8	25.5
		Islamic Banks	22.5	10.6	7.0	48.0
ΔR_t	Change in three month treasury bill rate		0.4	0.7	-0.7	2.5
$\sum_{j=0}^{4} \Delta R_{t-j}$	Change in three month treasury bill rate, sum of last four quarters		1.7	2.0	-4.4	5.5
ΔIPI_t	Change in the industrial production index		1.4	10.1	-18.0	21.8
$\sum_{j=0}^{3} \Delta IPI_{t-j}$	Change in the industrial production index, sum of last four quarters		7.5	12.2	-19.5	25.1

Table 7: Loan Growth, All banks

The dependent variable is $\Delta log(L_{it})$ which is the quarterly change in the logarithm of the total amount of the loans granted to the private sector by bank *i* in year: quarter *t*. The independent variables are: $\Delta log(L_{it-j})$ which is the quarterly change in the logarithm of the total amount of the loans granted to the private sector by bank *i* in year: quarter *t-j*, ΔR_{t-j} is the quarterly change in the three-month Treasury bill rate in year: quarter *t-j*, and X_{it-1} is the liquid assets (i.e., cash and balances with the banks) over total assets of bank *i* in year: quarter *t*. The estimations use 756 bank – year: quarter observations. *** Significant at 1%, ** significant at 5%, * significant at 10%.

(Sum of) Estimated Coefficients	(1) Baseline	(2) R = KIBOR	(3) R = Six-month Treasury bill rate	(4) With Bank Province Shares	(5) With Industrial Production
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	0.34***	0.36***	0.33***	0.40***	0.34***
$\sum_{j=0}^{4} \Delta R_{t-j}$	-5.83***	-3.69***	-5.12***	-5.95***	-5.04***
$\sum_{j=0}^{4} X_{it} * \Delta R_{t-j}$	20.71*	15.01	15.42	19.22	19.20
$\sum_{j=0}^{3} \Delta IPI_{t-j}$					0.19
Quarter Dummies, Trend	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	No	Yes
Bank Province Shares	No	No	No	Yes	No

Table 8: Loan Growth, Across Bank Type

The dependent variable is $\Delta log(L_{it})$ which is the quarterly change in the logarithm of the total amount of the loans granted to the private sector by bank *i* in year: quarter *t*. The independent variables are: $\Delta log(L_{it-j})$ which is the quarterly change in the logarithm of the total amount of the loans granted to the private sector by bank *i* in year: quarter *t-j*, ΔR_{t-j} is the quarterly change in the three-month Treasury bill rate in year: quarter *t-j*, and X_{it-1} is the liquid assets (i.e., cash and balances with the banks) over total assets of bank *i* in year: quarter *t*. The estimations use 756 bank – year: quarter observations. *** Significant at 1%, ** significant at 5%, * significant at 10%.

		(1)	(2)	(3)	(4)	(5)
(Sum of) Estimated Coefficients	Bank Type	Baseline	*R* = KIBOR	R = Six-month Treasury bill rate	With Bank Province Shares	W/ Industrial Production
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	Small	0.36***	0.39***	0.35***	0.43***	0.36***
	Large	0.15	0.29**	0.17	0.15	-0.02
	Islamic	0.08	0.06	0.07	0.21***	-0.04
Difference from Small Banks	*Large*	*-0.21*	*-0.10*	*-0.18*	*-0.28***	*-0.38*
	Islamic	*-0.28**	*-0.33***	*-0.28**	*-0.23*	*-0.40***
$\sum_{j=0}^{4} \Delta R_{t-j}$	Small	-7.17***	-4.26***	-6.36***	-7.12***	-7.16***
	Large	7.06*	4.99	6.74**	4.43	9.12***
	Islamic	2.05	3.85	0.46	-2.95	11.25*
Difference from Small Banks	*Large*	*14.23****	*9.25***	*13.10****	*11.60****	*16.28****
	Islamic	*9.22**	*8.12***	*6.82**	*4.17*	*18.41****
$\sum_{j=0}^{4} X_{it} * \Delta R_{t-j}$	Small	25.06**	18.24*	19.52	22.88*	25.84**
	Large	-39.20	-28.83	-39.47*	-17.40	-47.55*

	Islamic	-31.83	-27.29*	-26.38	-19.90	-48.08**
Difference from Small Banks	*Large*	*-64.26***	*-47.08*	*-59.00***	*-40.28**	*-73.39****
	Islamic	*-56.90****	*-45.54***	*-45.91****	*-42.78***	*-73.91****
Quarter Dummies, Trend		Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects		Yes	Yes	Yes	No	Yes
Bank Province Shares		No	No	No	Yes	No

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