The Transmission of Monetary Policy Through Conventional and Islamic Banks*

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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:Q2 and 2010:Q1. 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.

JEL Codes: E5, G2.

1. Introduction

Islamic banking is one of the fastest growing segments of the global financial sector. It is currently expanding at a rate of approximately 20 percent annually. 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 include Malaysia, Iran, and the Gulf Cooperation Council countries, i.e., Bahrain, Kuwait, Oman, Qatar, Saudi

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Arabia, and the 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. To tap into this growing market, large conventional banks that have opened Islamic windows include 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, the rest of the world's financial system contracted, and many of the financial institutions deleveraged 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 from selling 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

[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 (2011) formalize this channel, modeling financial intermediation as in Gertler and Karadi (2011) but including liquidity risk as in Kiyotaki and Moore (2012). Similarly, the agency problems between banks and their borrowers (firms and households) give rise to the firm balance sheet channel (Lang and Nakamura 1995; Bernanke, Gertler, and Gilchrist 1996, 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 there. If bank loans are imperfectly substitutable with public financing for firms, and prices adjust imperfectly, monetary policy affects real activity through the so-called credit channel.

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 they 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—à la socially responsible investors—may not consider their Islamic loans substitutable for any 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 into for religious reasons by depositors and borrowers (Baele, Farooq, and Ongena 2012; Khan and Khanna 2012). These contractual and motivational features, on both their liability and asset sides, may allow Islamic banks to shield themselves from monetary policy shocks (see section 3). Consequently, whether Islamic banks transmit monetary policy differently than conventional banks is an empirical question, which we aim to address in this paper.

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 in banks' response to a monetary shock in various European countries. Jayaratne and Morgan (2000), Kishan and Opiela (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.

We follow the seminal paper by Kashyap and Stein (2000) and investigate 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:Q2 and 2010:Q1.[2] The country and sample period provide a unique setting to analyze this differential response. Pakistan may be one of the few countries where both well-developed conventional and Islamic banking sectors have coexisted for a considerable period, formally since 2002 when Islamic banking was reintroduced in Pakistan. Out of forty banks that grant business loans, six banks are licensed by the Banking Policy and Regulation Department of the State Bank of Pakistan as *shariah*-compliant full-fledged Islamic banks.

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 large banks maintain their lending irrespective of their liquidity positions. The main contribution of our paper is to show that Islamic banks, 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.

In this respect, our paper contributes to the rapidly growing literature on socially responsible investment that shows that fund portfolio allocation and the resultant firms' cost of capital, and ultimately their performance, may be affected by the pursuit of social or ethical objectives by decision makers—in particular, by investors (Renneboog, Ter Horst, and Zhang 2008; Hong and Kacperczyk 2009; Hong and Kostovetsky 2012). Our results show that even the transmission of monetary policy may be affected by the religion-inspired objectives pursued by a set of bank managers and their clients.

[2]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), Zia (2008), and Baele, Farooq, and Ongena (2012), for example.

The remainder of this paper is organized as follows. Section 2 discusses the institutional framework in Pakistan after 2001 and its relevance for the lending channel. Section 3 describes the data and introduces the econometric specification, and section 4 discusses the results. Section 5 concludes.

2. Pakistan after 2001

2.1 Monetary Conditions

Following 9/11 there was a substantial inflow of capital in Pakistan. Workers' remittances, especially from the United States, the United Kingdom, the United Arab Emirates, and Saudi Arabia, 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 therefore welcomed initially. The State Bank of Pakistan (SBP), the nation's central bank, reacted to the inflow of foreign funds by purchasing U.S. dollars and by increasingly accumulating these and other foreign reserves. Its aim was also to curb the appreciation of the rupee against most other currencies to safeguard the competitiveness of Pakistan's exports. The purchase of dollars by the central bank almost inevitably caused the money supply to expand, despite the attempts to sterilize the increase in money supply through 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 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 the 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.[3] The use of a three-month interest rate was followed by 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 rate series is very high.

2.2 Islamic Banks

In principle, Islamic banking is equity, rather than fixed-interest, based on profit and loss sharing on both the liability and asset sides 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, operational leases, 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 automated teller machine (ATM), and the bank guarantees the nominal value of the deposit. However, Islamic banks cannot lend the funds to projects that are

[3]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 autoregressions 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.

haram—i.e., not permissible under Islamic jurisprudence (*Shariah*) and related to alcohol, pork, sex, etc.—or that deal with interest payments (*riba*), gambling (*maysar*), or excessive uncertainty (*gar-rar*). In general, Islamic banks aspire to be more conservative in lending.

Investment accounts are the equivalent of the conventional savings accounts plus time deposits. 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 (*murabahah*) and operational leases (*ijarah*), to finance household consumption, car purchases, and real estate. In Pakistan these two types cover approximately 80 percent of the total financing provided by Islamic banks (as of December 2004), which has decreased to about 60 percent over time (as of December 2009).[4]

2.3 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 (State Bank of Pakistan 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 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

[4]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.

price their *murabahah* and *ijarah* contracts. Instead, they used the Karachi Interbank Offered Rate (KIBOR) (State Bank of Pakistan 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 small and large conventional banks and Islamic banks in terms of liquidity. A large bank is defined as a bank with more than 200 billion PKR (around 2.5 billion U.S. dollars; 80 PKR = 1 USD) in assets. According to this definition there are six large banks, representing around 60 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 the same throughout the entire sample period, liquidity varies noticeably across bank type. On average, small conventional banks were 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 non-reversible 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 2013). 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

Table 1. Balance Sheet Items for Conventional Banks and Islamic Banks (as percentage of assets and liabilities, and indicated items)

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

Source: Annual audited bank accounts.

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 *shariah*-compliant instrument was issued by a public-sector enterprise only in 2005, but

Table 2. Statutory Cash and Liquidity Reserve Requirements (as 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

it could not fulfill the large investment appetite of Islamic banks. So until 2008, in the absence of any Islamic government security, Islamic banks held cash to fulfill the statutory liquidity requirement (SLR) and cash reserve requirements (CRRs).

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 with conventional banks in meeting the SLR, the SBP relaxed it for Islamic banks. While their CRRs are the same, Islamic banks, on average, have been required to hold 10 percent less in SLR than conventional banks. During the period under study, Islamic banks need to hold 9 percent of the total demand and time deposits for SLR purposes, whereas conventional banks are liable to maintain 19 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 most likely similar for conventional and Islamic banks.

In the absence of a risk-free Islamic instrument, Islamic banks also benchmarked their fixed-return contracts, *murabahah* and

ijarah, 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 mentioned earlier, 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 may be less affected by the changes in monetary policy.

2.4 Bank Lending Channel in Pakistan

The structure of a country's banking system is likely to determine the strength of the banks' lending response 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 the banks' loan supply. State-owned banks, which 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, for conventional and Islamic banks, many of the statistics we now discuss, while table 5 summarizes how the various characteristics we discuss determine the potency of the bank lending channel in Pakistan through the conventional and Islamic segment of the banking sector, respectively.

Table 3. Financial Intermediation in Pakistan in 2002–09

Year:	2002	2003	2004	2005	2006	2007	2008	2009
As Percent of Total Assets of the Financial Sector								
Microfinance Institutions	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Non-Bank 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
All Banks	65.0	64.5	67.3	70.4	71.9	72.7	73.0	73.5
As Percent of Gross Domestic Product								
Microfinance Institutions	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Non-Bank 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
All Banks	47.7	48.3	50.1	51.8	52.4	53.9	48.1	47.6
As Percent of Total Assets of All Banks								
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 2002–09

Year:	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	1.5	0.3	0.4	0.6	0.2	0.3	0.9	0.1
Stock Market Capitalization, in % of GDP	14	20	30	42	36	49	14	20
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 Five Largest Banks, in % of Total Bank Assets	61	59	56	54	52	52	52	51
Assets of Large Banks (Assets > 200 billion 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

(continued)

Table 4. (Continued)

Year:	2002	2003	2004	2005	2006	2007	2008	2009
Bank Performance, Conventional Banks (all values are in %)								
Capital Asset Ratio	6.3	5.8	6.3	3.8	6.7	5.5	−0.1	−2.5
Fixed Asset to Total Asset	1.6	2.0	1.8	1.9	3.0	3.1	4.6	4.4
Lending Rate	8.0	5.1	4.4	6.8	7.5	8.4	9.7	10.2
Non-Deposit Funding to Total Funding	25.3	24.9	27.3	26.5	24.8	22.3	20.9	22.2
Non-Loan Earning Assets to Total Earning Assets	50.5	51.1	45.7	44.1	40.6	41.3	35.0	45.0
Non-Performing Loans to Total Assets	13.1	12.3	11.8	11.7	8.5	9.3	12.0	13.8
ROA	0.6	0.9	1.4	1.0	1.0	0.3	0.1	1.0
Islamic Banks								
Capital Asset Ratio	19.0	14.7	12.7	13.0	28.4	27.2	21.2	17.0
Cost Income Ratio	69.2	66.2	69.4	63.6	179.4	99.9	101.4	101.0
Fixed Asset to Total Asset	0.4	0.5	0.7	0.7	5.1	5.0	5.6	4.7
Lending Rate	7.1	4.5	3.8	6.5	6.2	7.1	10.0	10.7
Non-Deposit Funding to Total Funding	11.8	16.4	17.9	12.8	8.8	3.8	5.3	6.4
Non-Loan Earning Assets to Total Earning Assets	30.5	22.8	23.5	27.0	43.6	43.6	35.4	44.9
Non-Performing loans to Total Assets	2.5	1.4	1.0	1.3	0.5	0.3	1.1	3.8
ROA	2.4	1.5	1.1	1.9	−1.0	0.0	−0.3	−1.1

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 in general and with respect to the specific status of conventional and Islamic banks in Pakistan. A positive sign (+) means that there is a positive impact of that factor on the potency of the bank lending channel, and vice versa if the sign is negative (–). The last four columns state the relevance of these factors with respect to status of both the conventional banks and Islamic banks in Pakistan. For example, borrowing/financing from conventional banks is very high in Pakistan, so it strengthens the lending channel through these banks, whereas for Islamic banks the share is much smaller, so the factor weakens the channel through Islamic banks (see section 2.4).

Factor	Impact on Potency of Bank Lending Channel	Relevancy for Status Banking System in Pakistan			
		Conventional Banks		Islamic Banks	
		Strengthening	Weakening	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	+	√			√

2.4.1 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 the 1990s—such as 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.[5]

In contrast, the share of non-bank 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 non-bank 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, then leveled off and, for the first time, dropped in 2007, corresponding to the tightening of monetary conditions. This fact is suggestive of the existence of a lending channel in Pakistan. The share of Islamic banks' assets in total assets of the banking sector is still small, though increasing over time.

2.4.2 Importance of Banks for the Financing of Corporations

Banks around the world are very important in fulfilling the financing needs of the corporate sector. For most firms and even in financially well-developed countries, public debt and equity play 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 small firms especially rely heavily on bank debt. Bond

[5]The banks also own shares in non-bank financial institutions, insurance companies, brokerage houses, and financial advisory services, further underlining their central role in the financial system (State Bank of Pakistan 2007–08).

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 will likely be affected, as financing alternatives are not readily available for most firms.

2.4.3 Performance of the Banking Sector

The transmission of monetary policy also depends on the performance of the banks. A 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 of the 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.

2.4.4 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 cross-sectional—i.e., 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 types of financing.

2.4.5 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 opaque informational situation of the 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 in Pakistan 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 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, particularly for small banks.

2.4.6 State Influence in the Banking Sector

Before the financial reforms in the 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 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 remained 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 bank lending channel of monetary policy transmission.

2.4.7 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 from taking 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.

2.4.8 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 to their depositors.

Due to these incidents in the past, there may be a higher occurrence of rumors and an 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 (State Bank of Pakistan 2008–09).

2.4.9 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, as they account for only 10 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 that the banks in Pakistan do pass shocks to their borrowers subject to their liquidity position (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 all the banks and a contraction in lending.

3. Data and Econometric Specification

The main source of data is the Quarterly Report of Condition (QRC) of all banks submitted to the State Bank of Pakistan (SBP). The data set covers the whole population of banking institutions that are operational in the financial system and incorporates their QRCs' figures. The time period is from 2002:Q2 to 2010:Q1 at a quarterly basis. There are forty banks, of which six are Islamic banks.

We lose observations because (i) some banks start operating after 2002:Q2; (i) we employ up to four lags of quarterly growth rates; (iii) some banks merge and, following Kashyap and Stein (2000), we remove banks' observations in any quarter in which they are involved in a merger; (iv) we remove observations for which the loan growth rate is more than three standard deviations from its sample mean; and (v) there are missing values in the data set. We are left with 756 bank year:quarter observations that can be used in the estimations. See table 6.

For our analysis of the bank lending channel, we use the theoretical model of Ehrmann et al. (2001), which is for our purposes a relevant version of the Bernanke and Blinder (1988) model. There is no fundamental change in the model when it is applied to Islamic banks. We explain the model with respect to conventional banks compared with Islamic banks. The money-market equilibrium can be described as follows:

$$M = D = -\psi r + \chi, \tag{1}$$

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. 80 PKR = 1 USD.

Variable Name	Definition	Number of Banks	Mean	Standard Deviation	Min.	Max.
Small Bank	= 1 if the bank has average total assets below 200 billion PKR and is a conventional bank, = 0 otherwise	28	0.70	0.46	0	1
Large Bank	= 1 if the bank has average total assets exceeding 200 billion PKR and is a conventional bank, = 0 otherwise	6	0.15	0.36	0	1
Islamic Bank	= 1 if the bank is classified as an Islamic bank, = 0 otherwise	6	0.15	0.36	0	1
Islamic Share	= 100 if the bank is classified as an Islamic bank, = 0 if the bank is a pure conventional bank, and varies between 0 and 100 (by asset share) if the bank is a mixed bank					
Small Banks	Six are Islamic, fifteen are pure conventional, and thirteen are mixed	34	18.19	37.97	0	100
Large Banks	One is pure conventional and five are mixed	6	1.33	3.04	0	13.38

(continued)

Table 6. (Continued)

Variable Name	Definition	Bank Type	Mean	Standard Deviation	Min.	Max.
$\Delta \log(L_{it})$	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-1}	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-j}	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
ΔLSM_t	Change in the large-scale manufacturing index		3.0	15.3	−30.7	33.6
$\sum_{j=0}^{4} \Delta LSM_{t-j}$	Change in the large-scale manufacturing index, sum of last four quarters		11.9	15.3	−27.6	40.0

where deposits (D), considered as money (M), depend negatively on the risk-free government bonds' interest rate being the opportunity cost of holding money. Due to the religious motivations, ψ is expected to be much lower for Islamic banks than for conventional banks (Khan and Khanna 2012).

The demand for loans (L_i^d) which a bank faces is assumed to depend on the interest rate on loans (r_l):

$$L_i^d = \varphi_1 r_l. \tag{2}$$

Equation (2) can also apply to Islamic banks, as Islamic banks indirectly use the government Treasury-bill rate as a benchmark for their products for financing (State Bank of Pakistan 2009).[6]

The supply of bank loans (L_i^s) depends on the amount of money (or deposits) available and interest rate on loans. L_i^s also depends (negatively) on the monetary policy rate directly, as the same is considered to be the opportunity cost of bank loans on their assets side as well as the cost of interbank financing on the liability side of the banks' balance sheet. The function remains the same, as Islamic banks are expected to behave like conventional banks—i.e., loans are positively related to the markup/profit rate and negatively related to conventional policy rate:

$$L_i^s = \mu_i D_i + \varphi_2 r_l - \varphi_3 r. \tag{3}$$

It is also assumed that the impact of change of monetary policy through deposits is lower, the higher the bank liquidity (x_i) is:

$$\mu_i = \mu_0 - \mu_1 x_i. \tag{4}$$

In comparison with conventional banks, Islamic banks are more liquid because of the limited financing avenues in the initial stage of their operations.

Inserting (1) and (4) into (3), we get

$$L_i^s = (\mu_0 - \mu_1 x_i)(-\psi r + \chi) + \varphi_2 r_l - \varphi_3 r. \tag{3a}$$

[6] In our specifications and to control for demand-side effects, we also include the large-scale manufacturing index as a proxy for GDP.

Also from (2), we get r_l:

$$r_l = \frac{-L_i^d}{\varphi_1}. \tag{2a}$$

We substitute (2a) into (3a) to get

$$L_i^s = (\mu_0 - \mu_1 x_i)(-\psi r + \chi) + \frac{\varphi_2(-L_i^d)}{\varphi_1} - \varphi_3 r. \tag{3b}$$

Since in equilibrium $L_i^d = L_i^s = L_i$, we replace the values accordingly and solve for L_i:

$$L_i = (\mu_0 - \mu_1 x_i)(-\psi r + \chi) + \frac{\varphi_2(-L_i)}{\varphi_1} - \varphi_3 r \tag{3c}$$

$$L = \frac{-(\mu_0\psi + \varphi_3)\varphi_1 r + \varphi_1\mu_1\psi x_i r - \varphi_1\mu_1\chi x_i + \varphi_1\mu_0\chi}{\varphi_1 + \varphi_2}. \tag{3d}$$

Hence,

$$L_i = constant + c_0 r + c_1 r x_i + d x_i, \tag{3e}$$

where $c_1 = \frac{\varphi_1\mu_{1\psi}}{\varphi_1+\varphi_2}$ is the coefficient on the interaction term of liquidity and the policy rate, and it captures the banks' response to a monetary shock depending upon their liquidity position. A statistically significant and economically relevant c_1 implies that monetary policy does affect the loan supply.[7] The identification requires that the interest rate sensitivity of loan demand observed by a bank is uncorrelated with its liquidity (x_i), i.e., φ_1 is the same for all banks. However, in our robust estimation we control for the demand-side impact as well by including the large-scale manufacturing index (LSM) and interacting the same with liquidity. This is equivalent to allowing for different values of φ_1 across various bank sizes and types with different liquidity. A priori, large banks are less likely to react to a

[7]We also replace the large bank dummy with "size" (total assets) and interact it with liquidity and the monetary policy measure, as robustness of the baseline specification (in which small and large bank dummies are interacted with liquidity and the monetary policy measure). The premise is that large banks, regardless of their liquidity position, can insulate themselves from a monetary shock through funding from capital markets and issuance of wholesale deposits.

monetary impulse, as these banks face fewer informational problems and resultant market frictions. Therefore, due to easier access to capital market and the issuance of wholesale deposits, large banks are *less* likely to cut their lending, irrespective of their liquidity position. Similarly, Islamic banks will not be responsive to monetary policy conditions because of (i) the religiosity of their depositors, and (ii) their strong liquidity position. For estimation, we introduce some dynamics in the final equation and closely follow Kashyap and Stein (2000). 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.

In sum, we estimate the following equation (5):

$$\Delta \log(L_{it}) = c_i + \sum_{j=1}^{m} \alpha_j \Delta \log(L_{it-j}) + \sum_{j=0}^{m} \mu_j \Delta R_{t-j} + \Theta T_t + \sum_{k=1}^{m} \rho_k \mathit{Quarter}_{kt} + X_{it-1} \left(\eta + \sum_{j=0}^{m} \varphi_j \Delta R_{t-j} \right) + \varepsilon_{it}, \tag{5}$$

where c_i is the bank i specific fixed effect;[8] $\Delta \log(L_{it-j})$ 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 $t-j$; T_t is the time trend; $\mathit{Quarter}_{kt}$ is the dummy for quarter k in year:quarter t; and X_{it-1} is 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 cross-sectional and time-series derivatives of equation (5) explain the correspondence we assess in the data. The cross-sectional derivative, $\frac{\partial \dot{L}_{it}}{\partial X_{it-1}}$, determines the sensitivity of bank i's lending to its *liquidity position* in the last quarter. The time-series derivative, $\frac{\partial \dot{L}_{it}}{\partial \dot{R}_t}$, captures the sensitivity of lending of bank i to *monetary impulses*. This derivative establishes the direct responsiveness of

[8] Our main results are unaffected if we exclude the set of bank fixed effects.

bank lending to monetary policy on average, irrespective of individual bank characteristics.

We want to test how the sensitivity of bank lending to monetary policy of an individual bank depends on its liquidity position, which can be captured through a second cross partial derivative, $\frac{\partial^2 \dot{L}_{it}}{\partial X_{it-1} \cdot \partial \dot{R}_t}$. Instead, the second cross partial derivative, $\frac{\partial^2 \dot{L}_{it}}{\partial \dot{R}_t \cdot \partial X_{it-1}}$, measures the sensitivity of bank credit to monetary policy, and the hypothesis is that this sensitivity is higher for banks with weak liquidity positions. Both these derivatives use the cross-sectional *and* the time-series properties of the data.

The main hypothesis is that contractionary monetary policy affects the small 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., $\sum \varphi$. The correctness of the aforementioned hypothesis requires this coefficient to be positive and statistically significant, i.e., lending by small liquid banks is less sensitive to a monetary shock than lending by other small banks.[9]

Equation (5) 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 funds from capital markets and issue wholesale 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 (5) including dummies both for large banks and Islamic banks. Both dummies are interacted then with all coefficients, except the trend, quarter, and province shares. We also replace the bank-specific effects with these province shares, which are constructed by calculating for each bank the relative number of branches it has in each province.

[9]For large banks, the interaction term is equivalent to evaluating the hypothesis $\frac{\partial^3 \dot{L}_{it}}{\partial X_{it-1} \partial \dot{R}_t \partial Size_{it-1}} < 0$, i.e., the impact that more-liquid banks decrease their lending less than other banks decreases as the size of the banks increases. This means that the liquidity constraint is not effective for the largest banks, as they can easily raise funds from capital markets and issue wholesale deposits. Therefore, these banks are more likely to maintain their lending after a monetary shock, regardless of their liquidity positions.

In robustness, and to further control for the business cycle and loan demand, we also include change in the large-scale manufacturing index (LSM). Equation (6) equals

$$\begin{aligned}\Delta \log(L_{it}) = c_i &+ \sum_{j=1}^{m} \alpha_j \Delta \log(L_{it-j}) + \sum_{j=0}^{m} \mu_j \Delta R_{t-j} \\ &+ \sum_{j=0}^{m} \pi_j LSM_{t-j} + \Theta T_t + \sum_{k=1}^{3} \rho_k Quarter_{kt} \\ &+ X_{it-1} \left(\eta + \sum_{j=0}^{m} \varphi_j \Delta R_{t-j} + \sum_{j=0}^{m} \gamma_j LSM_{t-j} \right) + \varepsilon_{it}. \end{aligned} \tag{6}$$

4. Results

4.1 All Banks

Table 7 presents the results of the preliminary regression—i.e., equation (5)—estimated using the observations for 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, individual liquidity, and time trend are not shown. All estimates are in percentage terms and we report White (1980) heteroskedasticity-consistent standard errors that are clustered at the year:quarter level (we also check estimates when standard errors are clustered at the bank level, but the significance levels are mostly unaffected).

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 equals -5.83^{***}.[10] Hence, an increase in the interest rate by 1 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

[10] As in the tables, we star (the sum of) the estimated coefficients according to their significance levels. *** denotes significance at 1 percent, ** significance at 5 percent, and * significance at 10 percent.

Table 7. Loan Growth, All Banks

This table reports the sum of the estimated coefficients for specifications with the dependent variable $\Delta \log(L_{it})$, 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 are j lags of the dependent variable, ΔR_{t-j} is the quarterly change in the three-month Treasury-bill rate in year:quarter $t-j$, 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, and ΔLSM_{t-j} is the quarterly change in the large-scale manufacturing index in year:quarter $t-j$. The estimations use 756 bank year:quarter observations. Standard errors are heteroskedasticity consistent and clustered at the year:quarter level. *** denotes significance at 1 percent, ** significance at 5 percent, and * significance at 10 percent.

(Sum of) Estimated Coefficients	**Preliminary** (1)	**GMM/2SLS** (2)	**R = KIBOR** (3)	**With Bank Province Shares** (4)	**With Large-Scale Manufacturing Index** (5)
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	0.34^{***}	0.25^{*}	0.36^{***}	0.40^{***}	0.35^{***}
$\sum_{j=0}^{4} \Delta R_{t-j}$	-5.83^{***}	-5.8^{***}	-3.69^{***}	-5.95^{***}	-5.56^{***}
$X_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$	20.71^{*}	21.72	15.01	19.22	25.42
$\sum_{j=0}^{4} \Delta LSM_{t-j}$					0.32^{*}
Quarter Dummies, Trend	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	No	Yes
Bank Province Shares	No	No	No	Yes	No

the interest rate (as in Kashyap and Stein 2000).[11] 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).

A fixed-effects model may create a correlation between lagged dependent variable ΔL_{it-1} and the error term, causing the "Nickel bias" as described, for example, in Verbeek (2008). However, this bias is expected to be negligible if the time period is substantial (Judson and Owen 1999). In our case it is thirty-two quarters, which is sufficiently large. Nevertheless, to ensure the validity of our results we also estimate equation (5) using a two-stage least-squares method (first-stage GMM). Specifically, we employ in model (2) the Arellano and Bover (1995) approach (with the second lag of the dependent variable in level as an instrument, which is valid according to a Sargan 1958 test). There is only a very small change in results.

To further check the robustness of these estimates, we replace the three-month Treasury-bill rate with the KIBOR in model (3) and the six-month Treasury bill (results not shown). The sum of the estimated coefficients on the changes in the interest rates equals -3.69^{***} and -5.12^{***}, respectively, while the sum of the estimated coefficients on the interaction term with liquidity equals 20.71 and 15.42. Individual liquidity coefficients are insignificant for all specifications.

To control better for 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 LSM. Estimates are mostly unaffected.

4.2 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

[11] We also use liquid assets to deposits as a liquidity measure instead of liquid assets to total assets. This measure incorporates the changes in the deposits as a result of monetary policy impulses. The new estimates corroborate the earlier findings.

dummies for large and Islamic banks with all independent variables (except with the trend, season, and province shares). Table 8 exhibits the results for various specifications. Panel A provides the sum of the estimated coefficients, while panel B provides for the baseline model (1) the estimated *individual* coefficients for the included lags (which are, as in Kashyap and Stein 2000, broadly in line with the sums).

The baseline model (1) indicates that the small banks especially 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 1 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 equals 25.06**.

To assess if the estimated coefficients also have economically relevant implications, we need to calculate the response in lending by similar-sized banks, but with different liquidity positions, to a monetary policy shock. Using the liquidity distribution of small banks in 2010:Q1, we consider a bank at the ninth decile a "liquid" bank and at the first decile an "illiquid" bank. The liquidity ratios according to this criterion are 24 and 5 percent, respectively. Under this scenario, a 1-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 a one-year time period. This is calculated through multiplying $\sum \varphi$ by the 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 capital market (other than from demand 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' coefficients, there is a 12.2 percent gap in the level of lending across liquid and illiquid 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

Table 8. Loan Growth, Across Bank Type

This table reports the sum of the estimated coefficients for specifications with the dependent variable $\Delta \log(L_{it})$, 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 are j lags of the dependent variable, ΔR_{t-j} is the quarterly change in the three-month Treasury-bill rate in year:quarter $t-j$, ΔLSM_{t-j} is the quarterly change in the large-scale manufacturing index 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. Standard errors are heteroskedasticity consistent and clustered at the year:quarter level. *** denotes significance at 1 percent, ** significance at 5 percent, and * significance at 10 percent.

A. Sum of Estimated Coefficients

(Sum of) Estimated Coefficients	**Bank Type**	**Baseline (1)**	**GMM/2SLS (2)**	**R = KIBOR (3)**	**With Bank Province Shares (4)**	**With Large-Scale Manufacturing Index (5)**
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	Small	0.36^{***}	0.26^{**}	0.39^{***}	0.43^{***}	0.37^{***}
	Large	0.15	-0.03	0.29^{**}	0.15	0.09
Difference from	Islamic	0.08	0.10	0.06	0.21^{***}	0.06
Small Banks	*Large*	*−0.21*	−0.29	*−0.10*	*−0.28***	−0.28
	Islamic	*−0.28**	−0.15	*−0.33***	*−0.23*	−0.30*
$\sum_{j=0}^{4} \Delta R_{t-j}$	Small	-7.17^{***}	-7.33^{***}	-4.26^{***}	-7.12^{***}	-7.21^{***}
	Large	7.06^{*}	7.97	4.99	4.43	11.13^{***}
Difference from	Islamic	2.05	3.91^{*}	3.85	−2.95	−3.38
Small Banks	*Large*	*14.23****	15.30^{***}	*−9.25***	*−11.60****	18.34^{***}
	Islamic	*9.22**	11.24^{*}	*−8.12***	4.17	3.83

(continued)

Table 8. (Continued)

A. Sum of Estimated Coefficients						
(Sum of) Estimated Coefficients	**Bank Type**	**Baseline (1)**	**GMM/2SLS (2)**	**R = KIBOR (3)**	**With Bank Province Shares (4)**	**With Large-Scale Manufacturing Index (5)**
$X_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$	Small	25.06^{**}	26.90^{*}	18.24^{*}	22.88^{*}	31.05^{*}
	Large	-39.20	-41.35	-28.83	-17.40	-62.24^{***}
Difference from	Islamic	-31.83	-36.32	-27.29^{*}	-19.90	-0.42
Small Banks	*Large*	-64.26^{**}	-68.25^{**}	-47.08	-40.28^{*}	-93.28^{***}
	Islamic	-56.90^{***}	-63.22^{**}	-45.54^{**}	-42.78^{**}	-31.47
$\sum_{j=0}^{4} \Delta LSM_{t-j}$	Small					0.20
	Large					0.87^{**}
Difference from	Islamic					0.99
Small Banks	*Large*					0.67
	Islamic					0.79
$X_{it-1} * \sum_{j=0}^{4} \Delta LSM_{t-j}$	Small					-0.81
	Large					-5.17^{**}
Difference from	Islamic					-4.35^{*}
Small Banks	*Large*					-4.36
	Islamic					-3.54
Quarter Dummies, Trend		Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects		Yes	Yes	Yes	No	Yes
Bank Province Shares		No	No	No	Yes	No

(continued)

Table 8. (Continued)

B. Baseline Specification (1)						
(Sum of) Estimated Coefficients	**Bank Type**	***Lags: j = 0***	***j = 1***	***j = 2***	***j = 3***	***j = 4***
$\Delta \log(L_{it-j})$	Small		-0.05	0.23^{***}	0.22^{***}	-0.04
	Large		-0.03	-0.25^{***}	-0.25^{***}	0.33^{***}
Difference from Small Banks	*Islamic*		-0.11	-0.01	-0.21^{***}	0.04
ΔR_{t-j}	Small	-1.16	-3.86^{***}	-0.03	-0.81	-1.31^{***}
	Large	6.04^{***}	8.59^{***}	-2.67	0.58	1.69
Difference from Small Banks	*Islamic*	7.19^{**}	1.55	-4.18^{*}	6.39^{**}	-1.72
$X_{it-1} * \Delta R_{t-j}$	Small	18.18^{**}	5.57	-17.74	10.29^{***}	8.76^{*}
	Large	-32.94^{**}	-42.13^{**}	28.76	-11.52	-6.44
Difference from Small Banks	*Islamic*	-33.39^{**}	-16.71	36.54^{**}	-40.86^{**}	-2.48

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, their share of fixed deposits to total deposits is higher than that of 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 Islamic banks 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 equals −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 use Arellano and Bover (1995) in model (2), replace the three-month Treasury-bill rate with the KIBOR in model (3) and the six-month Treasury-bill rate (results not shown), and introduce bank province shares and the change in large-scale manufacturing in models (4) and (5). Results are mostly unaffected and show 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. We further test whether there is any significant difference in lending response of banks to contractionary and expansionary monetary policy. The unreported results show that the difference in banks' lending response to both phases of monetary policy is insignificant.

4.3 Robustness

Clienteles and their demand could still differ between bank types—i.e., small and large conventional and Islamic—in a way that is not identifiable by the strategy in Kashyap and Stein (2000). In table 9 we therefore "horserace" other bank characteristics capturing specific clientele demand with bank type. In particular, the following bank characteristics are introduced "side by side" with bank type dummies in all relevant terms in the baseline model (i.e., model (1) from table 8): (i) *Non-Performing Loans* (non-performing loans over total assets), (ii) *Non-Lending Business* (non-lending-based earning assets over total earning assets), (iii) *Non-Deposit Funding* (funding by other than deposits over total funding), (iv) *Lending Rate* (interest income on loans granted to the private sector over average loans granted to the private sector), (v) *ROA* (return on assets), and (vi) *Fixed Assets* (fixed assets over total assets). Results are mostly unaffected, suggesting that it is bank type per se and not clientele and/or other bank characteristics that determines our findings.

In addition to the six banks (out of forty) that are licensed by the Banking Policy and Regulation Department of the State Bank of Pakistan as (*shariah*-compliant) full-fledged Islamic banks, five large and eight small banks are licensed to operate Islamic branches as well as conventional ones. These so-called "mixed" banks actually keep two separate balance sheets for their conventional and Islamic branches, respectively. In table 10 we therefore also study the impact through the Islamic share (by assets) of the banks in panel A and through the Islamic branches of the large and small mixed banks (adding their conventional branches to the set of small and large conventional banks) in panel B. We again turn to the baseline model (i.e., model (1) from table 8) augmented by the respective additional variables.

In panel A of table 10, the results confirm our findings so far. Indeed, take the interaction terms of bank liquidity and changes in the interest rate for the pure conventional small banks. The estimated coefficient equals 25.16^{**}. For the (pure) Islamic small banks, the estimated coefficient then equals $25.16^{**} + (100 \times -0.61^{***}) = -35.84$, which is not different from the estimated coefficient for the pure conventional large banks, which equals -55.84^{***}.

In panel B the estimates on the coefficients for Islamic banks remain similar, even though now the benchmark category is

Table 9. Loan Growth, Across Bank Type: Baseline Specification Augmented with Additional Bank Characteristics

This table reports the sum of the estimated coefficients for baseline specifications with the dependent variable $\Delta \log(L_{it})$, 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 are j lags of the dependent variable, ΔR_{t-j} is the quarterly change in the three-month Treasury-bill rate in year:quarter $t-j$, 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, and B_{it-1} is the additional bank characteristic which varies by column: Non-Performing Loans is the amount of non-performing loans over total assets, Non-Lending Business is the non-lending-based earning assets over total earning assets, Non-Deposit Funding is the funding other than deposits over total funding, the Lending Rate is the interest income on loans granted to the private-sector over average loans granted to the private sector, ROA is return on assets, and Fixed Assets is the fixed assets over total assets. The estimations use 756 bank year:quarter observations. Standard errors are heteroskedasticity consistent and clustered at the year:quarter level. *** denotes significance at 1 percent, ** significance at 5 percent, and * significance at 10 percent.

(Sum of) Estimated Coefficients	**Additional Bank Characteristic/ Bank Type**	**Non-Performing Loans (1)**	**Non-Lending Business (2)**	**Non-Deposit Funding (3)**	**Lending Rate (4)**	**ROA (5)**	**Fixed Assets (6)**
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	Small	0.33^{***}	0.42^{***}	0.32^{***}	0.39^{***}	0.39^{***}	0.35^{***}
	Large	0.15	0.14	0.15	0.08	0.20	0.16
Difference from	Islamic	0.05	0.15	0.10	0.06	0.06	0.13
Small Banks	*Large*	-0.18	-0.28^{*}	-0.16	-0.31^{**}	-0.19	-0.19
	Islamic	-0.28^{*}	-0.27^{*}	-0.22	-0.33^{**}	-0.33^{*}	-0.21
$\sum_{j=0}^{4} \Delta R_{t-j}$	Small	-8.03^{***}	-8.62^{***}	-10.65^{***}	-5.04^{*}	-6.61^{***}	-6.27^{***}
	Large	5.42	3.61	6.29	9.59^{*}	5.05	8.07
Difference from	Islamic	2.03	-0.75	0.46	5.12	1.53	1.95
Small Banks	*Large*	13.45^{***}	12.23^{***}	16.94^{***}	14.63^{***}	11.66^{***}	14.35^{***}
	Islamic	10.06^{**}	7.88	11.10^{**}	10.15^{**}	8.14	8.22^{**}

(continued)

Table 9. (Continued)

(Sum of) Estimated Coefficients	Additional Bank Characteristic/ Bank Type	Non-Performing Loans (1)	Non-Lending Business (2)	Non-Deposit Funding (3)	Lending Rate (4)	ROA (5)	Fixed Assets (6)
$X_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$	Small	28.42^{**}	78.69^{***}	44.89^{*}	17.75	20.89	24.22^{*}
	Large	-27.75	28.73	-36.58	-46.92	-23.03	-44.61
Difference from	Islamic	-32.33	33.73	-21.95	-39.13	-27.30	-29.42^{*}
Small Banks	*Large*	-56.17	-49.96	-81.46^{***}	-64.67^{**}	-43.92	-68.83^{**}
	Islamic	-60.75^{***}	-44.96^{*}	-66.83^{***}	-56.87^{***}	-48.19^{*}	-53.64^{***}
B_{it-1}		-0.07	0.00	-0.21^{***}	0.09	-0.25	-0.05
$B_{it-1} * X_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$		-0.78	-1.79^{***}	-0.70	2.21	-10.03	1.18
$B_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$		0.12^{*}	0.12	0.14^{**}	-0.62	1.27	-0.33
$B_{it-1} * X_{it-1}$		-0.87	1.54^{***}	0.41	-0.03	5.95	3.28
Quarter Dummies, Trend		Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes

Table 10. Loan Growth, Across Bank Branch Type: Augmented Baseline

This table reports the sum of the estimated coefficients for a baseline specification with the dependent variable $\Delta \log(L_{it})$, 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 are j lags of the dependent variable, 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. In panel A, we also perform an exercise where we use a continuous measure of Islamic share. For pure Islamic banks, the value "Islamic Share" is 100, for pure conventional banks this is 0, and for mixed banks the measure varies between 0 and 100. In panel B, we split the balance sheet of the thirteen mixed banks, five of which are large and eight of which are small, into their conventional and Islamic branches. The estimations therefore use 982 bank (branch type) year:quarter observations. Standard errors are heteroskedasticity consistent and clustered at the year: quarter level. *** denotes significance at 1 percent, ** significance at 5 percent, and * significance at 10 percent.

A. Baseline Specification Augmented by Islamic Share

(Sum of) Estimated Coefficients	**Bank Type**	**Augmented Baseline**	
		Conventional	**Islamic Share**
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	Small Banks	0.36^{***}	0.003^{***}
	Large Banks	-0.06^{***}	-0.03
Difference from Small Conventional Banks	*Large Banks*	-0.42^{***}	
$\sum_{j=0}^{4} \Delta R_{t-j}$	Small Banks	-7.23^{***}	0.10^{**}
	Large Banks	11.73^{***}	-17.42^{***}
Difference from Small Conventional Banks	*Large Banks*	18.96^{***}	
$X_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$	Small Banks	25.16^{**}	-0.61^{***}
	Large Banks	-55.84^{***}	113.60^{***}
Difference from Small Conventional Banks	*Large Banks*	-81.00^{***}	

(continued)

Table 10. (Continued)

B. Baseline Specification Augmented by Islamic Branches			
(Sum of) Estimated Coefficients	**Bank Type**	**Augmented Baseline**	
		Small	**Large**
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	Conventional Banks and Conventional Branches of Mixed Banks	0.35^{***}	0.08
Difference from Small Conventional Banks and Conventional Branches of Small Mixed Banks	Islamic Branches of Mixed Banks	-0.22	0.71^{***}
	Islamic Banks	0.06	
	Conventional Banks and Conventional Branches of Mixed Banks		-0.28^{**}
	Islamic Branches of Mixed Banks	-0.58^{***}	0.36^{*}
	Islamic Banks	-0.29^{*}	
$\sum_{j=0}^{4} \Delta R_{t-j}$	Conventional Banks and Conventional Branches of Mixed Banks	-6.43^{***}	3.40^{*}
Difference from Small Conventional Banks and Conventional Branches of Small Mixed Banks	Islamic Branches of Mixed Banks	-3.91	0.11
	Islamic Banks	1.54	
	Conventional Banks and Conventional Branches of Mixed Banks		9.83^{***}
	Islamic Branches of Mixed Banks	2.52	6.54^{**}
	Islamic Banks	7.96^{*}	

(continued)

Table 10. (Continued)

B. Baseline Specification Augmented by Islamic Branches			
(Sum of) Estimated Coefficients	**Bank Type**	**Augmented Baseline**	
		Small	**Large**
$X_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$	Conventional Banks and Conventional Branches of Mixed Banks	24.27*	−18.34
Difference from Small Conventional Banks and Conventional Branches of Small Mixed Banks	Islamic Branches of Mixed Banks	1.82	21.38
	Islamic Banks	−29.56	
	Conventional Banks and Conventional Branches of Mixed Banks		−42.61**
	Islamic Branches of Mixed Banks	−22.45	−2.89
	Islamic Banks	−53.83***	
Quarter Dummies, Trend		Yes	
Bank Fixed Effects		Yes	

somewhat altered (i.e., it no longer comprises the Islamic branches of the small mixed banks). The estimates on the coefficients of the Islamic branches of large mixed banks and the Islamic branches of small mixed banks, and their difference from the benchmark category of small conventional banks and conventional branches of small mixed banks, are also very interesting. The estimates suggest a similar though more muted reaction from Islamic branches (of mixed banks) than from Islamic banks, even though the estimates (and their differences from the benchmark category) are not always statistically significant. There is one mixed bank that is public; it is also small. So in unreported regressions we further split the Islamic branches of the small mixed banks into private and public but find no further differences.

Next we investigate the results for different levels of interest rates, i.e., to assess across bank type the existence of any nonlinearity in the impact of monetary conditions (e.g., Thoma 1994; Weise 1999). In table 11 we show the estimates for the baseline model ((1) in table 8) that also includes dummies for high and low Treasury-bill rates (above and below median). The table reports the sum of the estimated coefficients from this one specification in the first two adjacent columns, while the third column reports the difference and its statistical significance based on a Wald test of the High – Low = 0 equality restriction. The estimates suggest that there are statistically no differences in the reaction to monetary conditions for small banks between periods with high and low Treasury-bill rates. However, the differential impact of liquidity is stronger for these banks during the time of low interest rates than in the period of high interest rates. The potential explanation for this difference is that when the interest rates are low, the changes (increase) in interest rates are more consistent and higher than when interest rates are high. Also, reactions of the large Islamic banks in times of low interest rates are stronger than when interest rates are high.

Finally, we investigate the impact of monetary conditions on the interest rate charged by banks (lending rate). We calculate the lending rate as the interest income on loans granted to the private sector over average loans granted to the private sector. In table 12 we introduce (the quarterly change of) this new dependent variable in the baseline model (i.e., model (1) from table 8). Recall that in principle Islamic banks do not charge any interest, so for these banks

Table 11. Loan Growth, Across Bank Type: For the Baseline Regression Banks' Response at High and Low Level of the Policy Rate

This table reports the sum of the estimated coefficients for the baseline specification with the dependent variable $\Delta \log(L_{it})$, 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 specification also includes dummies for high and low Treasury-bill rates (above and below median). The table reports the sum of the estimated coefficients from this one specification in two adjacent columns. Column 3 reports the difference and its statistical significance based on a Wald test of the High – Low = 0 equality restriction. The independent variables are $\Delta \log(L_{it-j})$, which are j lags of the dependent variable, 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. Standard errors are heteroskedasticity consistent and clustered at the year:quarter level. *** denotes significance at 1 percent, ** significance at 5 percent, and * significance at 10 percent.

(Sum of) Estimated Coefficients	**Bank Type**	**High Treasury-Bill Rate**	**Low Treasury-Bill Rate**	**Wald Test: High – Low = 0**
$\sum_{j=1}^{4} \Delta \log(L_{it-j})$	Small	0.37^{***}		
	Large	0.28^{*}		
Difference from Small Banks	Islamic	0.07		
	Large	-0.10		
	Islamic	-0.30^{**}		

(continued)

Table 11. (Continued)

(Sum of) Estimated Coefficients	Bank Type	High Treasury-Bill Rate	Low Treasury-Bill Rate	Wald Test: High − Low = 0
$\sum_{j=0}^{4} \Delta R_{t-j}$	Small	-8.52^{***}	-8.53^{***}	0.01
	Large	3.06	8.09^{**}	-5.03^{***}
Difference from Small Banks	Islamic	1.01	7.86	1.01^{*}
	Large	11.58^{***}	16.62^{***}	-5.04^{***}
	Islamic	9.53^{***}	16.39^{***}	-6.86^{***}
$X_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$	Small	18.73	29.02^{**}	-10.29^{**}
	Large	−19.25	-51.99^{*}	32.74^{***}
Difference from Small Banks	Islamic	-46.61^{**}	-55.02^{**}	8.41
	Large	−37.97	-81.01^{***}	43.03^{***}
	Islamic	-65.33^{***}	-84.03^{***}	18.70^{*}
Quarter Dummies, Trend		Yes	Yes	Yes
Bank Fixed Effects		Yes	Yes	Yes

Table 12. Change in the Lending Rate, Across Bank Type

This table reports the sum of the estimated coefficients for the baseline specification with the alternative dependent variable $\Delta LRATE_{it}$, which is the quarterly change in the net interest income on loans granted to the private sector over total loans granted to the private sector by bank i in year:quarter t. The independent variables are $\Delta \log(LRATE_{it-j})$, which are j lags of the dependent variable, ΔR_{t-j} is the quarterly change in the three-month Treasury-bill rate in year:quarter $t-j$, 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, and B_{it-1} is the bank characteristics, which varies in each column and mentioned in the first row of the table. The estimations use 756 bank year:quarter observations. Standard errors are heteroskedasticity consistent and clustered at the year:quarter level. *** denotes significance at 1 percent, ** significance at 5 percent, and * significance at 10 percent.

(Sum of) Estimated Coefficients	**Bank Type**	**Without Liquidity Interaction**	**With Liquidity Interaction**
$\sum_{j=1}^{4} \Delta \log(LRATE_{it-j})$	Small	-1.69^{***}	-1.73^{***}
	Large	-2.04^{***}	-2.04^{***}
Difference from Small Banks	Islamic	-1.50^{***}	-1.51^{***}
	Large	-0.35	-0.31
	Islamic	0.19	0.22
$\sum_{j=0}^{4} \Delta R_{t-j}$	Small	1.02^{***}	0.95^{***}
	Large	1.40^{***}	1.53^{*}
Difference from Small Banks	Islamic	1.38^{***}	1.75^{**}
	Large	0.38	0.58
	Islamic	0.35^{**}	0.81
$X_{it-1} * \sum_{j=0}^{4} \Delta R_{t-j}$	Small		0.96
	Large		-2.01
Difference from Small Banks	Islamic		-2.08
	Large		-2.97
	Islamic		-3.04
Quarter Dummies, Trend		Yes	Yes
Bank Fixed Effects		Yes	Yes

the interest income is a markup which has to be calculated on the basis of all outstanding contracts (that may often have equity-like features). Despite the difficulties of the comparison involved, the estimates (though not always statistically significant) are consistent with those on the quantity side.

5. Conclusion

The fast growth of Islamic banking and finance across the world raises an important question to academics and policymakers alike: Will the transmission of monetary policy through the bank lending channel be altered when the Islamic segment of the banking sector becomes significantly larger? The bank lending channel importantly depends on the ability of the central bank to affect bank loan supply. For that it matters whether banks can or cannot attract (time) deposits perfectly elastically at interest rates outside the control of the central bank and whether they consider the loans granted and securities held in portfolio as perfect substitutes.

Islamic banks may, on the one hand, be unable or unwilling to issue wholesale time deposits at a fixed rate and may not consider their Islamic loans substitutable for any of the securities they would alternatively 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 into for religious reasons by depositors and borrowers (Baele, Farooq, and Ongena 2012; Khan and Khanna 2012). These contractual and motivational features on both their liability and asset sides may allow Islamic banks to shield themselves from monetary policy shocks. Thus, in the end, whether Islamic banks transmit monetary policy differently than conventional banks is an empirical question, which we address in this paper.

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:Q2 and 2010:Q1. 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 is likely to weaken when Islamic banking grows in relative importance, assuming of course that the characteristics of Islamic banks will not change as the sector grows larger.

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