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## Are Islamic Banks More Resilient during Financial Panics?

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## **IMF Working Paper**

Research Department and Strategy, Policy, and Review Department

### **Are Islamic Banks More Resilient during Financial Panics?\***

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### **Abstract**

Rapid growth of Islamic banking in developing countries is accompanied with claims about its relative resilience to financial crises as compared to conventional banking. However, little empirical evidence is available to support such claims. Using data from Pakistan, where Islamic and conventional banks co-exist, we compare these banks during a financial panic. Our results show that Islamic bank branches are less prone to deposit withdrawals during financial panics, both unconditionally and after controlling for bank characteristics. The Islamic branches of banks that have both Islamic and conventional operations tend to attract (rather than lose) deposits during panics, which suggests a role for religious branding. We also find that Islamic bank branches grant more loans during financial panics and that their lending decisions are less sensitive to changes in deposits. Our findings suggest that greater financial inclusion of faith-based groups may enhance the stability of the banking system.

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## 1. Introduction

Maturity transformation, that is, the conversion of short term liabilities into long term assets, is a core function of banks. Therefore, by the very nature of their business, banks hold a mix of illiquid assets and liquid liabilities which exposes them to liquidity mismatch risk. This, in turn, may lead to bank runs and insolvency (Diamond and Dybvig (1983)). As history painfully illustrates, bank runs sometimes occur just because of rumor mongering about the health of the financial sector, regardless of the actual financial strength of individual banks. This kind of panic situation can test the resilience of banking systems—for example one that comprises relatively new faith-based financial institutions such as Islamic banks—during liquidity crises. However, research into the behavior of Islamic banks compared to conventional banks during financial stress is limited.

In this paper we examine the impact of a financial panic on the deposit and lending behavior of Islamic and conventional banks in Pakistan, where no explicit deposit insurance exists.<sup>1</sup> Starting in the last week of September 2008, the banking sector in Pakistan faced massive deposit withdrawals induced by rumors in the media about the potential failure of several financial institutions. These withdrawals led to a severe liquidity crunch. Demand deposits in the banking sector continuously fell over a period of seven weeks (from September 27, 2008 to November 14, 2008). In just three weeks (from September 27, 2008 through October 18, 2008), demand deposits declined by 4 percent or 131 billion PKR (Pakistani Rupee). The panic was contained within about two months through central bank interventions aimed at restoring liquidity in the banking sector.

We find that Islamic banks (in particular, Islamic bank branches and subsidiaries) experienced less deposit withdrawals than conventional banks and some even recorded increase in deposits during this panic, leading to an average inflow of deposits into Islamic branches and subsidiaries over the period. This result holds in a variety of specifications with and without bank characteristics, and suggests a role for ‘religious branding’. As a result, Islamic banks were better able to maintain the supply of credit to the real economy during the financial panic. We also find that lending by Islamic banks is less sensitive to the change in deposits than it is for their conventional counterparts.

Earlier work has explored several dimensions in which Islamic banks behave differently during financial crisis. Looking at various metrics in a cross country setting, Hasan and Dridi (2010) find that the recent global financial crisis affected Islamic Banking Institutions (IBIs) differently than conventional banks (CBs). A different business model helped IBIs shield their profitability during early stages of the crisis, while weak risk management practices affected their profitability during later stages of the crisis. On balance IBIs contributed to “*financial and economic stability*” by posting higher credit and asset growth rates than conventional banks. Using the data of 141 countries over the period 1995-2007, Beck, Demirgüç-Kunt and Merrouche (2013) conclude that during the global financial crisis, Islamic banks had a higher intermediation ratio, higher asset quality and were better capitalized. They also observe a

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<sup>1</sup>A cross-country study of jurisdictions with sizeable presence of Islamic banking (for instance, Malaysia) and facing similar crisis situation could have strengthened the inferences made in this paper. However, such comparison requires access to deposits and credit registry data of other jurisdictions, which we do not have.

relatively better stock market performance of Islamic banks during the same period. However, the performance of Islamic banks is not universally superior as there are significant size effects. Using data from 18 countries with substantial presence of Islamic banking, Cihák and Hesse (2010) conclude that Islamic banks are financially stronger when they are small, however, they lose their relative strength as they grow bigger in size which reflects challenges of credit risk management in large Islamic banks. Besides Islamic banks, ability of other types of banks to use customer surplus as a cushion may improve their stability as compared to commercial banks. Cihák and Hesse (2007) show that owing to their ability to use customer surplus during weaker periods, cooperative banks (i.e. mutual banks and credit unions) had less volatile earnings and were more stable than commercial banks in 29 OECD member states from 1994 to 2004. They further find that the presence of cooperative banks had an overall positive impact on the stability of the banking sector. Our study adds to the literature on performance of Islamic and conventional banking sectors during crisis periods by examining banks of all sizes. Moreover, we contribute to the literature by combining *weekly data on deposits and credit register* to gauge the impact of financial panic on deposits and, in turn, lending behavior of conventional as well as Islamic banking institutions.

This paper also contributes to the literature on the evidence of transmission of financial sector shock to the real sectors of the economy as documented by Kapan and Minoiu (2013), de Haas and van Horen (2013), Giannetti and Laeven (2012), Ivashina and Scharfstein (2010), and Khwaja and Mian (2008) among others. For example, Kapan and Minoiu (2013) use variation in banks' dependence on wholesale funding and their structural liquidity in 2007Q2 to gauge the impact of financial turmoil in bank funding markets during the global financial crisis on the supply of corporate loans. Their findings suggest that banks with stronger balance sheets, that is, banks with more high-quality capital and in a better structural liquidity position before the crisis, were better able to sustain the supply of credit to firms. Their findings complement a growing body of literature that establishes a causal link between financial sector shocks and bank lending, with evidence drawn both from international corporate loans (de Haas and van Horen (2013), Giannetti and Laeven (2012), Ivashina and Scharfstein (2010)) and domestic loans (Khwaja and Mian (2008)). Our contribution to this strand of literature is to determine whether financial panics affect Islamic and conventional banks differently, while controlling for banks' financial strength, in the context of an emerging market economy.

We approach this question in two steps. First, we determine whether the rumor-mongering regarding the health of Pakistani banks that prevailed in media outlets during September-October 2008 resulted in deposit withdrawals of different magnitudes across banks, and hence a different liquidity shock. Second, we assess whether the change in deposits affected banks' lending behavior, and whether it did so differentially for Islamic vs. conventional banks. In some of the specifications that look at the change in deposits we include bank fixed effects to compare how the Islamic and conventional operations *of the same bank* were affected during the panic. In specifications for lending we use borrower (firm) fixed effects to assess how bank credit to *the same firm* was affected by Islamic and conventional banks during the same period. Firm fixed effects control for possible credit demand shifts that may have occurred over the period.

How do the impacts of crises differ for Islamic and conventional banks? On one hand, a liquidity shock may be particularly perilous for Islamic banks because Islamic money markets are less developed and, in some countries, there is no lender of last resort facility. Islamic banks

may also face additional deposit withdrawal risk because they share profit and loss on investment deposits (Khan and Ahmed (2001)). On the other hand, religion-oriented depositors may be less sensitive to the rate of return on their deposits, and hence to their bank's financial strength. These counteracting forces make it important to assess the resilience and the lending behavior of Islamic banking institutions during panics and contrast it to that of conventional banks. The question is of policy relevance because if Islamic banks are more resilient during periods of financial stress, then greater financial inclusion through Islamic banking can dampen the transmission of financial shocks to the real economy.

In terms of data, we use banks' weekly liquidity positions from the State Bank of Pakistan (SBP) to measure deposit movements during the crisis period. We combine this data with loan-level information from the Pakistani credit registry, which is maintained by the Credit Information Bureau at the SBP for supervisory and regulatory purpose. Since our loan-level data refers to new *granted* loans (as opposed to loan applications), our focus is on the intensive margin of bank lending.

The remainder of the paper is organized as follows. Section 2 provides some background on Islamic banking in Pakistan. Section 3 describes the financial panic and liquidity crunch of September-October 2008. In Section 4, we describe the data and econometric specifications. Section 5 presents the results and Section 6 concludes.

## **2. Background on Islamic Banking in Pakistan**

Pakistan has a bank-centric financial system, where conventional and Islamic banks co-exist. Islamic banking started developing in the 1980s and its growth was spurred by favorable regulation in the late 1990s. The financial industry was permitted to set up regular conventional banks (CBs), full-fledged Islamic banks (IBs), and Islamic banking subsidiaries or standalone Islamic banking branches (ISs) of existing CBs. During the 2000s, the Islamic banking sector grew at double digits. Currently, there are 13 CBs, 5 full-fledged IBs, and 15 CBs with Islamic branches (representing about 7 percent of total banking sector assets) in Pakistan. For ease of exposition, we refer to IBs and ISs together as Islamic banking institutions (IBIs).

How do IBIs differ from their conventional counterparts, and how do those differences impact their behavior during a financial panic? Unlike CBs, IBIs cannot engage in interest-based lending or borrowing. Profit and loss sharing (PLS) contracts are considered to be the ideal form of financing by Islamic banks. However, due to moral hazard problem in such equity-like contracts, Islamic banks often use asset-backed fixed return arrangements like deferred payment sales (*Murabahah*), operating leases (*Ijarah*) and diminishing *musharakah* as primary modes of financing. In Pakistan these three types form over 80 percent of the total financing provided by Islamic banks whereas the share of strictly PLS contracts remains small (Baele, Farooq and Ongena (2014); Zaheer, Ongena and van Wijnbergen (2013)). Hence, the contemporary portfolio of IBIs' financing exhibits asset-backed arrangements rendering them relatively less susceptible to financing crisis.

In addition, the scarcity of appropriate *shariah*-compliant liquidity management instruments, small and underdeveloped Islamic money markets, and a lack of lender of last resort facility in some countries (due to the absence of an alternative to the discount rate) renders liquidity management an important challenge for Islamic banks (Errico and Farahbaksh (1998);

IIFM (2010)). This leads IBIs to maintain higher cash reserve buffers, which is cost inefficient. The higher unremunerated (excess) reserves are equivalent to a tax on financial intermediation (IMF (2003)), and adversely affect the performance and profitability of Islamic banks in competitive markets (Hasan and Dridi (2010)). Thus, to offset part of this disadvantage, the SBP requires Islamic banks to keep a *lower* level of Statutory Liquidity Reserves (SLR) than CBs<sup>2</sup>. The figures in Table 1, which reports excess reserves of Islamic banks (in percent of total deposits) in several countries, indicate that banks in Pakistan, especially Islamic banks, hold significantly lower reserves than in other jurisdictions.

The liability side of IBIs mainly consists of current accounts (transaction deposits), profit & loss sharing saving and investment accounts (PSIAs), and equity.<sup>3</sup> Current accounts are similar to those of CBs and can be withdrawn on demand by deposit holders. IBIs raise transaction deposits on the basis of an interest-free debt contract (*Qard*). IBIs are required to maintain a certain fraction of demand deposits as reserves either in cash or in form of *shariah*-compliant government bonds (*sukuk*). Therefore, as far as these deposits are concerned, IBIs may be affected by financial panics in the same way as CBs.

PSIAs are unique to IBIs. Since IBIs cannot mobilize funds by paying interest, they primarily use a *mudarabah* contract to raise funds in the form of PSIAs from *mudarabah* account holders (MAHs)<sup>4</sup>. MAHs, like shareholders, are contractually bound to share profit or loss subject to the outcome of the banking operations and in proportion to their investment. Therefore, neither the return nor the principal amount of PSIAs is guaranteed. As PSIA depositors share in profit and loss of the banks, they are exposed to risk of capital loss, whereas, PSIAs provide an extra line of protection to Islamic banks (besides equity) when losses occur.

Since PSIAs are not mobilized through a debt contract, MAHs are not considered creditors and, in the event of insolvency, are not the first claimants on the banks' assets. On the contrary, these accounts are not customary equity either. Unlike equity which is irredeemable, MAHs' funds are invested for a fixed period of time and withdrawals can be made from these accounts, with or without some penalty according to the individual *mudarabah* contracts. Therefore, we can think of PSIA as limited-duration equity investments.<sup>5</sup> MAH, like

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<sup>2</sup> As of May 22, 2008, the Cash Reserve Requirement (CRR) for all banks operating in Pakistan was 9 percent of demand and time liabilities (with less than 1 year tenor). By contrast, Statutory Liquidity Reserves (SLR) were 9 percent and 19 percent of total demand and time liabilities for Islamic and conventional banks respectively.

<sup>3</sup> PSIA generally refers to Profit Sharing Investment Account, which does not include saving accounts. However, as saving accounts are also mobilized on *mudarabah* basis, we refer PSIA to both profit & loss sharing saving and investment accounts. In our view, since the saving deposits are demand deposits they are more sensitive to any change in rate of return, especially when it becomes negative (i.e. loss). Funding of Islamic banks through issuing *sukuk* (Islamic bonds) is limited.

<sup>4</sup> *Mudarabah* is a contract between *mudarabah* account holders (MAHs) and an IBI in which MAHs act as fund providers and share in either profit or loss, as the case may be, of the bank. There is no financial loss to the bank as *mudarib*. However, if negligence, misconduct, fraud or breach of contract can be proven, the IBI is responsible for the entire loss (IFSB (2008)). Islamic Financial Services Board (IFSB) names it as IAH ("investment account holder"), but due to change in our definition of PSIA we introduce this terminology.

<sup>5</sup> PSIA can be regarded as a puttable equity instrument that gives MAH the right to sell it back to the bank. IAS 32 classifies any puttable instrument as a financial instrument. In Pakistan a portion of demand deposits (saving deposits) are also mobilized on *mudarabah* basis, and can be withdrawn at any time.

shareholders, are residual claimants on banks' assets. However, they do not enjoy the same rights as shareholders do for selecting board members and having access to information through the board. To discipline bank management, MAHs have to rely on the monitoring of the board by shareholders or on their ability to divest out of the bank. MAHs can gain some benefit out of the monitoring only if interests of the shareholders and MAHs coincide. These issues may give rise to complex agency problems (Archer, Abdel Karim et al. (1998); El-Gamal (2003)) and may lead to moral hazard on part of the bank management (Mudawi (1985); Khan (1986); Sadr and Iqbal (2001). Management of an IBI may protect their own interests or interests of the shareholders instead of those of MAHs. There are, however, two factors which may protect MAHs from moral hazard problem despite asymmetric information and lack of voting rights. The first factor is that PSIAs are of limited duration. Due to the redeemable nature of PSIAs an IBI faces commercial pressure to pay competitive returns to retain the existing funds (AAOIFI (1999). MAHs can withdraw funds and invest elsewhere if they feel that the return on their investment is lower than the market rate. This pressure may discipline IBIs and make them more efficient and prudent.

Second factor is the alignment of interests of MAHs and shareholders. Al-Deehani, Abdel Karim and Murinde (1999) state that 'an increase in investment accounts financing enables the IBI to increase both its market value and its shareholders' rates of return at no extra financial risk to the bank'. Archer, Abdel Karim et al. (1998) demonstrate that both shareholders and MAH are subject to the same portfolio investment risk to the extent that the funds of both parties are commingled as done in almost all IBIs. As the interests of MAHs and shareholders are aligned, agency costs, moral hazard problem and corporate governance issues may be of less concern in IBIs.

Contrary to the contractual obligations of PSIAs, IBIs usually manage to give competitive returns to MAHs to retain PSIAs, regardless of their actual financial performance. If an IBI pays lower return to the MAHs or passes some losses to these depositors, they may withdraw their deposits. Thus, from this standpoint there is greater risk of deposit withdrawal for IBIs than CBs (Sundararajan and Errico (2002)) that could be problematic especially for smaller banks. Therefore, in extreme cases when current period's profits are not sufficient to pay market based returns to MAHs or when some losses attributable to MAHs, the IBIs may instead shift these losses to the equity holders, which exposes equity holders to displaced commercial risk (Cihák and Hesse (2010)). To manage these risks IBIs usually maintain *profit equalization reserves (PER)* and/ or *investment risk reserves (IRR)* to pay competitive returns to MAHs.<sup>6</sup> Thus in an economic downturn IBIs can still remain more resilient than their conventional counterpart due to these reserves, though in absolute term their resilient index would decrease. Moreover, literature suggests that depositors of Islamic Banks are not necessarily in 'search of yield' and their decision to withdraw deposit may be less sensitive to profit rates on deposits (Gerrard and Cunningham (1997); Khan and Khanna (2010).

On the asset side, IBIs can be more stable than CBs because Islamic banking contracts prevent risk taking by limiting speculative activities. Islamic banks provide "credit for primarily the purchase of *real goods and services*" and operate in an environment with "*restrictions on the sale of debt, short sales, excessive uncertainty (gharar), and gambling (qimar)*" (Chapra (2008),

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<sup>6</sup> In PER, both IBIs and MAHs contribute some share of their profits, whereas in IRR only the profit share of MAHs is set aside as reserves.



emphasis added). These features of Islamic banking contracts help ensure market discipline and financial stability. As asset-backed financing of IBIs create a direct link between financial transactions and real sector activities (Mohieldin (2012)), depositors of IBIs have strong incentives to monitor their banks (Beck, Demirgüç-Kunt et al. (2013)). Thus, the liability structure of Islamic banks may impose the required market discipline.<sup>7</sup>

In summary, IBIs do not entail *ex-ante* a different vulnerability to bank runs so far as current accounts are concerned because Islamic deposits are *functionally* similar to conventional deposits.<sup>8</sup> However, there may be more withdrawal risk of PSIA deposits which may fluctuate depending on the volatility of returns on these accounts. Weak bank fundamentals like low asset quality, high leverage, and low capital may also trigger a bank run once the depositors realize the situation. In this respect IBIs are less likely to face a bank run than CBs due to their stronger liquidity positions, better asset quality, and the ban on excessive speculation, derivatives, short selling and sale of debt (Farooq and Zaheer (2013) and Farooq, Wijnbergen and Zaheer (2013)).

To gauge the relative financial strength of Islamic banks, in Table 2 we report several key bank ratios for IBs, ISs, and CBs respectively. We notice that IBIs, which are on average younger than CBs, are better capitalized (capital to asset ratios for IB, IS and CB are 23%, 12% and 7%, respectively) and they rely less on non-deposit funding (while Islamic subsidiaries do so more) than CBs. With non-performing loan (NPL) ratios of 1.27 and 1.26 percent respectively, both type of IBI have significantly better asset quality compared to CBs (13.37). Both IBs and ISs have lower liquid-to-total asset ratios than CBs<sup>9</sup>.

In addition to the role that bank balance sheet strength may play during a financial panic, bank clients may also have different motivations in preferring one form of banking over the other. For example, borrowers choose banks because of ease of accessibility or specific product needs. If proximity of the closest bank branch or suitability of the financial product is the overriding reason, then we do not expect either type of banks to systemically differ in losing deposits during a financial panic. While choosing to go Islamic or conventional is a plain economic decision for depositors, it is also possible that those who prefer IBIs, including for religious reasons, have a higher propensity not to abandon their bank during times of stress. Gerrard and Cunningham (1997) document that over 60 percent of the Muslim customers of IBIs in Malaysia state that they would not withdraw deposits even if their bank did not pay any return.

All in all, we conclude that whether IBIs experienced a greater decline in deposits during financial panics compared to CBs is ultimately an empirical question. We aim to test this question in the subsequent sections by means of formal regression analysis.

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<sup>7</sup> However, Islamic banks may not exploit the equity-like nature of saving and investment accounts as they face deposit withdrawal risk.

<sup>8</sup> Apart from functional similarity, returns on Islamic and conventional deposits are also subject to a similar tax treatment in Pakistan.

<sup>9</sup> Generally, Islamic banks need to keep more (cash and) liquidity with them because of paucity of Shariah compliant liquidity instruments and other reasons set out in section 2. However, in Pakistan, conventional banks also maintained high liquid asset to total asset ratio because of the attractive rates available on government securities.

### 3. The 2008 Financial Panic

During the last week of September 2008 the banking sector in Pakistan faced a financial panic that resulted in large deposit withdrawals. These were induced by widespread rumors in the media outlets about the potential failure of several financial institutions. In the first week of October 2008 there were strong rumors about the alleged bankruptcy of a few banks. The fall in deposits occurred over a total period of seven weeks. In Figures 1 and 2 we report the aggregate and bank-wise change in deposits during the crisis period. Figure 1 shows that demand deposits fell from a pre-panic maximum of 3,397 bn PKR to a low of 3,233 bn PKR, or by 4.8 percent. In the context of this massive generalized bank run, there was a great deal of heterogeneity in the experience of individual banks. As seen in Figure 2, some banks experienced deposit outflows of up to 46 percent, while others experienced deposit inflows of up to 58 percent. The panic thus translated into a bank-specific liquidity shock, which was positive for 18 banks/branches and negative for 34 banks/branches. Looking at the distribution of the shock by bank type, we notice that CBs mainly experienced negative shocks, while IBIs (in particular, ISs) mainly experienced positive shocks.

As a result of the bank run, several banks failed to meet the weekly cash reserve requirements of the central bank. A liquidity crunch ensued, with the (annualized) overnight interbank lending rate reaching 48 percent in October 2008. While we cannot rule out that the fragile global financial conditions and the bankruptcy of US investment bank Lehman Brothers in September 2008 may have played a role in heightening concerns about the health of the Pakistani banking sector, we believe that the rumor mongering was not directly related to the fallout of Lehman Brothers.<sup>10</sup> An IMF study also suggests that Islamic banks in Gulf Cooperation Countries remained less affected in the early stages of global financial crisis as they did not have any direct exposure to the financial derivatives and conventional securities<sup>11</sup>. Anecdotal evidence from the media outlets suggests that the rumors were unrelated to the actual health of any particular bank (or set of banks), as different sources reported different financial institutions facing troubles and acknowledged rumors as one of the reasons behind the liquidity stress. In reference to the liquidity pressures of September-October 2008, Shamshad Akhtar, the Governor of the State Bank of Pakistan, stated on October 21, 2008 that “these pressures mainly pertain to a combination of seasonal factors (cash withdrawal for Eid festival and beginning of commodity finance season) and decline in foreign currency inflows. However, continuous rumour mongering by unscrupulous elements to destabilize the banking system intensified the liquidity pressure.”<sup>12,13</sup> Daily newspapers and news agencies reported on the events as follows:

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<sup>10</sup> Pakistan has a relatively closed banking sector, with most of the assets within Pakistan. As of end-2007 ‘balances abroad’ and ‘investment in foreign shares and securities’ formed 1.24 per cent of the total banking sector assets. Source: Banking Sector Statistics, 2007, State Bank of Pakistan, available at <http://sbp.org.pk>

<sup>11</sup> IMF, Regional Economic Outlook: Middle East and Central Asia, October 2009

<sup>12</sup> The Governor, State Bank of Pakistan, mentioned withdrawals due to Eid (a religious festival) as another reason for liquidity crunch. However, it may be noted that Eid is a regular bi-annual feature and banks are prepared to cater to the additional demand, if any.

<sup>13</sup> The then Governor, State Bank of Pakistan, speaking at The Asian Banker Dialogue, October 2008. <http://www.sbp.org.pk/press/2008/PakistanBankingSystemRemainsUnhurt-21-Oct-08.pdf> (accessed 01-Aug-2014)

“Withdrawals of huge amounts from the banks continued on Thursday as the efforts of central bank to dilute the impression of financial sector institutions defaults by easing the cash reserve ratio have not changed the mind of general public. Cash withdrawal panic was seen in every bank but it was highest at Bank Alfalah and Standard Chartered Bank”. *The News*, 10-Oct-2008<sup>14</sup>

“The central bank yesterday pumped foreign currency into the market to prop up the rupee, as speculation grew the country will default on its debt prompting investors to shift funds elsewhere. The State Bank has denied rumors that it plans to freeze foreign currency accounts.” *Bloomberg*, 09-Oct-2008<sup>15</sup>

“Last but not the least rumours of default/bankruptcy or freezing of foreign currency accounts along with personal lockers have created seriously problem in the country (*sic*). The rumours were active that United Bank Limited, Bank Alfalah, International General Insurance (IGI) have defaulted after the US and European financial crisis” *Business and Finance Review, Jang News Paper*, 27-Oct-2008<sup>16</sup>

The situation prompted immediate action by the central bank. The SBP declared that the banking sector of the country was “stable, safe and sound.”<sup>17</sup> The SBP also communicated about the two most affected banks that they had strong balance sheet position and robust financial ratios. To ease the liquidity situation, the SBP gradually decreased the reserve requirement from 9 percent to 5 percent in October 2008, and exempted short-term liabilities from the cash reserve requirement. Reducing the cash reserve requirement and the statutory liquidity requirement infused almost PKR 270 billion worth of liquidity into the banking system.<sup>18</sup> In addition, the SBP conducted thirteen open market operations (OMO) to inject temporary liquidity in excess of PKR 300 billion (Financial Stability Review, SBP, 2008-09). Although these actions generally eased the liquidity situation in the banking sector, several banks had to borrow through the discount window facility. It took more than two months for deposits to reach the pre-crisis level and for these measures to restore the confidence of depositors in the banking industry.

#### 4. Data Analysis and Econometric Specifications

Our data set comprise weekly deposit data for all banks operating in Pakistan between July 11, 2008 and January 2, 2009. We define the “financial panic” period as the period of large deposit outflows from the banking system spanning seven weeks starting on September 27, 2008 and ending on November 14, 2008. Other than deposit information, we have data on a number of bank level variables that are discussed later.

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<sup>14</sup> <http://www.thenews.com.pk/TodaysPrintDetail.aspx?ID=140101&Cat=3&dt=10/9/2008> (accessed 31-Jul-2014)

<sup>15</sup> <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=abMHKKsuGCUA> (accessed 31-Jul-2014)

<sup>16</sup> <http://jang.com.pk/thenews/oct2008-weekly/busrev-27-10-2008/p6.htm> (accessed 31-Jul-2014)

<sup>17</sup> <http://www.sbp.org.pk/press/2008/BankingSysStandsSoundFootings-10-Oct-08.pdf> (accessed 03-Aug-2014).

<sup>18</sup> 1 USD ~ PKR (Pakistani Rupee or Rs.) 79 in October 2008.

To evaluate the impact of the financial panic on the deposits of Islamic and conventional banks, we run the following regression:

$$\Delta \ln D_{ij} = \alpha + \beta_1 IB_i + \beta_2 IS_{ij} + \gamma X_{ij} + \varepsilon_{ij} \quad (1)$$

Where  $\Delta \ln D_{ij}$  is the change in log of deposits over the seven-week liquidity crisis period for bank  $i$ , branch type  $j$  (that is, the difference in log-deposits between November 14, 2008 and September 27, 2008),  $IB_i$  is an indicator variable for Islamic Banks,  $IS_{ij}$  is an indicator variable for Islamic Banking Subsidiaries/Branches) of mixed CBs. The omitted category is CB.  $X_{ij}$  represents a matrix of bank characteristics that vary across banks and branch types, that include the standard CAMEL-type bank fundamentals, as well as size (log of total assets),<sup>19</sup> bank reach (log of number of branches), bank age (the number of quarters since start of operations), credit rating,<sup>20</sup> and non-deposit funding to total funding (a proxy for differences in funding structure). Since some of these variables may be endogenous relative to the magnitude of the bank run, they are measured as of before the panic (specifically, at June 30, 2008). In some specifications we control for unobserved bank heterogeneity with bank fixed effects, which allow us to compare the change in deposits for the Islamic vs. conventional operations *of the same (mixed) bank*.

Summary statistics for the variables used in the regressions are presented in Table 2. Notice that only *ISs* gained deposits during the financial panic, while IBs and CBs lost deposits during this period. We first estimate specification (1) with an intercept and dummies for IBs and ISs (in order to compare these with CBs), then add covariates to control for bank characteristics that may explain differences in the liquidity shock across banks.

Next, we check whether the liquidity shock experienced during this period was absorbed by banks or was transmitted to the real economy in the form of a credit crunch. Therefore, we augment our bank balance sheet data with granular, loan-level data from the Pakistani credit registry (matched by bank), and analyze how the banks differentially affected by the liquidity shock extended *new loans* during the period of analysis. Focusing on new granted loans (as opposed to loan applications) means that we analyze the intensive margin of bank lending.<sup>21</sup> With this augmented set of data we run the following regression:

$$\ln L_{ijkl} = \alpha + \vartheta \Delta \ln D_{ij} + \beta_1 IB_{ij} + \gamma X_{ij} + \delta F_k + \theta L_l + \varepsilon_{ijkl} \quad (2)$$

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<sup>19</sup> CAMEL stands for Capital Adequacy, Asset Quality, Management, Earnings, Liquidity.

<sup>20</sup> There are two credit rating agencies in Pakistan. Pakistan Credit Rating Agency (PACRA, sponsored by Fitch Ratings among others) and JCR-VIS (co-sponsored by Japan Credit Rating Agency). Both agencies rate banks on rating scales ranging from AAA (highest credit worthiness) to D (default). The rating scales are domestically calibrated and are not internationally comparable. AAA rating assigned by these agencies to a bank imply '*Highest credit quality. The risk factors are negligible, being only slightly more than for risk-free Government of Pakistan's debt*'. All banks operating in Pakistan are required to be rated by one of the two credit rating agencies.

<sup>21</sup> See Jimenez et al. (2014, 2012) for analyses of the extensive margin of lending.

where  $\ln L_{ijkl}$  is the natural log of new loan  $l$  granted by bank  $i$ , branch type  $j$ , to borrowing firm  $k$  during the financial panic<sup>22</sup>.  $\Delta \ln D_{ij}$  is the change in log of deposits between the beginning and the end of the seven-week liquidity crisis, and  $IBI_{ij}$  is a dummy for IBIs that is either  $IB_i$  or  $IS_{ij}$ . As before,  $X_{ij}$ ,  $F_k$  and  $L_l$  represent bank, borrower, and loan characteristics.

A key empirical challenge is to disentangle the credit supply effect of the liquidity shock from the credit demand effect. Empirically isolating these effects is difficult because the events that trigger liquidity crunch often affect credit demand. Following Khwaja and Mian (2008), our identification strategy is to use borrower (firm) fixed effects to test how bank lending to *the same firm borrowing from different banks* (Islamic vs. conventional, more vs. less affected by the shock) was affected during the liquidity crisis. Specifically, we run the following regression:

$$\ln L_{ijkl} = \alpha_k + \vartheta \Delta \ln D_{ij} + \beta IBI_{ij} + \gamma X_{ij} + \theta L_l + \varepsilon_{ijkl} \quad (3)$$

which is identical to specification (2) except that we add a full set of borrower (firm) fixed effects  $\alpha_k$ .

## 5. Results

### 5.1. Islamic vs. conventional banks

Table 3 shows the main results of specification (1) which investigates the behavior of deposits during the financial panic by bank type. As a starting point, we first report estimates from a parsimonious specification (column I), where we regress the change in log-deposits during the crisis period on the *IB* and *IS* dummies. The estimates show that different bank types behave differently during the period of analysis. The coefficient on the constant term is negative and statistically significant, suggesting that CBs experienced a large withdrawal of demand deposits during September-October 2008 (to the tune of 7 percent). The coefficient for full fledged IBs is statistically insignificant, which implies that demand deposit outflows from IBs were similar from those out of CBs. In contrast, the estimated coefficient on ISs is positive and statistically significant, indicating an *increase* in demand deposits during the period to the tune of 19 percent for the average ISs. With mean demand deposits at PKR 64 million, 19.8 percent is economically significant as well. The statistically significant coefficient for ISs and the statistically insignificant coefficient for IBs suggests that Islamic nature of banks *per se* is not the main factor in the bank run, but other bank characteristics may be important as well. We explore this possibility in the next subsection.

### 5.2. Do bank fundamentals matter?

The specification used in Table 3 column I does not control for important factors that may affect depositor behavior during a financial panic. For example, during a crisis, rather than looking at whether a bank is Islamic or not, depositors may be considering the bank's relative financial strength, as captured by its capital ratios (solvency), asset quality, earnings history and liquidity position. As Zaheer and Farooq (2013) and Beck, Demirgüç-Kunt et al. (2013) show, and our summary statistics indicated, IBIs are better capitalized than their conventional counterparts. Therefore, the deposit outflows from CBs and deposit inflows into ISs may be the

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<sup>22</sup> Earlier, we have identified a financial panic period from 27-Sep-2008 to 14-Nov-2008. However, it may be noted that the deposit data is available at weekly frequency whereas the credit data/ loan register is updated monthly basis. Therefore, the panic period for credit data is slightly different and runs from '30-Sep-2008' to '30-Nov-2008'

result of ISs being better capitalized. To control for this, Table 3 column II we add to the baseline specification a set of regressors to control for pre-crisis bank characteristics. The coefficient on the capital to asset ratio turns out to be positive but statistically insignificant.

He and Manela (2012) hypothesize that during crises depositors try to seek more information about their banks and the availability of information may affect their decision to run on a bank. A credible and sought out channel of information during crises can be bank branches. Therefore, banks with more branches may be in a better position to provide information to depositors and may be able to avert a bank-run through better provision of information. To account for this effect, we add the log of number of branches of banks to the model. The results (column II) show that the size of a bank's branch network does not affect the decision to withdraw demand deposits. This effect could mean that depositors do not treat information available through branches during crises as credible. The statistically insignificant coefficient on the size of the branch network also shows that having a larger network does not enable deposit outflows, but does not help to avert them either.

Demand depositors may also evaluate the relative strength of their banks based on their history of past successful operations or their size. On this front, CBs have a clear advantage over IBIs as IBIs are relatively new entrants into the banking system. Looking at the estimated coefficient on the variable "age" (measured as number of quarters in operation) (column II), we see that age, too, appears to be irrelevant for the change in deposits.

Finally, we control for other bank level characteristics drawn from the CAMEL framework, including asset quality (NPLs), earnings (return on average assets), and liquidity (liquid-to-total assets), as well as funding structure (with the share of non-deposit funding in total funding) and bank size. However, we find that none of these individual controls matter for the extent of the bank run. Given that specification (1) is estimated on the cross-section of banks in Pakistan, these insignificant results may be driven by the small sample size. However, controlling for these additional factors leaves the coefficient estimate on *ISs* statistically significant at the 10 percent level, which suggests that on average Islamic banking branches/subsidiaries experienced deposit inflows conditional on pre-crisis bank characteristics.

### **5.3. Does independent information help banks?**

The results so far show that the *ISs* are less likely to experience a bank-run in times of financial stress, and that many bank characteristics are irrelevant in the depositors' decision to withdraw their liquidity. Given that our covariates so far may not fully capture the risk profile of the banks (and hence possible "flight to quality" effects), here we test if credible third-party information regarding bank financial strength affects depositor behavior. To evaluate this, we estimate equation (1) by adding solely a 'credit rating' score in addition to the bank type dummies (Table 3, column III). To construct this variable, we assign a numerical rating to each notch of the ratings given by credit rating agencies, ranging from 1 to 10, with the 1 being the lowest (BBB-) or equivalent and 10 being the highest (AAA or equivalent).<sup>20</sup> The results show that bank credit rating is positively related to the bank specific change in deposits, in that banks or bank branches with better ratings experienced deposit inflows during the financial panic. The coefficient estimate indicates that a one-notch improvement in the bank's credit rating results in a deposit withdrawal smaller by 2.1 percent.

This result complements existing findings from the literature regarding the importance of financial intermediary health during crises and the endogeneity of liquidity shocks with respect to bank characteristics. Goldberg, Kennedy and Miu (2010) show that healthier European banks, according to an overall bank health index based on the CAMEL framework, were less vulnerable to freezes in bank funding markets during the early stages of the European financial crisis. Kapan and Minoiu (2013) construct a bank health index also based on the CAMEL framework and correlate it with credit default swap (CDS) spreads for a large sample of banks; they find that banks in poorer financial condition before the bankruptcy of Lehman Brothers faced a higher cost of funds, as proxied by lower CDS spreads, and thus were more exposed to shocks in the bank during markets during the 2007-08 crisis.

It is important to note that when we control for bank credit rating, the estimated coefficient on *ISs* remains statistically and economically significant. To the extent that credit rating fully captures possible “flight to quality” effects, this findings suggests that there may be “religious branding” effects associated with Islamic bank branches and subsidiaries that explain their relative resilience during the 2008 financial panic.

#### **5.4. Bank or her (religious) depositor?**

Although we controlled for a set of bank characteristics that may potentially affect the decision of a bank run, we cannot rule out that our results are driven by unobserved heterogeneity. To control for unobserved bank characteristics, we add bank fixed effects in specification 1 (Table 3, column IV), which allows us to focus on the subsample of mixed banks (which provide both Islamic and conventional banking services), and ask the question: did the Islamic operations perform better or worse than the conventional operations *of the same bank* during the financial panic? The results reveal a positive and statistically positive coefficient in *ISs*, which confirms our earlier results and suggests that the religious orientation of depositors (as opposed to quality effects) influenced the size of the liquidity shock for each bank during this turbulent period.

In other words ‘religious branding’, rather than other observable bank characteristics, might have helped *ISs* fare better during the financial panic. It is intriguing why depositors would not abandon *IBIs* during financial panics. What drives customers to bank with an *IBI* in the first place may help unscramble this phenomenon. A recent survey<sup>23</sup> carried out in Pakistan, shows that 86 per cent of the business customers choose *IBIs* because ‘*owners of the company are religiously motivated*’ and 72 per cent *IBI* customers believe that ‘*Islamic banking practices are in line with the religious and moral philosophy of the company*’. 62 per cent of the respondents were even willing to pay more for Islamic banking services because of these were *shariah* compliant<sup>24</sup>. These findings suggest that religious motivation is the overriding reason to prefer Islamic banking over its conventional counterpart. It is likely that the religiously motivated customers may have less tendency to abandon a bank during difficult times that ‘*offers religious*

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<sup>23</sup> DFID-SBP: Knowledge, Attitudes, and Practices of Islamic Banking in Pakistan, 2014. Available online at <http://www.sbp.org.pk/publications/KAPStudy.pdf>, (accessed 07-Oct-2014)

<sup>24</sup> 62 per cent of the respondents ‘strongly agreed’ or ‘agreed’ to the survey question “Are you willing to pay more for Islamic banking services because they are *shariah* compliant?”, 14 per cent ‘disagreed’ or ‘strongly disagreed’, while 24 per cent were neutral.

*satisfaction*<sup>25</sup>, therefore, during trying times they may continue to support the institution that operates in line with their value system or their ‘*religious and moral philosophy*’.

The findings of the survey further indicate that, this possibly is the case. 62 per cent of the survey respondents indicated their willingness to deposit money in Islamic saving accounts *even* if there is a chance of loss<sup>26</sup>, 55 per cent responded that they would not withdraw money if their Islamic bank announces a loss<sup>27</sup> and 57 per cent stated that they will not switch to conventional banks if they suffer a loss with an Islamic bank<sup>28</sup>. We are not aware of similar survey questions administered to conventional banking customers, however, we believe that such staunch supporters are unique to Islamic banking and it is highly unlikely that majority of conventional banking depositors would opt to continue with their banks should they suffer personal losses.

The devoted and loyal depositor base is expected to make *IBIs* less prone to bank runs and hence more resilient during panics. Our results indicate that this indeed was the case during the financial panic that hit the Pakistani banking sector during September/October 2008.

### **5.5. Did the liquidity shocks affect the supply of credit?**

We have established that *ISs* were less prone to the risk of deposit outflows during the financial panic of September-October 2008. We now assess whether the liquidity crunch facing banks during the period translated into an impaired ability to extend new loans. To investigate this effect, we estimate specifications (2) and (3) and report the results in Table 4 (columns I-IV). In specifications with enough degrees of freedom, we cluster the standard errors by bank.<sup>29</sup>

In column I we estimate a parsimonious model with the *IBI* dummy as the only explanatory variable and find that during the liquidity crisis, *IBIs* on average extended 77 percent more credit than their conventional counterparts. Column II of the Table 4 confirms the sensitivity of the decision to grant new loans to the change in deposits, with an expansion in deposits supporting new lending (the coefficient is statistically significant at the 1 percent level). To determine whether the lending response of *IBIs* and *CIBIs* that were similarly exposed to deposit withdrawals was different, we add an interaction term of the *IBI* dummy with the change in deposits, and find that for *IBIs*, the decision of granting new loan is *less* sensitive to change in deposits. Put differently, among banks that were subject to the same deposit withdrawals during the crisis period, *IBIs* reduces the supply of new loans less than their conventional counterparts.

This result could be explained by differences in bank, borrower, or loan characteristics. To control or these, we add a battery of control variables (column III). The bank characteristics are

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<sup>25</sup> For 98.4 per cent of the survey respondents, the idea that ‘Islamic products/services offer religious satisfaction and comfort’ was an ‘Important reason to switch to Islamic banking’.

<sup>26</sup> “Are you willing to deposit money into a Islamic savings account even if there is a chance of loss?” (Strongly Agree/Agree 62%, Strongly Disagree/Disagree 21 %, Neutral 17%)

<sup>27</sup> “Would you withdraw your money from an Islamic savings account if the Bank announces loss?” (Strongly disagree/Disagree 55%, Strongly Agree/Agree 21 %, Neutral 24%)

<sup>28</sup> “In the event of loss would you withdraw your money from an Islamic savings account and deposit in a fixed return account with a conventional bank?” (Strongly disagree/Disagree 57%, Strongly Agree/Agree 15%, Neutral 28%)

<sup>29</sup>Standard errors are not clustered by bank, where number of clusters is less than number of regressors.



the same as in Table 3. The borrower and loan control variables include borrower size (proxied with the log of total loans extended by all banks to the borrower) and loan maturity. We observe that after controlling for these factors, the IBIs still appear to grant more new loans during the crisis period compared to CBs, but the effect of change in deposits is no longer statistically significant. In addition, bank characteristics such as capital adequacy, size of branch network, age, and liquidity positively affect the volume of new loans extended, while NPLs, profitability and reliance on non-deposit funding are negatively related to loan volume. On the borrower side, we find that larger borrowers receive more loans.

So far we have not distinguished between ISs and IBs as distinct types of IBIs. To allow for a differential impact, we split the IBI dummy into these two categories (the omitted category being the CBs). The results (column IV) show that on average both ISs and IBs granted more new loans than CBs during the financial panic and this effect holds up to controlling for bank, borrower, and loan characteristics. However, differences in lending by IBIs could be explained by unobserved bank-level heterogeneity. We address this possibility by adding bank fixed effects in our specification (column V) and find that within the same bank, Islamic operations extended larger loan volumes during the financial panic compared to their conventional operations..

However, as mentioned earlier, the differential behavior of IBIs compared to CBs in terms of lending during the liquidity shock period may be driven by demand-side effects. It is possible, for example, that borrowers from IBIs are fundamentally different from borrowers from CBs, and suffer a different demand shock. To control for possible shifts in credit demand that may have occurred during the period of analysis, we add borrower fixed effects to isolate supply from demand effects in bank credit. Adding borrower fixed effects is more demanding of the data as we need to keep in the sample only those firms that borrow from both Islamic operations (IBs or IBIs) and CBs. We keep the bank fixed effects and add to the specification an interaction term between *ISs* and the change in deposits.

The results (Table 4, column VI) show that, after controlling for unobservable bank characteristics and credit demand, banks that experienced an increase in deposits during the financial panic also raised the supply of loans (the coefficient is statistically significant at the 10 percent level). In addition, loan supply by *ISs* does not appear to be more sensitive to the change in deposits during the liquidity crunch, as the linear combination of the estimated coefficients on deposit change and the interaction with *IS* dummy yields 0.022 with a standard error of 0.021). This suggests that, to the extent that lending by *ISs* is unaffected by changes in deposits during financial panics, IBIs can help shield the real sector from financial sector shocks. Due to liquidity management challenges as mentioned earlier, IBIs have to be content with less efficient use of funds, but they can afford to operate less efficiently by charging ‘religiosity premium’ from their customers in the form of higher rates on financing and lower rates on deposits<sup>30</sup>. However, this less efficient use of capital and funds may work as a blessing in disguise during a liquidity crunch and enable IBIs to continue providing credit to the prospective borrowers.

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<sup>30</sup> SBP sets a floor rate of interest for conventional deposits, which by definition is not applicable on profit and loss sharing Islamic deposits.

## 5.6. Robustness

To ensure the robustness of our results, we carry out some additional checks. In our baseline set of specifications (Table 4), we use only new loans granted during the crisis period. However, this treatment may produce biased results if *IBIs* systematically differ in their tendency to give new loans (perhaps to blue chip clients) by cutting down lending to existing clients. To rule out this concern, in our robustness exercise we change our unit of analysis from ‘loan’ to ‘firm’ by replacing dependent variable ‘Log of New Loans granted during Financial Panic’ with ‘Change in Log of Lending to a Firm during Financial Panic’. Our starting point is the set of all performing private business loans outstanding at the beginning of the financial panic (September 2008). Following Khwaja and Mian (2008), we define a loan as a Firm-Bank pair, that is, multiple loans of a firm from the same bank<sup>31</sup> are aggregated up and considered as a single loan. With this treatment, our sample comprises 17,606 loans to 15,224 borrowers. In particular we estimate the following equation (and a variant with firm fixed effects):

$$\Delta \ln L_{ijk} = \alpha + \vartheta \Delta \ln D_{ij} + \beta IBI_{ij} + \gamma X_{ij} + \varepsilon_{ijk} \quad (4)$$

Where  $\Delta \ln L_{ijk}$  is the natural log of change in loan to firm  $k$  granted by bank  $i$ , branch type  $j$  during the crisis period.  $\Delta \ln D_{ij}$  is the change in log of deposits between the beginning and the end of the seven-week liquidity crisis, and  $IBI_{ij}$  is a dummy for IBIs that is either  $IB_i$  or  $IS_{ij}$  and  $X_{ij}$  represent bank characteristics. The results are presented in Table 5. Although the coefficients differ in size as compared to those in our previous treatment, the sign and significance of coefficients of our prime interest remains largely same and support our results presented earlier.

## 6. Conclusions

In this study we used detailed data on bank balance sheets and their granted loans from Pakistan to examine the differential behavior of Islamic and conventional banks during a financial panic that occurred during September-October 2008. Our results indicate that Islamic branches of mixed banks are less prone to the risk of deposit withdrawals during panics, both unconditionally and conditional on bank characteristics.

In fact, the Islamic operations of the mixed banks on average attracted deposits during the panic compared to the banks’ conventional operations, which suggests a role for religious branding. We also showed that Islamic banks were more likely to grant new loans during the liquidity crisis and that their lending decisions were less sensitive to changes in deposits. Overall, our results suggest that greater financial inclusion of faith-based groups, for instance through Islamic banking, may enhance banking system stability. These findings lend support to the earlier evidence that stronger bank fundamentals may inhibit transmission of financial sector shocks to the real economy. For example, using syndicated loan market data, Kapan and Minoiu (2013) show that better capitalized and more liquid banks were better able to continue supply of credit during 2007–2008.. Our results indicate that *ISs* appear to fare better than their conventional parent, which is inconsistent with the literature that suggests a negative role of parent bank fragility on the lending of subsidiary. For example, using data of multinational bank-holding companies and their subsidiaries, Allen, Hryckiewicz et al. (2011) document the negative impact of parent bank fragility on subsidiaries’ lending. Our study, however, goes a step

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<sup>31</sup> Islamic and conventional operations of same banks are treated as different banks to determine firm-bank pairs

further and show that other than the financial strength, ‘religious branding’ in its own right, may help banks steer better through a financial panic. These results support earlier findings of relatively better performance of Islamic banks during financial crisis. For example, in a cross country analysis, Hasan and Dridi (2010) find that during 2008-09, Islamic banks fared better than conventional banks in terms of credit and asset growth. Using the data of 141 countries over the period 1995-2007, Beck, Demirgüç-Kunt et al. (2013) conclude that during the global financial crisis, Islamic banks had a higher intermediation ratio, higher asset quality and were better capitalized and recorded better stock market performance.

Other than the better fundamentals, what is special about IBIs and/or their customers that makes IBIs less prone to bank runs and hence more resilient during panics, is the willingness of *IBIs*’ customers to share in losses and their higher degree of affiliation with *IBIs*, perhaps because both the bank and the customer share same set of values.

We show that Islamic banks were more likely to grant new loans during the financial panic and that their lending decisions were less sensitive to changes in deposits in comparison with their conventional counterparts. Thus the transmission of financial shocks to the real economy may also be partially dampened if faith-based financial institutions are in operation (in a muslim majority country in this case). Resultantly, financial stability may be improved by the religion-inspired or otherwise altruistic objectives pursued by a set of bank managers and/or their clients.

Since we only analyze the resilience of the banking sector in this paper, future research can also include the overall financial sector of the economy by including non-deposit taking or non-banking financial institutions. The findings of our paper have important policy implications regarding macroprudential policy and banking regulations. Overall, our results suggest that greater financial inclusion of faith-based groups, for instance through Islamic banking, may enhance banking system stability. Moreover, some features of Islamic banking may be considered for adaption and adoption in the conventional banking. One such feature is equity-like profit and loss sharing saving accounts. Such saving accounts not only provide an additional cushion to banks’ capital but also to some extent do away with the ‘private gains – public pains’ phenomenon, by sharing both the profits and losses with depositors. Moreover, asset backed financing may put a natural cap to excessive borrowing and ensuing debt overhang. More theoretical and empirical research needs to be done regarding the effect of pursuit of social or ethical objectives by players / decision-makers on financial sector and real economy.

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Figure 1: Demand Deposits (in Pak Rupees, billions)

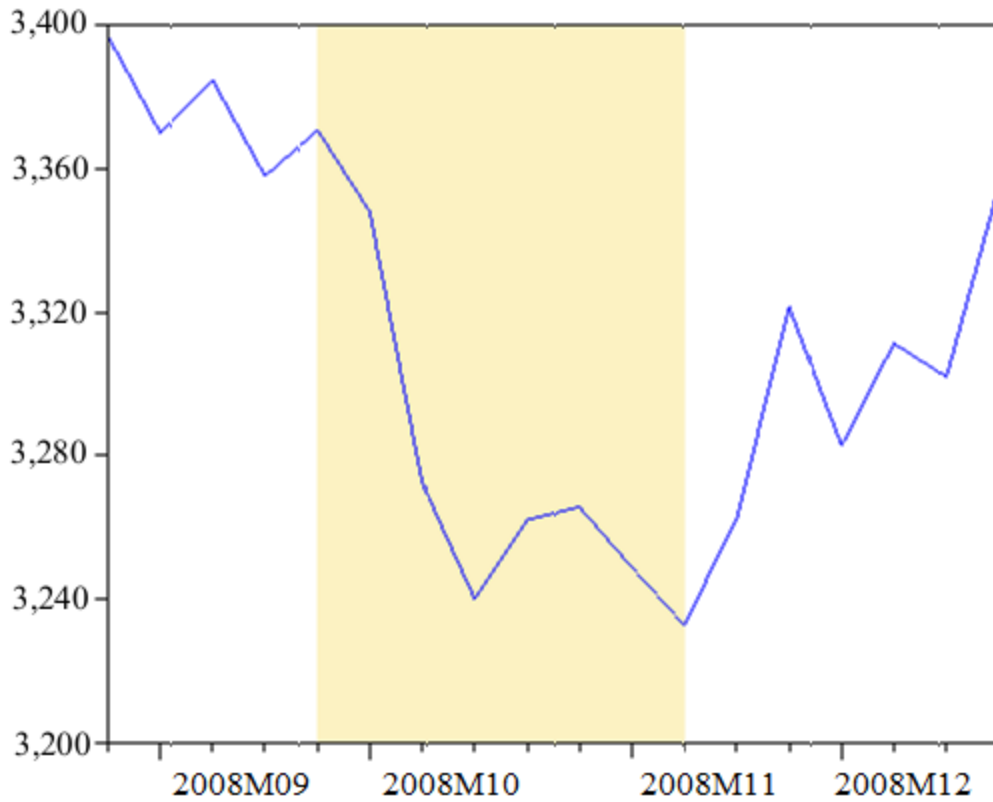
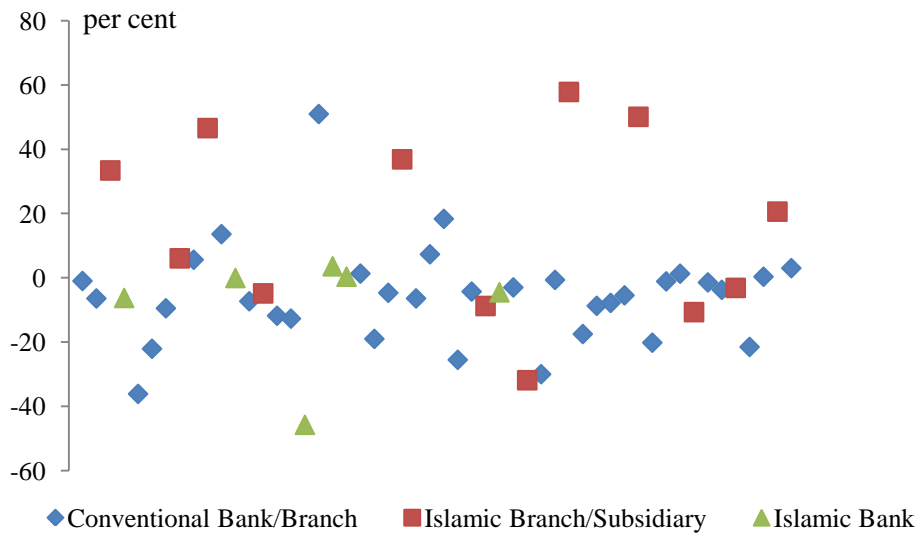


Figure 2: Change in Demand Deposits during Liquidity Shock (26-Sep-2008 to 14-Nov 2008)





**Table 1: Excess reserves as a percentage of total deposits**

	<u>Islamic Banks</u>		<u>Conventional Banks</u>	
	2002	2006	2002	2006
Indonesia	23.65	20.45	2.8	2.9
Iran	6.79	2.81	NA	NA
Malaysia	NA	NA	4	6
Pakistan	3.31	3.81	0.24	0.27
Saudi Arabia	6.95	5.06	2.52	2.38
Singapore	NA	NA	6.59	5.27
Sudan	7.4	7	NA	NA
Bangladesh	69.8	57.3	28.2	24.1

NA : Not Available

Source: Islamic Financial Services Board

**Table 2: Summary Statistics**

The table reports the descriptive statistics for the variables used in estimations

Sr.	Variable	Type / Description	Mean			Median			Maximum			Minimum			Std. Dev.		
			IB	IS	Conv.	IB	IS	Conv.	IB	IS	Conv.	IB	IS	Conv.	IB	IS	Conv.
1	Islamic Banks (IB)	1/0	0.12			0			1			0			0.32		
2	Islamic Banking Branches Subsidiaries (IS)	1/0	0.23			0			1			0			0.43		
3	CAR (Capital to Asset)	Per cent	23.39	12.09	6.99	21.13	8.94	12.63	40.28	33.88	76.32	8.05	6.46	-321.33	14.63	7.84	59.72
4	Log (Number of Branches)	Number	3.13	1.76	4.32	3.04	1.50	4.33	4.74	3.47	9.45	1.79	0.00	0.00	0.95	0.93	1.92
5	Log (Age of Bank in Quarters)	Number	2.20	2.61	3.69	2.17	2.74	3.61	3.76	3.00	4.45	0.00	1.79	2.30	1.32	0.43	0.51
6	Non-deposit Funding to Total Funding	Per cent	11.76	23.55	22.45	10.67	15.30	12.85	23.90	90.30	92.45	1.08	0.45	5.23	8.32	28.94	24.77
7	NPL Ratio	Per cent	1.27	1.26	13.37	0.45	0.06	6.66	4.29	7.13	96.90	0.00	0.00	0.00	1.76	2.21	20.66
8	Return on Assets	Per cent	-0.28	1.65	1.15	-0.57	1.44	1.15	1.29	3.66	4.35	-1.25	0.15	-2.94	1.11	1.01	1.80
9	Liq. Assets/Total Assets	Per cent	17.33	33.95	35.33	17.04	33.55	32.70	32.97	41.54	92.21	0.00	28.87	17.49	12.83	3.71	14.00
10	Credit Ratings	Number	5.17	8.08	6.38	4.50	8.50	7.00	8.00	10.00	10.00	4.00	3.00	1.00	1.60	1.88	2.45
11	Log (Assets)	Number	10.01	7.36	11.07	9.85	7.06	11.14	11.24	9.28	13.49	9.23	5.41	8.16	0.69	1.26	1.48
12	Change in Log Deposits during 7-week liquidity crisis ( $\Delta \ln D$ )	Number	-9.31	11.82	-7.26	-2.17	12.27	-5.24	12.71	45.60	41.16	-61.18	-38.42	-44.87	26.31	25.99	15.39
13	Log of New Loans Granted during 7-week liquidity crisis ( $\ln L$ )	Number	16.33	16.23	15.50	16.52	16.12	15.42	19.70	19.34	19.81	10.82	13.03	10.82	2.03	1.40	1.68
14	Term	Loan Maturity in Months	13.81	10.59	10.01	12.01	5.92	8.95	60.59	60.07	84.14	1.97	1.12	1.02	12.88	12.64	9.87
15	Size	Log Firm Size (measured as sum of all loans)	17.40	17.41	16.79	17.88	17.17	16.81	21.86	22.32	23.31	10.82	13.40	10.82	2.73	2.26	2.34

**Table 3: Liquidity Crisis and Deposits**

The table reports the estimation results of OLS models. The regression examines impact of a liquidity shock on the deposits of Islamic Banks (IBs), Islamic Branches/Subsidiaries (ISs) and conventional banks. The liquidity crisis period runs from 27-Sep-2008 to 14-Nov-2008, during which banking sector in Pakistan lost over Rs. 130 billion or 4 per cent of deposits due to rumors regarding viability of some financial institutions. The dependent variable is change in log of deposits over seven-week liquidity crisis for bank i, branch type j (calculated as  $\ln(\text{deposits as on 14-Nov-2008 of Bank A Islamic operations}) - \ln(\text{deposits as on 27-Sep-2008 of Bank A Islamic operations})$ ). For each variable in the specification the table reports the estimated coefficient, statistical significance level and standard error (below in parentheses). In all estimations white heteroskedasticity consistent standard errors are used.

Models	I	II	III	IV
Islamic Banks (IB)	-2.045 (10.451)	4.900 (10.624)	0.4500 (9.883)	
Islamic Banking Br. / Subsidiaries (IS)	19.086** (7.87)	29.502* (15.685)	15.594** (7.392)	15.144** (7.384)
Capital to Asset Ratio		0.013 (0.04)		
Log (Nr of Branches)		-3.175 (2.994)		
Age of Bank (in quarters)		0.081 (0.191)		
Return on Assets		1.900 (1.865)		
Liquid Assets/Total Assets		-0.008 (0.217)		
Non Performing Loans to Total Loans		0.323 (0.201)		
Credit Rating			2.052** (0.801)	
Non-deposit Funding to Total Funding		-0.151 (0.156)		
Log (Assets)		3.517 (3.027)		
Constant	-7.262*** (2.679)	-39.033 (35.297)	-20.361*** (6.528)	-3.320 (5.221)
Bank Fixed Effects	No	No	No	Yes
Observations	52	52	52	24
R-squared	0.157	0.220	0.204	0.277

\*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10 %

**Table 4: Liquidity Crisis and Bank Credit**

The table reports the estimation results of OLS models. The regression examines impact of a liquidity shock on the new lending by Islamic Banks (IBs), Islamic Banking Branches/Subsidiaries (jointly IBIs or Islamic Banking Institutions), and conventional banks. IBIs, IBs, and ISs are dummy variables representing Islamic Banks, Islamic Banking Branches/Subsidiaries or Islamic banking institutions respectively. The dependent variable is log of new loans granted over financial panic period by bank *i*, branch type *j* to borrower *k*. The financial panic period runs from 27-Sep-2008 to 14-Nov-2008, during which banking sector in Pakistan lost over Rs. 130 billion or 4 per cent of deposits due to rumors regarding viability of some financial institutions. Change in log of deposits for bank *i*, branch type *j* is calculated as  $\ln(\text{deposits as on 14-Nov-2008 of Bank A Islamic operations}) - \ln(\text{deposits as on 27-Sep-2008 of Bank A Islamic operations})$ . For each variable in the specification the table reports the estimated coefficient, statistical significance level and standard error (below in parentheses). In all estimations white heteroskedasticity consistent standard errors are used, and where possible errors are clustered by bank.

Models	I	II	III	IV	V	VI
Islamic (IBIs)	0.771*** (0.207)	0.721*** (0.165)	0.428** (0.183)			
Islamic Banks (IBs)				0.735*** (0.241)		
Islamic Banking Branches / Subsidiaries (ISs)				1.223*** (0.405)	1.947** (0.885)	0.310 (0.917)
Change in Log Deposits ( $\Delta \ln D$ )		0.0114*** (0.00431)	0.00395 (0.00338)	0.000 (0.0038)	-0.047* (0.026)	0.227* (0.125)
IBIs * $\Delta \ln D$		-0.0151* (0.00775)				
ISs * $\Delta \ln D$						-0.249** (0.121)
<b>Bank Characteristics</b>						
CAR			0.0279*** (0.00742)	0.0263*** (0.0074)		
Non-deposit Funding to Total Funding			-0.00771* (0.0041)	-0.00530 (0.0043)		
Log(Branches)			0.0457* (0.0247)	-0.0282 (0.0327)		
Log (Assets)			-0.0185 (0.0364)	0.120*** (0.0445)		
Age			0.133*** (0.0344)	0.133*** (0.0343)		
NPL Ratio			-0.0157*** (0.0057)	-0.00777 (0.0064)		
ROA			-0.0995*** (0.0366)	-0.131*** (0.0369)		
Liq. Assets / Total Assets			0.0294*** (0.0069)	0.0304*** (0.0067)		
<b>Borrower / Loan Characteristics</b>						
Log (Size)			0.469*** (0.0130)	0.468*** (0.0130)	0.495*** (0.023)	
Term			-0.00725** (0.0029)	-0.00861*** (0.0029)	-0.009** (0.004)	
Constant	15.50*** (0.0734)	15.54*** (0.0347)	6.718*** (0.573)	6.039*** (0.439)		
(66)Sectoral Dummies	No	No	Yes	Yes	Yes	No
Borrower Fixed Effects	No	No	No	No	No	Yes
Bank Fixed Effects	No	No	No	No	Yes	Yes
Observations	2,825	2,825	2,724	2,724	1,840	1,256
R-squared	0.01	0.01	0.40	0.40	0.38	0.10

\*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10 %

**Table 5: Liquidity Crisis and Bank Credit (Robustness)**

The table reports the estimation results of OLS models. The regression examines impact of a liquidity shock on the new lending by Islamic Banks (IBs), Islamic Banking Branches/Subsidiaries (jointly IBIs or Islamic Banking Institutions), and conventional banks. IBIs, IBs, and ISs are dummy variables representing Islamic Banks, Islamic Banking Branches/Subsidiaries or Islamic banking institutions respectively. The financial panic period runs from 27-Sep-2008 to 14-Nov-2008, during which banking sector in Pakistan lost over Rs. 130 billion or 4 per cent of deposits due to rumors regarding viability of some financial institutions. The dependent variable is change in log of loans during financial panic period (30-Sep-2008 to 30-Nov-2008 for loans as loan data is available only on monthly frequency) by bank *i*, branch type *j* to borrower firm *k*. Change in log of deposits for bank *i*, branch type *j* is calculated as  $\ln(\text{deposits as on 14-Nov-2008 of Bank A Islamic operations})$  minus  $\ln(\text{deposits as on 27-Sep-2008 of Bank A Islamic operations})$ . For each variable in the specification the table reports the estimated coefficient, statistical significance level and standard error (below in parentheses). In all estimations white heteroskedasticity consistent standard errors are used, and where possible errors are clustered by bank.

Models	I	II	III	IV	V	VI
Islamic (IBIs)	0.639*** (0.241)	0.427* (0.243)	2.823*** (0.352)			
Islamic Banks (IBs)				2.379*** (0.368)		
Islamic Banking Branches / Subsidiaries (ISs)				4.959*** (0.624)	2.101*** (0.469)	2.959*** (0.788)
Change in Log Deposits ( $\Delta \ln D$ )		0.0450*** (0.00665)	0.0219*** (0.00602)	0.0168*** (0.00614)	-0.0430*** (0.0138)	0.309*** (0.0633)
IBIs * $\Delta \ln D$		-0.0417*** (0.0123)				
ISs * $\Delta \ln D$						-0.248*** (0.0649)
<b>Bank Characteristics</b>						
CAR			-0.0116 (0.0146)	0.0135 (0.0158)		
Non-deposit Funding to Total Funding			-0.0246*** (0.00710)	-0.0287*** (0.00717)		
Log (Branches)			-0.458*** (0.0799)	-0.573*** (0.0845)		
Log (Assets)			0.331** (0.137)	0.609*** (0.153)		
Age			0.0620*** (0.00431)	0.0639*** (0.00433)		
NPL Ratio			0.0487*** (0.0106)	0.0484*** (0.0106)		
ROA			-0.0490 (0.0647)	-0.135** (0.0679)		
Liq. Assets / Total Assets			-0.0238** (0.0117)	-0.0212* (0.0117)		
Constant	1.351*** (0.0522)	1.567*** (0.0611)	-1.822 (1.606)	-4.758*** (1.754)		
(66) Sectoral Dummies	No	No	Yes	Yes	Yes	No
Borrower Fixed Effects	No	No	No	No	No	Yes
Bank Fixed Effects	No	No	No	No	Yes	Yes
Observations	17,606	17,606	17,606	17,606	10,296	4,332
R-squared	0.0004	0.003	0.0394	0.0403	0.0609	0.0121

\*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10 %