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ABSTRACT

Of Religion and Redemption: Evidence from Default on Islamic Loans

Do religious beliefs affect real economic decisions? We investigate this fundamental question by comparing default rates on conventional and Islamic loans using a comprehensive monthly dataset from Pakistan that follows more than 150,000 loans over the period 2006:04 to 2008:12. We find robust evidence that the default rate on Islamic loans is less than half the default rate on conventional loans. The evidence comes from a variety of specifications that contain pertinent combinations of time-varying borrower, loan contract and bank characteristics, and time, borrower, bank and borrower*bank fixed effects. For the same borrower taking both conventional and Islamic loans from the same bank, the hazard rate on Islamic loans drops to one fifth the hazard rate on conventional loans. Islamic loans are less likely to default during Ramadan and in big cities if the share of votes to religious-political parties increases, suggesting that religion--either through individual piousness or network effects--may play a role in determining loan default.

JEL Classification: A13, G21, G32, G33 and Z12
Keywords: duration analysis, islamic loans, loan default and religion

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Islamic banking is one of the fastest growing parts of the financial sector. Doubled in size since 2006 and already accounting for $900 billion or more than 1% of the global banking market (*Financial Times*, May 12, 2011), "the global potential of the Islamic banking market is conservatively estimated at $4,000 billion, according to Moody's Investor Service" (*Financial Times*, July 8, 2008). The financial crisis may have spurred its growth and potential market share even further, as observers claim the "principles based on religious law insulate the industry from the worst of the financial crisis" (*Washington Post*, October 31, 2008; see also the *International Monetary Fund* report by Hasan and Dridi [2010]).

Yet despite the fast growth of Islamic banking and the imperative claims made about the built-in protection against excessive risk-taking by financial institutions, no research (we are aware of) so far has investigated the default rate of individual conventional versus Islamic loans. This lack of evidence should not come as a surprise, because the identification challenges, and corresponding data requirements, faced by such an analysis are steep. Borrowers seeking Islamic financing and banks granting it may differ from their conventional counterparts in many observable and unobservable characteristics. Whether therefore the difference in credit risk in conventional and Islamic financing is mainly due to compliance with the principles of Islamic law (the *Shari'ah*) *per se*, or is due to borrower, loan contract and/or bank characteristics that are independent of any Islamic rulings remains an open question we aim to address in this paper.

The data set we employ covers <u>all</u> business loans that were outstanding in Pakistan during the period 2006:4 to 2008:12. The Credit Information Bureau (CIB) database, that we use, is maintained by the Consumer Protection Department of the State Bank of Pakistan and is also analyzed in Khwaja and Mian [2005], Mian [2006], Khwaja and Mian [2008], and Zia [2008]

for example. The country and sample period provide a unique setting to analyze the credit risk in Islamic loans.[1]

Pakistan may be one of the few countries in the world where both well-developed conventional and Islamic banking sectors have co-existed for a considerable period of time.[2] Though the characteristics of borrowers, loan contracts and banks may differ between conventional and Islamic loans, their co-existence in Pakistan offers a unique opportunity to assess the effect of religion on the loan default rate. The majority of Islamic loans granted in Pakistan are simple and standard equivalents to conventional loans, and therefore comparable to these conventional loans and to similar Islamic loans in other countries. Quite a few firms and banks repeatedly and concurrently engage in both conventional and Islamic type financing providing unique opportunities for advanced empirical identification. During the sample period loans continued to be first liberally granted and then increasingly started to default.

Estimating a variety of empirical models, we find robust evidence that Islamic loans are less likely to default. This effect is not only statistically significant, but also economically relevant. The hazard rate on Islamic loans (in various duration models) is on average less than half the hazard rate on conventional loans. For the same borrower taking both conventional and Islamic loans from the same bank, the hazard rate on Islamic loans drops to one fifth the

[1] We henceforth employ the term "Islamic loan", for ease of writing and in accordance with practice of the Credit Information Bureau (CIB) of the State Bank of Pakistan. The CIB maintains uniform records on conventional and "Islamic loans" (and even imputes an implied interest rate for the latter category). As we review briefly later "Islamic loans" involve no interest payments and almost always consist of multiple underlying contracts. For these and various other reasons scholars are often hesitant to label many of the Islamic financial products we will study as "loans" (Kuran [2004]) or even as "Islamic" (see the discussion in Pepinsky [2010] and Khan [2010] for example).

[2] Pakistan is the second most populous Muslim country in the world (behind Indonesia). It has 185 million inhabitants, of which 95 percent are Muslim (Source: *CIA Factbook*). It shares a long history with Bangladesh and India. These countries combined account for one third of all Muslims in the world.

hazard rate on conventional loans. These findings hold in a variety of specifications that contain pertinent combinations of borrower, loan contract and bank characteristics, and year*month, borrower, bank and borrower*bank fixed effects.

The elimination of interest in all its forms or *Riba* in Islamic banking, and the resultant structuring of Islamic loans into, among others, deferred-sale and lease-like contracts, may provide only a partial explanation for this robust finding. We cannot exclude the possibility that borrowers may also feel a more acute conflict with their individual religious beliefs or those of their fellow believers when defaulting on an Islamic loan (Iannaccone [1998] and Guiso, Sapienza and Zingales [2006]). Suggestive on this account is our finding that Islamic loans are less likely to default during Ramadan and in big cities − where family and other social networks may be weaker and the distinction between religious and other political parties may be more acute − if the share of votes to religious-political parties increases.

Our study aims, therefore, to contribute to a wider literature (Barro and McCleary [2006]) that investigates how religion helps to explain differences in economic growth across countries (Barro and McCleary [2003]), former colonies (Grier [1997]), regions (Landes [1999]), and early European cities (Dudley and Blum [2001]), and how religion may unidirectionally determine economic development (Barro and McCleary [2005], McCleary and Barros [2006]), through its potential impact on investor protection (Stulz and Williamson [2003]), economic attitude (Guiso, Sapienza and Zingales [2003]), entrepreneurship (Audretsch, Bönte and Tamvada [2007]), human capital formation (Becker and Wößmann [2009]), occupational organization (Richardson and McBride [2009]), work ethic (Spenkuch [2011]), and/or risk aversion (Hilary and Hui [2010]).

The rest of the paper proceeds as follows. Section I explains the basic tenets of Islamic banking and their relevance for loan default. Section II introduces the data, our identification

strategy, and duration models. Section III discusses the empirical results. Section IV concludes.

I. Islamic Banking and Loan Default

A. Islamic Banking

Islamic Banking refers to a system of banking or banking practices that is consistent, both in objectives and operations, with the *Shari'ah*. The main principles are either directly based on the *Qur'an* and the sayings and actions of the prophet *Mohammed*, or on a growing body of Islamic jurisprudence that is being developed by Islamic scholars.

The key distinguishing feature of Islamic banking is the prohibition of interest (*riba*):[3] Islamic banks are not allowed to offer a fixed rate of return on deposits and are not allowed to charge interest on loans, or any positive, fixed, predetermined rate of return that is guaranteed regardless of the performance of the investment.

Ideal modes of Islamic financing are based on the profit-and-loss sharing (PLS) paradigm (we provide details on the different types of Islamic financing in Appendix A). Examples include *Musharakah* (partnership where all partners invest both money and expertise) and *Mudarabah* (partnership with some partners investing only money and others only their skills/labor). The ex-ante fixed rate of return common in conventional loan products is replaced by a return that is uncertain and dependent on the borrowing company's realized profits, which make these two financing structures compatible with *Shari'ah* principles. Notice that both *Musharakah* and *Mudarabah* bear very little resemblance with interest-

[3] See El-Gamal [2001] for a detailed discussion of riba. Other important principles include the prohibition to: (i) invest in sinful activities (such as businesses involving alcohol, firearms, pork products, or adult entertainment); (ii) unequal exchange of money for debt (without an underlying real asset); (iii) speculate, bet, or gamble; (iv) trade the same object between the buyer and seller; and (v) engage in contracts with preventable uncertainty (see e.g. Jobst [2007]).

bearing contracts in conventional banking, which would make it problematic to compare their respective default rates. In practice, however, PLS contracts only constitute a small share of the market for Islamic loans products. In fact, in our sample, less than 3 percent of all Islamic loans are based on the PLS principle.[4]

Instead, Islamic banks have developed lending structures that, while being *Shari'ah* compliant, largely mimic the characteristics of conventional lending products. In a *Murabahah* contract (similar to a term loan), the bank first purchases a real asset from a supplier, and consequently sells it in a different contract at a marked-up price to the borrower. Interest rate payments are implicit as the borrower pays the markup price in installments over a period of time or in lump sum at maturity of the contract. This contract is permissible because trade in general is allowed and also the bank is technically exposed to risk between the moment it takes legal possession of the underlying asset (first contract) and the moment it transfers the asset to the borrower (second contract), even if in practice this moment is often very short.

Similarly, Islamic leasing products have been developed. In case of *Ijarah*, the bank buys an asset for a customer and then leases it to the customer for a certain period at a fixed rental charge. Islamic law allows rent to be charged because the customer enjoys the usufruct of the good while the bank bears the risk of ownership. *Ijarah wa'Iqtina* is similar to an Ijarah contract except that it allows for the possibility that the customer becomes owner of the good at the end of the lease contract, either for free (gift) or at a pre-agreed price. Finally, in a

[4] Often quoted reasons include agency problems, lack of well-defined property laws, the restrictive role of shareholders in management, or a disadvantageous tax treatment. Many banks, facing competition from conventional banks, may consider PLS contracts as being too risky. See also Bashir, Darrat and Suliman [1993] and Dar and Presley [2000], among others. The low share of PLS lending contracts is not specific to Pakistan. Chong and Liu [2009], for instance, find that only 0.5 percent of Islamic loans in Malaysia adopt the PLS paradigm.

diminishing Musharakah contract, a financier and his client participate either in the joint ownership of a property or an equipment. What is different, however, is that the share of the financier is divided into a number of units, which at pre-agreed moments in time will be purchased by the client. Each period, the client's share increases until all units are bought and he fully owns the property or asset. Rent is paid to the financier according to his remaining share in the project.

B. Default on Conventional and Islamic Loans

The previous section showed that the most popular Islamic lending products are *functionally identical* to conventional loan products.[5] Does this mean that we should also expect their default rates to be similar? Clearly, Islamic loans are structured differently and are governed by different contracts than conventional loans. Moreover, there can be different motivations to prefer one form of banking over the other. For example borrowers may choose conventional over Islamic banks because of easy accessibility or specific product needs. If proximity of the closest bank branch or suitability of product is the overriding reason to choose one type of loan over the other, we do not necessarily expect that the default rate on either type of loans will systematically differ.

Nevertheless competing hypotheses can be formed regarding the motivation for preferring one form of credit over the other and the expected default rates associated with that choice. The existence of Islamic banking *per se* is based on religion and for borrowers taking an Islamic loan plainly is a real economic decision (i.e., "putting your money where your mouth is"). An Islamic loan is – after all – a financial product with certain characteristics one of

[5] Apart from being functionally identical, conventional and Islamic loans are also subject to a similar tax treatment in Pakistan, in contrast to Malaysia for example where Islamic financing enjoys tax advantages.

which is its accordance with the *Shari'ah*. The text that prohibits interest payments, i.e., *Al Quran* and *Hadith*, also prohibits the misappropriation of other people's properties (i.e., "the eating other people's money in an unlawful way"). Those who choose to stick to one rule (i.e., the avoidance of interest payments) are expected to have a higher propensity to follow the other rule (i.e., do not default) as well. Therefore, if borrowers obtain Islamic loans because of their religious motives then they are expected to default less on their loans (we return to this conjecture later in the paper).

Borrowers likely base their borrowing and default decisions on a rational comparison of the associated costs of the respective loan contracts. They, when choosing a loan, also take into account the expected cost of default. Banks can charge a penalty to a borrower defaulting on an Islamic loan, but unlike with a conventional loan they have to give that amount to charity.[6] Islamic lenders should, therefore, be reluctant to impose penalties to keep the borrower in a more solvent state. This makes the expected cost of an Islamic loan default for a borrower lower than the expected cost of a conventional loan default. Therefore, those who have a higher probability of default should prefer Islamic over conventional loans and we should observe a higher rate of default on Islamic loans.

On the other hand, lenders may set the penalties on conventional loans lower than on Islamic loans to attract fees from borrowers that are expected to being only temporarily unable to repay their loan commitments. Islamic loan contracts may further result in a swifter loss of access for the borrower to the financed object (a car, for example) than a conventional loan,

[6] If a client does not fully pay on the due date or soon after, and hence is delinquent and "defaults", the price cannot be changed under Islamic rulings nor can penalty fees be charged. In order to deal with the associated moral hazard of the clients (i.e., "the incentives [that] exist for default and abuse" (Iqbal [1987]), it is therefore nevertheless possible under *Shari'ah* to charge a penalty, but only if the money is given to charity. If the Islamic bank incurs a real loss (and not simply the opportunity cost of a delayed payment) then an external arbitrator can also allow the bank to actually keep (part of) the penalty.

especially when the latter is uncollateralized. In both cases the probability of default of an Islamic loan may be lower.

Like borrowers, banks base their lending decisions on a rational comparison of the associated costs and benefits. Loan officers at banks granting Islamic loans may for example target young and more risky borrowers to reap future business and higher returns, or they may be less experienced in assessing credit risk and less sensitive about the credit quality of their borrowers in general. In all these cases we will observe a higher rate of default on Islamic loans.

On the other hand, banks may be more concerned about the judicial risk when granting Islamic loans (Jobst [2007]). Not only can Islamic borrowers turn to *Shari'ah* courts, which rule on a case-by-case basis, but they can also seek redress in regular courts which may also turn the *Shari'ah* when faced with an Islamic loan (see Hussain [2011] for a primer on the Pakistani court system). To avoid this "double jeopardy" banks may screen Islamic borrowers more strictly or evergreen non-performing Islamic loans by rolling them into new Islamic loans or even conventional loans. All these actions will likely mitigate (or at least delay) Islamic loan default. But the opposite is also true and conventional loans may be challenged on the basis of the *Shari'ah*.

In sum, our analysis will need to rely on a variety of borrower, loan contract and bank controls and fixed effects to account for both observed and unobserved borrower, loan contract and bank heterogeneity. However, our definition of loan default (detailed later) and the wide-spread presence of standardized loans in our dataset all but rule out the relevance of the discussed judicial risk for our estimates.

C. Empirical Literature

Though the characteristics of borrowers, loan contracts and banks may differ between conventional and Islamic loans, their co-existence in Pakistan offers a unique opportunity to assess the effect of religion on the loan default rate. We are not the first to empirically study Islamic banking − we summarize relevant papers in Table 1. With a few exceptions most studies indicate there are no significant differences between conventional and Islamic banks in their business orientation, efficiency, asset quality, or stability for example (see Beck, Demirgüç-Kunt and Merrouche [2010] for a comprehensive study).

[Insert Table 1 about here]

Yet our study, as far as we are aware, is the first to access individual loan data to empirically investigate the differences between conventional and Islamic lending at the contract level, in particular with respect to each loan's repayment performance. A decisive step in our otherwise straightforward identification strategy exploits the concurrent repayment over time of both conventional and Islamic loans by the same borrower to the same bank.

II. Data and Identification Strategy

A. Data Description

We analyze loan level data obtained from the Consumer Protection Department (CPD) of the State Bank of Pakistan that maintains the domestic credit registry, i.e., the Credit Information Bureau (CIB). The monthly available data covers all business loans outstanding in Pakistan from 2006:4 to 2008:12, including both the run-up to and the financial crisis[7] itself (for 16

[7] As the financial sector still maintains limited, albeit growing, linkages with global financial markets, Pakistan has been relatively well-insulated against contagion coming from international financial markets (Mansoor Ali

months each if one takes 2007:08 as the start date of the crisis). All loans were granted in the local currency, the Pakistani rupee (code: PKR. 1 USD ~ 79 PKR, 1 EUR ~ 110 PKR on December 31st, 2008).

All banks in Pakistan are required to consult the CIB to verify the credit history of a loan applicant if the application exceeds PKR 500,000, and this requirement is similar for conventional and Islamic loans. The CIB data set is also, therefore, thought to be of good quality and has already been studied in different contexts by Khwaja and Mian [2005], Mian [2006], Khwaja and Mian [2008], and Zia [2008] for example.[8]

For each loan contract the CIB records the identity code and total exposure of the borrower and his location and industry. While we do not have financial information on the borrowers other than the precise loan characteristics, we do know that each borrower meets a specific threshold of financial soundness and is required to have a debt to equity ratio of 4:1 or better, and a current ratio of at least 1. Deviations from these requirements are allowed only in exceptional cases.

The CIB further reports key loan characteristics, such as the exact financial loan product name, default status, maturity, collateralization, whether cash is immediately disbursed or whether the loan is contingent, loan use for export or agricultural purposes, the approved

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[2009]). Actually Pakistan underwent a phase of fiscal tightening and a stringent monetary stance with discount rates remaining relatively high for the entire sample period (discount rates remained at 15 percent till April 2009), to address significant macroeconomic imbalances in the domestic economy, rather than as a response to the financial crisis and global economic slowdown.

[8] As in these papers we do not observe loan need and/or demand to account for the "double" selection bias, in the spirit of Heckman [1979], as in Cerqueiro [2009], Chakravarty and Yilmazer [2009], and Ongena and Popov [2011] for example. Neither do we observe loan applications to study the approval of applications and/or loan granting as in Brown, Kirschenmann and Ongena [2010], Jiménez, Ongena, Peydró and Saurina [2011], and Puri, Rocholl and Steffen [2011] for example. But we are mainly interested in the differential loan default probabilities and control for observed and unobserved loan contract, borrower, bank, borrower-bank and time heterogeneity with combinations of characteristics and fixed effects. We also do not investigate riskiness at the bank or system level where Islamic deposit taking and limits on hedging and trading may be important.

limit and the remaining outstanding amount. The loan rate is also available for a subset of loans. Finally, the CIB records a unique and matching code for the lending bank and the branch where the loan is granted.

Our analysis of individual loan performance commences from the point when a unique credit decision is made. We therefore focus on new loans and loans that are renewed, extended or altered during the sample period. If a borrower obtains two different credit lines for example then both are considered as separate loans. During our 32-month sample period there are 1,238,574 loan-months related to distinct new loans out of a total of almost 4 million loan-months involving 107 financial institutions. Table 2 provides the sample details.

[Insert Table 2 about here]

We discard all loans given to the federal, provincial or local governments, financial intermediaries, autonomous bodies and public sector enterprises because these non-corporate borrowers either cannot default on domestic currency loans, or have different default dynamics that are beyond the scope of this paper. We also exclude from our analysis micro loans of less than PKR 50,000 (retaining them does not alter results), loans larger than PKR 419,000,000, infrastructure and other special loans, and loans granted by financial institutions that are not registered as banks.

Our final dataset consists of 603,677 complete loan-month observations, which corresponds to 152,730 loans granted to 22,723 borrowers by 40 different banks.[9] Around 5 percent of our sample involves Islamic loans (32,199 loan-months), that are granted either by one of the six Islamic banks in our sample (15,153 loan-months) or by an Islamic branch or subsidiary of

[9] This attrition we face (which is also caused by data availability) from 107 financial institutions to 40 banks is similar to Khwaja and Mian [2008] who study 42 banks out 145 financial institutions.

one of the twelve "mixed" banks that offer both conventional and Islamic loans (17,046 loan-months). All bank names (and types) are listed in Appendix B. As of December 2008 there were 8,225 conventional and 514 Islamic bank branches.

About 43% of the Islamic financing in our sample is Murabahah financing, about 22% is Diminishing Musharakah, and about 24% is Ijarah and Ijarah wa'Iqtina. The pure profit and loss sharing (partnership) contracts, Mudaraba and Musharakah, constitute a very small fraction of the market, i.e., only 2% and 1%, respectively.[10]

Crucially for our identification strategy is the observation that within the sample period quite a few borrowers and banks have balance sheets containing both conventional and Islamic loans. As indicated in Table 3 in total 91,008 loan-months involve borrowers that obtain both loan types, while in total 378,649 loan-months involve one of the twelve mixed banks. For 17,381 loan-months the same borrower within the sample period obtains conventional and Islamic loans from the same bank.[11]

[Insert Table 3 about here]

Table 4 reports detailed summary statistics for both conventional and Islamic loans. Crucial for our analysis is the definition of default. We define default to occur if 90 days after the maturity date or the date of an interest payment and/or installment, the debt balance remains

[10] These numbers are similar to those reported by the Islamic Banking Department of the State Bank of Pakistan in its *Islamic Banking Bulletin* of October-December 2008 for example.

[11] Because the sample period is short, a high proportion of the loans obtained by mixed borrowers from mixed banks are concurrently being repaid. Whether the concurrency requirement delivers sharper identification is *a priori* not fully clear, because borrowers could in principle repay one loan of one type with a new loan of the other type and then halt repayments. We will argue later that the bank may even have incentives to be complicit in such loan switching, a practice distinguishable from evergreening (which supervisors strictly aim to discourage by annually examining more than 80% of each bank's loan portfolio). We study the default of loans without this concurrency requirement in this paper and impose a concurrency requirement in unreported robustness.

unpaid. This definition for default is standard and identical for conventional and Islamic loans. In both cases default is not only self-reported by the banks upon prescription of the supervisor, but also carefully checked by the supervisor (every year around 80 percent of loans are randomly checked by supervisors, also for telltale signs of evergreening which if discovered carries penalties for the bank). Later on, we confirm the robustness of our findings if we define default to occur if loans payments are overdue for 180 days rather than 90 days.

[Insert Table 4 about here]

We observe a substantially lower monthly default rate for Islamic compared to conventional loans. This difference (0.9 percent versus 0.5 percent) is not only statistically significant but also economically important. The difference in monthly default rate on Islamic loans granted by an Islamic branch or subsidiary of a conventional bank or by an Islamic bank (0.7 percent versus 0.2 percent) is not statistically significant. For completeness the table also reports the right-censored loan duration, i.e., the time to repayment, default or end of the sample period.

We measure the size of the borrower as the natural log of the sum of all credit facilities (loan limits) that are granted to a borrower by all banks. Borrowers with Islamic loans are larger and are located more often in big cities than other borrowers.

Conventional and Islamic loans statistically differ in all contract characteristics at the one percent level, though the differences are often economically small. According to the means conventional loans have a shorter maturity (15 versus 18 months), are less likely to be collateralized (93 versus 99 percent) and to involve an immediate cash disbursal (74 versus 82 percent) or a durable / fixed asset (14 versus 27 percent), are more likely to be for export or agricultural purposes (11 versus 4 percent and 4 versus 0 percent), and are smaller (PKR 23 versus 35 million) than Islamic loans. Interest rates, which we observe for 239,943 loan-

months (i.e., 40 percent of our sample), are on average 2 percentage points lower for conventional than for Islamic loans. The medians point in a similar direction. Both conventional and Islamic loans can have a fixed or a variable "interest rate" (called "mark-up rate" in case of Islamic loans).

Conventional loans are proportionally more often granted by government, specialized, domestic or large banks than Islamic loans. In absolute terms most conventional and Islamic loans are granted by privately (often internationally) owned and domestically incorporated banks, such as Meezan, Standard Chartered, RBS, Dubai Islamic, Emirates Global for example.

B. Duration Model

1. Intuition

This section develops the econometric methodology employed in analyzing the time until repayment or default of the individual bank loans, or "loan spells".[12] The hazard function in duration analysis provides us with a suitable method for summarizing the relationship between the time to default and the likelihood of default. The hazard rate effectively has an intuitive interpretation as the per-period probability of loan default provided the loan "survives" up to that period.

Repayment of a loan or the sample period's end may prevent us from ever observing a default on this loan. Such a loan spell can be considered right censored. Not knowing when

[12] As in McDonald and Van de Gucht [1999]. Loans to small firms typically carry a relatively short maturity, often without early repayment possibilities; hence, we choose to ignore early repayment behavior captured in their competing risk model. Heckman and Singer [1984], Kiefer [1988] and Kalbfleisch and Prentice [2002] provide comprehensive treatments of duration analysis. Shumway [2001] and Duffie, Saita and Wang [2007] discuss and employ empirical bankruptcy models. See also the application to the duration of bank-firm relationships in Ongena and Smith [2001] and Degryse, Kim and Ongena [2009], on which we base our discussion.

the default would occur, means we are unable to observe the "true" time to default for these loan spells. With no adjustment to account for censoring, maximum likelihood estimation of the proportional hazard models produces biased and inconsistent estimates of model parameters. Accounting for right-censored observations will be accomplished in duration analysis by expressing the log-likelihood function as a weighted average of the sample density of completed loan spells and the survivor function of uncompleted spells. As the sample period runs from 2006:04 to 2008:12, but the median loan maturity is only twelve months, about 5% of all loans are right-censored because of the sample period's end. As our sample consists out of only *new* loans granted from 2006:04 onwards, there is no left censoring problem.

2. Terminology

We begin by introducing terminology common to duration analysis and then describe the hazard function estimators. Let T represent the duration of time that passes before the occurrence of a certain random event. In the econometrics literature, the passage of time is often referred to as a "spell," while the event itself is called a "switch", which in this case will be the switch to the default state. A simple way to describe the behavior of a spell is through its survivor function:

$$S(t) = P(T \geq t),$$

which yields the probability that the spell T lasts at least to time t. The survivor function equals one minus the cumulative distribution function of T.

The behavior of a spell can also be described through the use of the hazard function. The hazard function determines the probability that a switch will occur, conditional on the spell surviving through time t, and is defined by:

$$\lambda(t) = \lim_{\Delta t \to 0} \frac{P(t \le T < t + \Delta t | T \ge t)}{\Delta t} = \frac{-d \log S(t)}{dt} = \frac{f(t)}{S(t)},$$

where $f(t)$ is the density function associated with the distribution of spells. Neither the survivor function nor the hazard function provides additional information that could not be derived directly from $f(t)$. Instead, these functions present economically interesting ways of examining the distribution of spells.

The hazard function does provide a suitable method for summarizing the relationship between spell length and the likelihood of switching. When $\lambda(t)$ is increasing in *t*, the hazard function is said to exhibit positive duration dependence, because the probability of ending the spell increases as the spell lengthens. Similarly, negative duration dependence occurs when $\lambda(t)$ is decreasing in *t*, and constant duration dependence indicates the lack of a relation between $\lambda(t)$ and *t*.

3. Estimators

When estimating hazard functions, it is econometrically convenient to assume a proportional hazard specification, such that:

$$\lambda(t, X(t), \beta) = \lim_{\Delta t \to 0} \frac{P(t \le T < t + \Delta t | T \ge t, X(t), \beta)}{\Delta t} = \lambda_0(t) \exp(\beta' X_t)$$

where X_t is a set of observable, possibly time-varying explanatory variables, β is a vector of unknown parameters associated with the explanatory variables, $\lambda_0(t)$ is the baseline hazard function, and $\exp(\beta' X_t)$ is chosen because it is nonnegative and yields an appealing interpretation for the coefficients, β. The logarithm of $\lambda(t, X(t), \beta)$ is linear in X_t. Therefore, β reflects the partial impact of each variable in *X* on the log of the estimated hazard rate.

The baseline hazard $\lambda_0(t)$ determines the shape of the hazard function with respect to time. The previous equation can be estimated without specifying a functional form for the baseline hazard. The Cox [1972] partial likelihood model bases estimation of β on the ordering of the duration spells. Because it specifies no shape for $\lambda_0(t)$, we refer to the Cox [1972] partial likelihood model as "semiparametric."

Two commonly used parametric specifications for the baseline hazard are the Weibull and the exponential distributions. The Weibull specification assumes:

$$\lambda_0(t) = \lambda\alpha t^{\alpha-1},$$

and allows for duration dependence. When $\alpha > 1$ ($\alpha < 1$), the distribution exhibits positive (negative) duration dependence, implying that the hazard increases (decreases) in time. The exponential distribution, which exhibits constant duration dependence, is nested within the Weibull as the case $\alpha = 1$. To estimate hazard functions using the Cox [1972] partial likelihood model, Weibull, exponential or other specifications one uses maximum likelihood methods. We rely both on parametric Weibull specifications to determine the shape of the hazard function with respect to time, but resort to Cox [1972] proportional hazard models to handle inclusion of many fixed effects.

III. Empirical Results

A. First Specifications

Table 5 presents maximum likelihood estimation results for different duration models. As a starting point, however, we first report estimates from parsimonious logit specifications (Models I and II). The dependent variable in Model I equals one if the loan defaults and equals zero otherwise and we retain only those 122,331 loans that are either repaid or defaulted within the sample period. The dependent variable in Model II equals one if the loan

defaults in a certain month, and equals zero otherwise, and in this specification all 152,730 loans (also those that are right-censored) are included given that the estimation in this case is done at the loan-month level (there are 603,677 loan-months).

The estimated intercept terms in Models I and II that equal -3.228*** and -4.752***,[13] respectively, imply a probability of default for conventional lending that equals 4.3 percent per loan and 0.9 percent per loan-month. The estimated coefficients on the Islamic Loan dummy that equal -0.500*** and -0.612***, respectively, suggest that the odds ratio almost halves when a loan is Islamic (results are unaffected when we add borrower, loan, and/or bank characteristics to the logit specifications).

[Insert Table 5 about here]

Because we want to account for duration dependence, our main empirical results are established using duration models. Columns III to VI report results from a duration model that uses the Weibull distribution as a baseline hazard function.[14] In all parametric models errors are clustered at the borrower level. Model III features only the Islamic loan dummy (and an intercept) and in Model IV we add borrower size as well as 7 borrower region and 67 borrower industry dummies (all regions and industries are listed in Appendix C) and loan characteristics. In Model V, we additionally control for bank type and time (i.e., year*month) fixed effects. In Model VI, we distinguish between Islamic loans that are granted by Islamic branches/subsidiaries of conventional banks and Islamic loans that are granted by Islamic banks.

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[13] As in the Tables, *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

[14] In the next step we employ Cox proportional hazard models where the baseline hazard is left un-parameterized (we also estimate accelerated failure time models with a log-logistic distribution; results are similar and not further reported).

The coefficient for the Islamic Loan dummy is negative and highly statistically significant in all specifications. This is the first main result of our paper: The hazard rate is substantially lower for an Islamic than for a conventional loan. This effect is robust (we will show) to many additional controls, including borrower, bank, and borrower*bank fixed effects and is economically large. Though we return later to economic relevancy in more detail, by way of preview: The coefficient in Model V for example implies that the hazard rate of an Islamic loan is only 2/3rd (= $e^{-0.402}$) of the hazard rate on a conventional loan.

Model VI further shows that especially Islamic loans granted by Islamic banks have a lower hazard rate. The hazard rate of Islamic loans issued by Islamic branches or subsidiaries of conventional banks, though lower, is not statistically different from that of all conventional loans. However, our analysis in Table 7 will show that the hazard rate of Islamic loans issued by Islamic branches or subsidiaries of these mixed banks is statistically lower than the hazard rate of the conventional loans issued by these mixed banks. Hence the picture that arises is that Islamic loans issued by Islamic banks have the lowest hazard rate and that conventional loans issued by purely conventional banks have a lower hazard rate than those issued by mixed banks.

Before further model developments, however, we briefly review the estimated coefficients on the control variables. In our sample, we do not find a robust relationship between borrower size and hazard rates. With respect to loan characteristics, we find the hazard rate to be higher for loans with a longer maturity and those involving an immediate cash disbursal (in which case borrowers likely have to start paying back sooner), but lower for collateralized and agricultural loans (though the statistical significance of these findings later disappears somewhat).

Hazard rates are significantly higher for loans issued by government banks and by those belonging to the largest five banks by loan volume, but lower for loans issued by foreign banks. Our finding of higher hazard rates for loans issued by government banks is consistent with results in Khwaja and Mian [2005], who find that loans given to politically connected firms by government banks in particular tend to have to up to 50 percent higher default rates. Finally, we note that the parameter α is measuring the duration dependence in the baseline hazard specification and that this estimated parameter is not significantly different from one, indicating that there is neither positive nor negative duration dependence.

Borrower, loan and/or bank characteristics that differ between conventional and Islamic loans may be responsible for the estimated difference in the hazard rates. We now systematically investigate each of these possible sources of variation.

B. Differences between Borrowers that Obtain Conventional and Islamic Loans?

Models IV and V in Table 5 control for borrower size, region, and industry, for example, yet these controls may not capture all borrower heterogeneity. In Model VII we therefore include borrower fixed effects to capture all time-invariant unobservable and observable borrower heterogeneity in a Cox proportional hazard model that leaves the baseline hazard un-parameterized (including this many fixed effects in a Weibull specification is technically impossible in our setting). We designate this specification as our benchmark. Notice that we are able to control for borrower fixed effects because our dataset includes borrowers that have both conventional and Islamic loans (we label such borrowers as "mixed borrowers"), some of which default on one or more loans but not on others (this is possible given our 90 days loan-specific definition of non-performance).

We find that the parameter estimate for the Islamic loan dummy remains negative and statistically significant. Moreover, its magnitude is comparable to the other specifications, and even slightly more negative than in the previous most complete specification without borrower fixed effects (in Model V). Hence these estimates indicate that within the 32-month sample period (but controlling for year*month fixed effects) the same borrower is more likely to default on a conventional loan than on an Islamic loan. We revisit this finding, and especially its potential relationship with religion, in Section III.E.

For our benchmark Model VII we more closely assess the economic relevancy of our findings for a one-year (median), collateralized, cash loan that is not for export or agricultural purposes, or granted by a government, specialized, foreign or large bank. Figure 1 displays the resulting schedule of the cumulative hazard of conventional and Islamic loans respectively. After one year (the median loan duration), the difference in the cumulative hazard is already more than 2 percent. This first-year cumulative hazard rate on conventional loans equals 5.2 percent, not uncommon for loans in a developing economy, while the first-year cumulative hazard rate for Islamic loans equals 3.1 percent, more equal to the default rates on loans commonly observed in developed economies.

C. Differences in the Loan Contracts?

Despite the controls for the loan maturity, collateralization, cash disbursal, and the export or agricultural purpose of the loan, it is still possible that differences in loan contract characteristics between conventional and Islamic loans would explain the difference in hazard rates. In Table 6 we report a set of specifications that addresses this possibility.

We start by excluding the 45,254 non-cash facilities that may differ more between conventional and Islamic loans in other loan characteristics. We are left with 107,476 loans

and re-estimate all duration models in Table 5. Model I in Table 6 reports the estimates for the representative benchmark specification. Results are almost unaffected.

[Insert Table 6 about here]

Our data set does not include loan seniority, possibly because seniority of small business loans is often by default based on their precedence in time. In Model II we therefore include a variable *Seniority of Charge* that equals one if the loan is the only one outstanding, and equals zero otherwise. The coefficient on this new variable is insignificant, while the coefficient on Islamic Loan is unaffected.

One variable we have not included yet in the specifications, as we know it is rather coarsely measured, is the durability or fixity of the asset that is financed with the loan. The bank's ownership claim in a *Murabahah* contract will be quite limited (in time) if the financed asset is for example an inventory of raw materials that is being used in the production process (recall that almost all Islamic loans are in addition also collateralized). Model III in Table 6 includes the variable *Durable* that equals one if the loan is granted for a durable or fixed asset, like a plant, machinery, real estate or automobile for example, and equals zero otherwise, in the representative benchmark model. The coefficient on this new variable is also insignificant, while the coefficient on Islamic Loan is again unaffected.

Next, and to account at once for other loan characteristics that are not recorded and for time-varying borrower heterogeneity that is also unobservable to us but that may be observable to the bank, we add the loan rate (*Interest Rate*) in Model IV or the individual loan amount (*Amount*) in Model V. As described in the data section, we have the interest rate for only 40 percent of our sample observations. As expected, we find a positive relation between the loan

rate or size, and the probability of default. However, the estimate for the Islamic loan dummy remains almost unaltered, i.e., -0.406** and -0.506***, respectively.

Next, we perform additional robustness checks with respect to collateralization and Islamic loan type (to conserve space we chose not to tabulate the estimated coefficients). Banks possibly adjust collateralization depending on borrower condition or additional financing, and may do so differently ─ if not in principle, then in practice ─ for the two types of loans. To account for this possibility we simply remove collateral from the base specification. The coefficient on the Islamic loan dummy remains virtually unaffected. To account for the potentially differential nature of collateral in conventional and Islamic lending we add an interaction between the Collateral and Islamic Loan dummies to our benchmark specification. The interaction effect is, however, not statistically significant, and the coefficient on the Islamic Loan dummy remains again unaffected. Similarly we add interactions between all loan contract characteristics and the Islamic loan dummy. With the exception of the negative coefficient on the interaction with maturity, none of the estimated coefficients on the other interactions is statistically significant, and Islamic loans are still found to default less likely than conventional loans.

To account for the different types of Islamic loan contracts, in Model VI we split the Islamic Loan dummy into four loan type dummies, i.e., *Murabahah*, *Diminishing Musharakah*, *Ijarah* or *Ijarah wa'Iqtina*, and Other Islamic loans. The estimated coefficients on the four dummies equal -0.445*, -0.886*, -0.558*, and -0.263, respectively, confirming our findings so far.

We further exclude *Musharakah* and *Mudarabah* contracts (both types are more similar to equity financing than to conventional bank credit), or even more tightly in Model VII restrict the sample to *Murabahah* loans and similar conventional loans, i.e., term finance and

working capital (excluding all other credit facilities such as mortgage finance, leases, export finance, agricultural finance and off-balance financing for example). In both cases results are unaffected with estimated Islamic Loan coefficients that equal -0.500** (untabulated) and -0.554* (Model VII), respectively.

In Model VIII in Table 6 we redefine default to occur only after 180-days. Shorter duration or – when present – tighter covenants for example could result in earlier non-performance. But results are again unaffected (note that though the number of loans remains equal to 152,730, the number of loan-months increases to 613,218, because non-performing loan spells are now right-censored 90 days later).

Finally, in Model IX we study the default on the new loans at bank branches that were opened after 2006:06, i.e., the month with the first six-monthly listing of bank branches within our sample period (4,061 new loans that were originated before this first listing were removed). Loans at new branches may have different characteristics, but of course also the characteristics of the borrowers (and loan officers) there may differ. Unfortunately because of multicollinearity we have to drop the borrower fixed effects.[15]

At new bank branches the hazard of conventional loans is one third and the hazard of Islamic loans one tenth of the hazard of conventional loans at existing branches. Yet, at existing branches the hazard of Islamic loans is now three-quarters of the hazard of conventional loans at existing branches. So it seems that especially new Islamic branches attract re-paying borrowers. Alternatively, if the new branches would attract worse customers, the loan officers there are aware of the externality of the other banks' screening (Broecker [1990]) and screen

[15] One additional *caveat* when interpreting the estimates is that the tighter right-censoring for loans granted at branches that open later during the sample period may bias the estimated hazard for new branches downward if duration dependence is convex.

themselves more strictly, but then especially so when the branch is Islamic and grants Islamic loans.

In sum, it does not seem to be the case that only differences in loan contract characteristics between conventional and Islamic loans can explain their difference in hazard rates.

D. Differences in the Banks that Grant the Conventional and Islamic Loans?

While we do correct for bank type, our dataset does not include more detailed bank characteristics, such as efficiency,[16] capital ratios, overall riskiness of the loan portfolio, and/or liability structure, for example. Controlling for (time-invariant) bank fixed effects may be important, as default rates may be due to bank-specific clientele effects, risk-taking incentives, and/or screening and monitoring technology.

We therefore include bank fixed effects in a variety of models estimated on the set of loans that are issued only by mixed banks that offer both conventional and Islamic loans. This reduces our sample to 378,649 loan-month observations (15,653 borrowers for a total of 109,157 loans). Estimation results are tabulated in Table 7 and the model line-up is similar to Table 5.

[Insert Table 7 about here]

Models I and II in Table 7 are comparable to Models III and IV in Table 5, except that the estimation results are based on the reduced sample. While the parameter estimates on the controls are mostly similar, we find a substantially stronger Islamic loan effect in the reduced

[16] Shahid, ur Rehman, Khan Niazi and Raoof [2010] find almost no differences in efficiency scores between five conventional and five Islamic banks in Pakistan during the period 2005 to 2009, except for the year 2008. For a similarly sized sample and the same time period in Pakistan, Jaffar and Manarvi [2011] find that the conventional banks had the same asset quality, a somewhat lower capital and liquidity position, but higher management quality and earning ability than the Islamic banks.

compared to the full sample. This strong effect remains when we introduce first bank fixed effects (and a bank-specific parameter of duration dependence) in Model III, then both borrower and bank fixed effects in Model IV, and finally borrower*bank fixed effects in Model V. In the latter model the hazard rate on Islamic loans is only one fifth of the hazard rate on conventional loans ($=e^{-1.577}$). Hence the same borrower obtaining conventional and Islamic loans from the same bank within the sample period is five times more likely to default on the conventional loan(s) than on the Islamic loan(s).

In Model VI we contrast these mixed borrowers with those having only conventional loans from the mixed banks. The latter type of borrowers are three times more likely to default on their conventional loans than the mixed type of borrowers on their loans ($=e^{1.184}$), while the mixed and Islamic-only borrowers do not differ on average.

In sum, these findings combined suggest that at mixed banks the hazard rates increase as follows: (1) Islamic loans by mixed borrowers, (2) Islamic loans by Islamic-only borrowers, (3) conventional loans by conventional-only borrowers, and (4) conventional loans by mixed borrowers. Or put differently, at mixed banks the difference in hazard rates between conventional and Islamic loans for mixed borrowers is larger than the difference in hazard rates between conventional loans for conventional-only borrowers and the Islamic loans for Islamic-only borrowers.

Why this wider difference in hazard rates? One possible explanation could reside in the penalties banks charge in case of default.[17] Recall that those penalties flow to the bank in case of non-performance on a conventional loan and to a charity in case of an Islamic loan. In case

[17] Borrowers may also maintain other conventional and Islamic bank products (deposits for example) that are priced jointly with the conventional and Islamic loans respectively by a separate conventional or Islamic bank desk. Any cross-subsidization across products taken by borrowers done at the bank level is absorbed by the borrower*bank fixed effects however.

banks would set penalties optimally (but disregarding other loan terms) they would set the penalties on conventional loans lower than on Islamic loans, especially for borrowers that mix loan types and that are of an intermediate credit quality.[18]

Yet, we do not think differential penalties are the explanation here. First, anecdotal evidence from supervisors with ample field experience in Pakistan suggests that banks may actually set the penalties on conventional and Islamic loans equal to each other. In Appendix D we report the penalties we gleaned from bank websites recently for different household loan types; while not necessarily equal to those specified on the business loans in our study, the penalties the banks list on their website suggest that the penalties on Islamic loans may – if anything – even be lower than those on conventional loans.

Second, when introducing in a variety of specifications the interactions of the Islamic loan dummy with – as a proxy for borrower quality – the observed loan rate and the rate squared, the estimated coefficients on the interaction terms are statistically insignificant but are actually pointing in an opposite direction (i.e., for intermediate loan rate borrowers the difference in the hazard rate between conventional and Islamic loan is minimal not maximal as we would expect if penalties are set optimally).

E. Borrower, Bank or Loan Characteristics? Or Religion?

Until now, we have found consistent evidence that the same borrower is less likely to default on Islamic than on conventional loans obtained from the same bank, and that when borrowing

[18] In this way banks would entice non-performance on conventional loans and not only capture the penalties (when paid) on the non-performing conventional loan(s), but also assure continued payment of the higher loan rates on the Islamic loan(s). This penalties strategy may be optimal for borrowers of an intermediate quality, who with a probability between zero and one pay the penalties and repay both loans. For really bad or really good mixed borrowers differentiating penalties between conventional and Islamic loans may be marginally less important. Of course, *ex ante* banks likely set penalties jointly with the interest (mark-up) rate and other loan terms and/or could provide for example repayment *boni*.

from a mixed bank the difference in hazard rates between conventional and Islamic loans for these mixed borrowers is larger than the difference in hazard rates between conventional loans for conventional-only borrowers and the Islamic loans for Islamic-only borrowers.

One possible explanation for these robust findings is that borrowers may choose not to default on Islamic loans because of their individual religious beliefs. As argued before, the motivation to take the Islamic loan may also discourage the borrower from defaulting on it.

In Model VII in Table 7 two variables are introduced that capture whether borrowers (that have both type of loans) during the sample period switch to Islamic or to conventional borrowing, i.e., whether during the sample period conventional loans were obtained first or later than Islamic loans. Those borrowers that switch to Islamic borrowing may be, given the recency of their decision, even more motivated not to default on their Islamic loans.

For this exercise the start of the sample period presents a severe left-censoring problem, i.e., we cannot observe those loans that are no longer outstanding. One additional *caveat* when interpreting the estimates is that the tighter right-censoring for loans that are recently granted may bias the estimated hazard for new loans downward if duration dependence is convex. Hence one has to compare the difference between the two switching coefficients. Though not statistically different, the estimates suggest that individual motivation may play a role. Those borrowers that only recently turned to Islamic loans are even less likely to default on their Islamic loans than those that switched to conventional loans.

While the most fervent religious believers may prefer to obtain Islamic loans only, intermediate fervency may result in mixed borrowing.[19] Hit by a negative shock large enough

[19] We do not think that intermediate piousness and mixed borrowing *per se* negates religion as a possible determinant of lower Islamic loan default ("some people pray but do not fast"). Of course mixed borrowing may also arise from specific credit needs such as corporate credit cards, export finance supported by the SBP,

to overwhelm their religious resistance to loan default, Islamic-only borrowers have no choice but to default on one of their Islamic loans. On the other hand mixed borrowers do have a choice and despite their lower fervency may on the margin more often decide not to default on their Islamic loans than on their conventional loans.[20]

To establish beyond any doubt that religious beliefs matter for loan default one would need an objective measurement of religiosity for each individual borrower. As far as we are aware no existing research has had access to such a measure,[21] and neither do we. In Table 8 we therefore introduce a number of specifications that are a first step in identifying whether religion in this setting matters for loan default.

[Insert Table 8 about here]

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specific discounting of bills, etc.. Many Islamic scholars would even argue that borrowing at some interest is allowed if the borrower is to meet un-avoidable necessities.

[20] Appendix E further illustrates how the different degrees of individual religiosity of the borrowers may create the differentials in default probabilities we observe. If both the probability the borrowers take a conventional loan and the probability the borrowers default on a loan decrease in the degree of their religiosity, then Islamic loans are on average less likely to default than conventional loans. If a borrower takes two loans, intermediate religiosity is more likely to result in a conventional and Islamic loan being taken. If a secular borrower is indifferent between defaulting on the conventional or Islamic loan, and a religious borrower prefers to default on the conventional loan, then the ratio of the Islamic over conventional loan default probabilities may be smaller for the two-loan borrowers than for the one-loan borrowers (which is precisely what our findings so far suggest). An alternative explanation for our findings could be that the bank loan officer similarly driven by religious beliefs – maybe the loan officer works for an Islamic branch because of religious beliefs or is influenced by its orientation – is lenient and helps (or convinces) the borrower in one way or another to avoid non-performance on the Islamic loan rather than on the conventional loan. The imputed interest rate on Islamic loans is more than 200 basis points higher than on conventional loans suggesting that borrowers may be "more religiously motivated" than banks (though it is important to note that the loan rate is only collected or imputed for less than half the loans, and that in the case of Islamic loans it may also include some insurance fees). Hence we prefer to discuss our findings in terms of borrower rather than in terms of loan officer religiosity.

[21] Al-Azzam, Hill and Sarangi [2011] find that the repayment delay on 160 *group* loans in Jordan is negatively affected by the percentage of group members who pray five times a day. More broadly Guiso, Sapienza and Zingales [2011] document that homeowners that find it "*morally wrong* to walk away" are less likely to say that they are willing to default when the value of their home equity falls below a certain threshold even if they can afford to pay the monthly mortgage costs.

Model I in Table 8 introduces a variable *Ramadan* that equals one if the month is in the Ramadan period and equals zero otherwise.[22] If either (1) the local network effect of religious activity,[23] and/or (2) the identification of the borrower with Islamic tenets,[24] plays a role in explaining the lower hazard rate on Islamic loans, one would expect this differential between conventional and Islamic loans to widen during the holy Muslim month.[25] The estimated coefficient on the interaction between Islamic loan and *Ramadan* is indeed negative and sizeable, i.e., -0.696*, implying that during *Ramadan* months default on Islamic loans drops by more than half.

In case the network effect of religious activity plays a role, the location of the borrower (and/or the bank) may matter. In rural areas (and small towns) there may be more inherent social pressure to repay and more informal help from family and friends in case a borrower faces financial difficulties, and religious affiliation and practice may provide few or no extra

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[22] During the sample period *Ramadan* took place from September 23rd, 2006, to October 22nd, 2006, from September 13th, 2007, to October 12th 2007, and from September 1st, 2008, to October 1st, 2008. In 2006 and 2007 we consider September and October *Ramadan* months, in 2008 only September.

[23] Prospective borrowers and loan officers may meet at mosques for example. Meetings there between loan officers may also function as an informal credit register (see Jappelli and Pagano [1993], Padilla and Pagano [1997], Bouckaert and Degryse [2006] and Brown, Jappelli and Pagano [2009] for example on the effects of formal credit registers). Using 1999 – 2003 data on the composition of the boards of directors of all firms in Pakistan, Khwaja, Mian and Qamar [2011] estimate the value of membership in the large yet diffuse network that links firms through interlocks for the access to bank credit and financial viability. The *common bond* present in credit unions around the world may fulfill a similar role (McKillop and Wilson [2011]). Ostergaard, Schindele and Vale [2009] for example find that savings banks located in Norwegian communities with high *social capital* have a higher probability of survival and lower loan losses. Though they stress the role social capital plays in facilitating collective decision-making at the banks.

[24] Khan [2010] argues that "despite not providing an alternative to conventional banking and finance, Islamic banking and finance does strengthen a distinctly Islamic identity by providing the appropriate Islamic terminology for *de facto* conventional financial transactions."

[25] Ramadan is a fundamentally shared experience, both within the local community and with other Muslims across the world, and may hence result in both a (temporary) strengthening of local social networks and a surge in the identification with the Muslim world and its practices. Clingingsmith, Khwaja and Kremer [2009] show that identification with the global Muslim community may also strengthen following participation in the Hajj, but we lack individual Hajj participation data to test this conjecture in this context. Following Frieder and Subrahmanyam [2004], Bialkowski, Etebari and Wisniewski [2010] show that equity returns in 14 Muslim markets are substantially higher during Ramadan, while volatility is markedly lower. These findings can possibly be attributed to the sentiment of Islamic investors and their trades during this period.

network benefits. The distinction between religious and other political parties in rural areas and small towns may also be less acute than in big cities because rural dwellers may in general be more religious.

We introduce a dummy variable *Big City* that equals one if borrower is located in a city with more than one million inhabitants and equals zero otherwise. To measure local religious fervency we rely on a variable *Share Religious Political Parties*, which equals the percentage of total votes obtained for National Assembly seats by the coalition of six religious-political parties in the General Elections of 2002 in the district where the borrower is located.[26]

We interact the Share variable with the Big City dummy. We expect that if the network effects of religion matter the hazard differential between Islamic and conventional loans will increase in the share of religious political parties in big cities (i.e., we expect the estimated coefficient on Islamic Loan * Share * Big City to be negative).[27]

We report the estimates with the Share of Religious Political Parties and Big City variables in Models II and III in Table 8. Notice that the sample now includes only those loans that are granted in the four provinces and the federal capital (i.e., regions where Pakistani political parties can operate) and exclude loans in other regions administered by Pakistan. The results are very interesting. The estimated coefficients in Model III (which includes bank fixed effects) for example suggest that <u>in big cities</u>: (1) the loan hazard rate is on average almost 50 percent higher than in rural areas (i.e., the coefficient on Big City equals 0.486***); (2) Islamic loans are relatively more likely to default than in rural areas (i.e., the coefficient on

[26] We use the poll results from the 2002 General Election because 5 of the 6 religious-political parties boycotted the 2008 edition.

[27] Borrower size may also be positively correlated with possible religious network effects. In various specifications we indeed find that the coefficient of our measure of borrower size interacted with the Islamic Loan dummy is negative, statistically significant, and economically sizable.

Islamic Loan * Big City equals 0.206, hence is positive and sizeable though not significant); and (3) Islamic loans are relatively less likely to default loans if the share of religious parties grows while this is not the case in rural areas (i.e., the coefficient on Islamic Loan * Share * Big City equals -0.170***, while the coefficient on Islamic Loan * Share equals 0.0429).

This evidence suggests that difference in loan performance of conventional and Islamic loans, especially among urban dwellers that in general may be less pious, may be explained by the network effect of religious activity.

In robustness we replace the Share of Religious Political Parties with *Religious School Enrollment* we glean from Andrabi, Das, Khawaja and Zajonc [2006]. They define this variable as the number of children enrolled in religious schools as a percentage of total school enrollments in each district (we use the mid-points for the ranges they report). Results (we do not tabulate) again suggest that network effects of religion play a role in determining the differential probability of conventional and Islamic loan repayment, though now the effect is more muted in big cities than in rural areas. Possibly the increased possibilities for pupils to commute in big cities may weaken the correspondence between this measure of local religiosity and the differential in hazard rates.[28]

In a recent study, Pepinsky [2010] argues that the demand for Islamic banking products is determined more by a quest by individuals to claim or maintain a Muslim identify, rather than by religiosity itself. The need for identification tends to be stronger for middle-class borrowers, who are more vulnerable to social dislocation problems induced by modernization and globalization, especially when located in a big city. We hypothesize that in particular

[28] We further replace the Big City by the *Government Bank* dummy in all specifications but none of the coefficients on the interaction terms are statistically significant. This result suggests that the share of religious parties may not influence the loan officers at these government banks (that grant also Islamic loans) to be more lenient on these loans.

these middle-class borrowers that look to strengthen their Muslim identify not only demand more Islamic banking products but also have a lower propensity to default on them, especially in big cities.

To test this conjecture, we introduce a variable *Share of Post-Natal Private Care* which equals the percentage of women that used private (and not public) hospitals or clinics for their post-natal care in the district of the borrower captures the local consumption of a luxury good by the middle class. Models IV and V feature this new *Share* variable and its interactions. The estimated coefficient on the triple interaction term (almost marginally significant, its p-value equals 0.104) suggests that in big cities Islamic loans are less likely to default than conventional loans if the share of post-natal private care grows.

In sum, the reported estimated correlations suggest that in addition to borrower, loan and/or bank loan characteristics, also religion may play some role in determining the differential repayment performance of conventional and Islamic loans, through individual piousness, network effects and maybe also group identification.

IV. Conclusions

The hazard rate on Islamic loans is less than half the hazard rate on conventional loans, across many duration models we estimate using a comprehensive monthly dataset from Pakistan that follows more than 150,000 loans over the period 2006:04 to 2008:12. The specifications include a variety of loan contract, borrower, and bank characteristics, where possible combined with time, borrower, bank and/or borrower*bank fixed effects. During Ramadan and in big cities where religious parties poll well Islamic loans default less likely, suggesting that religious motivation may partly determine the differential loan default rates.

It is important to notice that our study does not aim to address the broader question if conventional or Islamic finance is "better" from either the borrower's, bank's or even society's perspective. Such individual, institutional and public welfare analyses would require for example the collection of detailed data on individual motivations for loan repayment and the aggregation at the bank level of micro-level data, not only on individual bank loans but also on deposits and other bank products, bank organization and processes etc. Nor does our study imply that similar effects could not be present among adherents to other religions or value systems. But studying the default rates on individual conventional and Islamic loans is a first and necessary step, however, in understanding how the specific arrangements in Islamic finance may, or may not, determine borrower loan repayment.

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Figure 1.

The figure displays the cumulative hazard based on the estimated coefficients of Model VII in Table 5 for a one-year (median) conventional or Islamic loan with all other covariates set at their mean. The cumulative hazard after 12 months for a conventional loan equals 5.2%, for an Islamic loan it equals 3.1%.

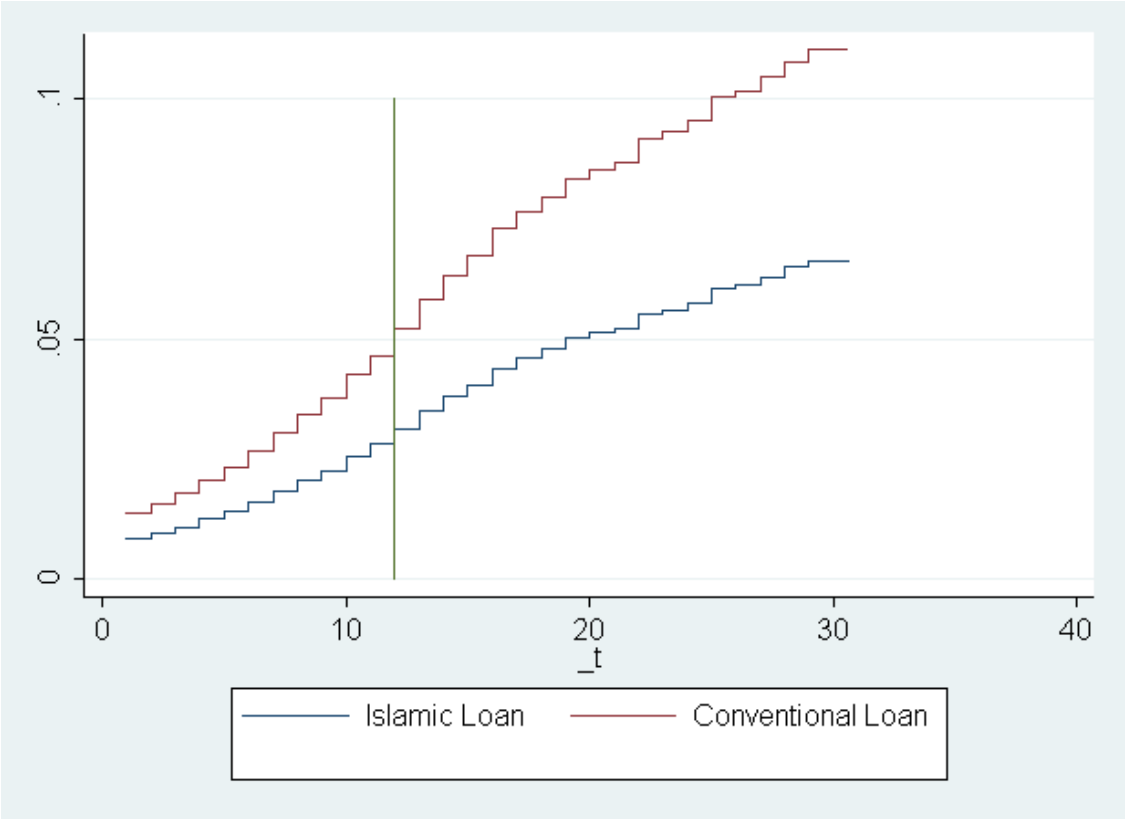

Table 1.

The table summarizes selected empirical work on Islamic banking.

Paper	***Sample***			***Analysis***		
	Countries	*Period*	*# Obs.*	*At Level*	*Explains*	*Finds (w.r.t. differences between conventional and Islamic banks / loans)*
Imam and Kpodar [2010]	117	1992-2006	1,520	Country - Year	Presence	Identifies various factors of diffusion
Mohamad, Hassan and Bader [2008], Bader, Mohamad, Ariff and Hassan [2008]	21	1990-2005	80	Bank	Efficiency	No differences
Chong and Liu [2009]	Malaysia	1995:04-2004:04	109	Month	Average interest rates	Islamic deposits are not interest-free, but are closely pegged to conventional deposits
Čihák and Hesse [2010]	18	1993-2004	2,347	Bank - Year	Z-score Bank strength	Small Islamic > small commercial Large commercial > large Islamic Small Islamic > large Islamic
Abdul-Majid, Saal and Battisti [2010]	10	1996-2002		Bank - Year	Technical inefficiency	Islamic banks are more technically inefficient
Abedifar, Molyneux and Tarazi [2011]	22	2001-2008	1,230	Bank - Year	Bank stability, loan risk	No differences in insolvency risk; for Islamic banks lower loan loss reserves or problem loans but more frequent write-offs and lower recovery
Weill [2010]	17	2000-2007	1,301	Bank - Year	Bank market power (Lerner)	Islamic banks have somewhat less market power
Beck, Demirgüç-Kunt and Merrouche [2010]	141	1995-2007	25,000	Bank - Year	Various bank measures	Few significant differences in business orientation, efficiency, asset quality, or stability
Ongena and Şendeniz-Yüncü [2011]	Turkey	2008	16,056	Bank - Firm	Firm bank choice	Islamic banks deal with young, multiple-bank, industry-focused and transparent firms
Pepinsky [2010]	Indonesia	2008:05/06	2,548	Consumers	Views on Islamic Finance	Islamic identity matters, not piety
Khan and Khanna [2010]	Pakistan	2008	9,078	Customers at two banks	Opening bank account	Religiosity and wealth matters when opening an Islamic bank account
Khan [2010]	Pakistan	2006:06-2009:03	995	Bank - Account	Growth deposit accounts	Islamic deposit accounts grow faster than conventional ones
This paper	Pakistan	2006:04-2008:12	603,677	Loan - Month	Loan default	Islamic loans less likely to default

Table 2: Sample Composition

The table reports the composition of the sample. The sample period runs from 2006:04 to 2008:12. Loans to non-corporates include loans to financial intermediaries, public sector enterprises, local, provincial or federal governments, and other autonomous bodies. Micro, special and non-bank loans comprise loans smaller than PKR 50,000, loans larger than PKR 419,000,000, infrastructure and other special loans, and loans granted by financial institutions that are not registered as banks.

Variable	Number of Observations	Unit
All new loans granted	1,238,574	loan - months
Minus loans to non-corporates	363,221	loan - months
Minus micro, special and non-bank loans	252,047	loan - months
Sample loans observed each month	603,677	loan - months
Conventional	*571,478*	loan - months
Islamic	*32,199*	loan - months
Loans	152,730	loans
Borrowers	22,723	borrowers
Banks	40	banks

PKR = Pakistani Rupee. 1 USD ~ 79 PKR , 1 EUR ~ 110 PKR (December 31, 2008).

Table 3: Samples for borrowers and banks by loan types

The table reports the number of loan - months for the samples of borrowers and banks by loan type.

Loans observed each month		**Granted by banks that offer loans that are**			
		only conventional	**conventional and Islamic**	**only Islamic**	***Totals***
Obtained by borrowers with loans that are	**only conventional**	172,120	331,675	-	*503,795*
	conventional and Islamic	37,755	44,946	8,307	*91,008*
	only Islamic	-	2,028	6,846	*8,874*
	Totals	*209,875*	*378,649*	*15,153*	*603,677*

Table 4: Summary Statistics on Conventional and Islamic Loans

The table reports the name, definition, and unit for all variables employed in the empirical analysis, and the number of observations, mean (and difference-in-means), standard deviation, median, minimum, and maximum seperately for conventional and Islamic loans (*and where indicated for Islamic loans granted by an Islamic branch or subsidiary of a conventional bank or by an Islamic bank*). Other Islamic loan types include Istisna, Salam, Musharakah, Modaraba, and Qard-e-Hasna loans. The sample period runs from 2006:04 to 2008:12. See the Appendix for the Regions, Industries and Bank types.

Variable	Definition	Unit	Number		Mean			St. Dev.		Median		Minimum		Maximum	
Islamic Loan	=1 if loan is an Islamic loan, =0 otherwise	0/1	32,199		0.053			0.225		0		0		1	
by Islamic Branch/Subsidiary	*=1 if the Islamic loan is granted by an Islamic branch or subsidiary of a conventional bank, =0 otherwise*	*0/1*	*17,046*		*0.028*			*0.166*		0		0		1	
by Islamic Bank	*=1 if the Islamic loan is granted by an Islamic bank, =0 otherwise*	*0/1*	*15,153*		*0.025*			*0.156*		0		0		1	
Murabahah	=1 if Islamic loan is a Murabahah loan, =0 otherwise	0/1	13,869		0.023			0.150		0		0		1	
Diminishing Musharakah	=1 if Islamic loan is a Diminishing Musharakah loan, =0 otherwise	0/1	7,219		0.012			0.109		0		0		1	
Ijarah or Ijarah wa' Iqtina	=1 if Islamic loan is a Ijarah or Ijarah wa' Iqtina loan, =0 otherwise	0/1	7,794		0.013			0.113		0		0		1	
Other	=1 if Islamic loan is an other Islamic loan type, =0 otherwise	0/1	3,317		0.005			0.074		0		0		1	
			Convent. Loan (*Bank*)	Islamic Loan (*Bank*)	Convent. Loan (*Bank*)	Islamic Loan (*Bank*)	Diff.	Convent. Loan (*Bank*)	Islamic Loan (*Bank*)	Convent. Loan (*Bank*)	Islamic Loan (*Bank*)	Convent. Loan (*Bank*)	Islamic Loan (*Bank*)	Convent. Loan (*Bank*)	Islamic Loan (*Bank*)
Loan Performance															
Loan Default	=1 if the loan defaults, =0 otherwise	0/1	571,478	32,199	0.009	0.005	***	0.092	0.068	0	0	0	0	1	1
	if the Islamic loan is granted by an Islamic branch or subsidiary of a conventional bank (Convent.) or by an Islamic bank (Islamic)	*0/1*	*17,046*	*15,153*	*0.007*	*0.002*		*0.083*	*0.045*	*0*	*0*	*0*	*0*	*1*	*1*
Duration	time to repayment, default or end of sample period	months	571,478	32,199	4.958	4.906	**	4.541	4.473	3	3	1	1	33	32
	if the Islamic loan is granted by an Islamic branch or subsidiary of a conventional bank (Convent.) or by an Islamic bank (Islamic)	*months*	*17,046*	*15,153*	*4.626*	*5.221*		*4.159*	*4.783*	*3*	*4*	*1*	*1*	*30*	*32*
Borrower Characteristics															
Size	the sum of all loans granted by all financial institutions to a borrower	mln. PKR	571,478	32,199	329.000	433.000		1,220.000	1,160.000	25	52	0	0	80,900	19,100
ln(Size)	the natural log of borrower size	-	571,478	32,199	16.849	17.618	***	2.475	2.143	16.816	17.523	10.820	10.820	25.109	23.659
Region	location in province or other distinct region	1 of 8	560,822	30,232											
Industry	affiliation to industry	1 of 68	556,848	29,893											
Loan Characteristics															
Maturity	period for which loan is granted	months	571,478	32,199	15	18	***	14	20	12	12	1	1	180	236
Collateral	=1 if loan is collateralized, =0 otherwise	0/1	571,478	32,199	0.929	0.991	***	0.257	0.096	1	1	0	0	1	1
Cash	=1 if loan involves immediate cash disbursal, =0 otherwise	0/1	571,478	32,199	0.739	0.817	***	0.439	0.387	1	1	0	0	1	1
Export	=1 if loan is used for export, =0 otherwise	0/1	571,478	32,199	0.106	0.038	***	0.308	0.192	0	0	0	0	1	1
Agricultural	=1 if loan is used for agricultural activities, =0 otherwise	0/1	571,478	32,199	0.037	0	***	0.189	0	0	0	0	0	1	0
Seniority of Charge	=1 if loan taken is the only one outstanding, =0 otherwis	0/1	571,478	32,199	0.379	0.360	***	0.485	0.480	0	0	0	0	1	1
Durable	=1 if loan is granted for durable/fixed asset, =0 otherwise	0/1	571,478	32,199	0.142	0.266	***	0.349	0.442	0	0	0	0	1	1
Interest Rate	the interest rate on the loan	%	234,398	5,545	12.695	14.795	***	4.214	2.301	13.50	14.63	1.000	1.000	42.80	42.05
Amount	the amount of cash disbursed or the granted limit	000 PKR	571,478	32,199	22,900	34,900	***	50,400	58,000	4,800	11,400	50	50	419,000	418,000
New Bank Branch	=1 if loan is granted by a bank branch opened after 2006:06, =0 ot	0/1	571,478	32,199	0.021	0.131	***	0.142	0.337	0	0	0	0	1	1
Bank Characteristics															
Government	=1 if bank is government-owned, =0 otherwise	0/1	571,478	32,199	0.133	0.087	***	0.340	0.282	0	0	0	0	1	1
Specialized	=1 if bank is a specialized bank, =0 otherwise	0/1	571,478	32,199	0.038	0.000		0.191	0.000	0	0	0	0	1	0
Foreign	=1 if bank is foreign-owned, =0 otherwise	0/1	571,478	32,199	0.018	0.174	***	0.132	0.379	0	0	0	0	1	1
Large	=1 if bank is 1 of the 5 largest by loan volume, =0 otherwise	0/1	571,478	32,199	0.367	0.055	***	0.482	0.227	0	0	0	0	1	1
Time Period Characteristic															
Ramadan	=1 if Ramadan takes place during the month, =0 otherwise	0/1	571,478	32,199	0.132	0.131		0.339	0.337	0	0	0	0	1	1
Borrower District Characteristics															
Big City	=1 if borrower is located in a city with more than one million inhabitants, =0 otherwise	0/1	559,945	30,811	0.651	0.835	***	0.477	0.371	1	1	0	0	1	1
Share Religious Political Parties	percentage of total votes obtained for National Assembly seats by the coalition of six religious-political parties in General Elections-2002 in the district of the borrower	%	560,454	31,357	13.911	17.378	***	12.031	12.700	10.235	10.235	0	0	74.107	74.107
Share Private Post-Natal Care	percentage of women who used private (and not public) hospitals or clinics for post-natal care in the district of the borrower	%	560,734	31,424	0.208	0.229	***	0.118	0.118	0.183	0.183	0	0	0.392	0.392

***, **, * indicate significance at 1%, 5% and 10% level, two-tailed. PKR = Pakistani Rupee. 1 USD ~ 79 PKR , 1 EUR ~ 110 PKR (December 31, 2008).

Table 5: All Banks

The table reports the maximum likelihood estimation results of logit and duration models. The dependent variable in Model I equals one if the loan defaults and equals zero otherwise. The dependent variable in Model II equals one if the loan defaults in a certain month, and equals zero otherwise. The dependent variable in all other models is the hazard rate. The estimations in Models I and II employ logit models. The estimations in Models III to VI employ parametric duration models with a Weibull distribution that includes a parameter of duration dependence. Model VII reports the results of a Cox-proportional hazard model and includes borrower fixed effects. The sample period runs from 2006:04 to 2008:12. For each variable in the specification the table reports the estimated coefficient, statistical significance level and standard error (below in parentheses). In all estimations involving parametric models, standard errors are clustered by borrower.

Models	I	II	III	IV	V	VI	VII
Estimation	Logit	Dynamic Logit	Weibull	Weibull	Weibull	Weibull	Cox
Dependent Variable	Loan Default 0/1	Loan-Month Default 0/1	Hazard Rate	Hazard Rate	Hazard Rate	Hazard Rate	Hazard Rate
Islamic Loan	-0.500***	-0.612***	-0.581***	-0.725***	-0.402**		-0.508***
	(0.148)	(0.144)	(0.144)	(0.157)	(0.158)		(0.193)
-- by Islamic branch or subsidiary of conventional bank						-0.262	
						(0.189)	
-- by Islamic Bank						-0.781***	
						(0.238)	
Borrower Characteristics							
ln(Size)				-0.00934	0.0148	0.0145	
				(0.0223)	(0.0247)	(0.0247)	
Loan Characteristics							
Maturity				0.00504**	0.00462*	0.00472**	0.00909***
				(0.00222)	(0.00238)	(0.00238)	(0.00138)
Collateral				-0.233**	0.0462	0.0476	-0.109
				(0.114)	(0.136)	(0.136)	(0.105)
Cash				2.302***	2.185***	2.181***	1.509***
				(0.109)	(0.111)	(0.112)	(0.109)
Export				-0.0152	0.00793	0.00947	-0.199***
				(0.211)	(0.204)	(0.204)	(0.0654)
Agricultural				-0.701**	-0.302	-0.301	0.245
				(0.318)	(0.251)	(0.251)	(0.381)
Bank Characteristics							
Government					0.216*	0.213*	0.503***
					(0.123)	(0.123)	(0.121)
Specialized					-0.113	-0.114	0.191
					(0.305)	(0.305)	(1.322)
Foreign					-0.828**	-0.745**	-0.552
					(0.339)	(0.335)	(0.374)
Large					0.719***	0.718***	0.575***
					(0.154)	(0.153)	(0.0984)
Intercept	-3.128***	-4.752***	-4.759***	-6.689***	-8.752***	-8.745***	
	(0.0620)	(0.0608)	(0.0995)	(0.476)	(1.169)	(1.168)	
Borrower Region dummies (7)	No	No	No	Yes	Yes	Yes	No
Borrower Industry Dummies (67)	No	No	No	Yes	Yes	Yes	No
Year*Month Fixed Effects	No	No	No	No	Yes	Yes	Yes
Borrower Fixed Effects	No	No	No	No	No	No	Yes
Log Pseudolikelihood	-20,995	-29,115	-25,121	-23,013	-22,157	-22,154	-9,510
α (Duration Dependence)	-	-	0.978	0.983	0.962	0.962	-
Chi^2(k) [LR in VI, VII, IX & XIII, Wald in others]	11	18	16	4,009	4,479	4,437	1,631
Number of regressors minus one (k)	1	1	1	81	117	118	42
Number of Loan-Months	-	603,677	603,677	582,759	582,759	582,759	603,677
Number of Loans	122,331	152,730	152,730	149,302	149,302	149,302	152,730
Number of Borrowers	19,063	22,723	22,723	21,866	21,866	21,866	22,723

***, **, * indicate significance at 1%, 5% and 10% level, two-tailed.

Table 6: All Banks: Robustness

The table reports the maximum likelihood estimation results of duration models. Models I to VIII report the results of a Cox-proportional hazard model and include borrower fixed effects. The estimation in Model IX employs a parametric duration model with a Weibull distribution that includes a parameter of duration dependence. The sample used in Model I contains only cash loans. The sample used in Model VII contains Murabaha and conventional loans given as working capital and term finance (excluding all other credit facilities, i.e., mortgage finance, leases, export finance, agricultural finance and off-balance financing). The sample period used in Model IX starts in 2006:07. Otherwise the sample period runs from 2006:04 to 2008:12. The dependent variable is the hazard rate. For each variable in the specification the table reports the estimated coefficient, statistical significance level and standard error (below in parentheses). In all estimations involving parametric models, standard errors are clustered by borrower.

Models	I	II	III	IV	V	VI	VII	VIII	IX
Alteration	Only Cash Loans	Seniority Added	Durable Added	Interest Rate Added	Loan Amount Added	By Islamic Loan Type	Murabahah and Similar Conv.	180-Days Default	New Bank Branch
Islamic Loan	-0.535***	-0.509***	-0.498***	-0.406**	-0.506***		-0.554*	-0.740**	-0.259*
	(0.203)	(0.193)	(0.193)	(0.192)	(0.193)		(0.298)	(0.308)	(0.158)
-- Murabaha						-0.445*			
						(0.240)			
-- Diminishing Musharakah						-0.886*			
						(0.469)			
-- Ijarah						-0.558*			
						(0.310)			
-- Other						-0.263			
						(0.456)			
Islamic Loan * New Bank Branch									-2.384**
									(1.058)
Borrower Characteristics									
ln(Size)									0.0181
									(0.0247)
Loan Characteristics									
Maturity	0.00653***	0.00907***	0.00950***	0.00510*	0.00872***	0.00924***	0.00966***	0.0111***	0.00485**
	(0.00150)	(0.00138)	(0.00142)	(0.00305)	(0.00138)	(0.00140)	(0.00208)	(0.00190)	(0.00233)
Collateral	-0.0968	-0.110	-0.110	-0.244	-0.105	-0.111	-0.323**	-0.167	-0.0429
	(0.115)	(0.105)	(0.105)	(0.157)	(0.105)	(0.105)	(0.158)	(0.139)	(0.135)
Cash		1.509***	1.518***	1.161***	1.500***	1.505***		1.543***	-2.203***
		(0.109)	(0.109)	(0.338)	(0.109)	(0.109)		(0.151)	(0.112)
Export	-0.207***	-0.199***	-0.204***	0.156	-0.192***	-0.200***		-0.214***	0.00234
	(0.0662)	(0.0654)	(0.0654)	(0.128)	(0.0650)	(0.0654)		(0.0793)	(0.203)
Agricultural	0.267	0.246	0.215	0.385	0.247	0.243		-0.631	-0.300
	(0.386)	(0.381)	(0.382)	(0.581)	(0.380)	(0.381)		(0.671)	(0.251)
Seniority of Charge		0.0204							
		(0.0916)							
Durable			-0.112						
			(0.0878)						
Interest Rate				0.0277**					
				(0.0116)					
Amount					0.001***				
					(0.0005)				
New Bank Branch									-1.199***
									(0.293)
Bank Characteristics									
Government	0.533***	0.503***	0.498***	0.383	0.442***	0.504***	0.561***	0.202	0.199
	(0.125)	(0.121)	(0.121)	(0.279)	(0.123)	(0.121)	(0.186)	(0.162)	(0.123)
Specialized	0.0772	0.187	0.239		0.145	0.191	-0.419	-36.03	-0.138
	(1.440)	(1.321)	(1.343)		(1.315)	(1.322)	(0.443)	(38.000)	(0.305)
Foreign	-0.529	-0.551	-0.558	-0.201	-0.554	-0.507	-0.596	0.189	-0.908***
	(0.401)	(0.374)	(0.374)	(0.553)	(0.372)	(0.379)	(0.674)	(0.481)	(0.339)
Large	0.570***	0.574***	0.568***	0.984***	0.566***	0.578***	0.528***	0.774***	0.694***
	(0.102)	(0.0983)	(0.0984)	(0.195)	(0.0984)	(0.0985)	(0.138)	(0.130)	(0.150)
Intercept									-8.206***
									(1.153)
Borrower Region dummies (7)	No	No	No	No	No	No	No	No	Yes
Borrower Industry Dummies (67)	No	No	No	No	No	No	No	No	Yes
Year*Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Log Pseudolikelihood	-9,018	-9,510	-9,510	-2,922	-9,506	-9,510	-4,302	-5,771	-22,062
α (Duration Dependence)	-	-	-	-	-	-	-	-	0.961
Chi^2(k) [LR in VI, VII, IX & XIII, Wald in others	1,215	1,631	1,632	545	1,639	1,632	814	1,238	7,419
Number of regressors minus one (k)	41	43	43	41	43	45	38	42	119
Number of Loan-Months	448,333	603,677	603,677	239,946	603,677	603,677	257,979	613,218	580,810
Number of Loans	107,476	152,730	152,730	54,952	152,730	152,730	61,184	152,730	148,669
Number of Borrowers	19,084	22,723	22,723	13,628	21,574	21,574	14,652	22,041	21,837

***, **, * indicate significance at 1%, 5% and 10% level, two-tailed.

Table 7: Mixed Banks

The table reports the maximum likelihood estimation results of duration models. Models I to III and V to VII employ parametric duration models with a Weibull distribution that includes a parameter of duration dependence. Model IV reports the results of a Cox-proportional hazard model and includes borrower fixed effects. The sample includes only loans given by banks that grant both conventional and Islamic loans and the sample period runs from 2006:04 to 2008:12. The dependent variable is the hazard rate. For each variable in the specification the table reports the estimated coefficient, statistical significance level and standard error (below in parentheses). In Models I to III and V to VII standard errors are clustered by borrower.

	I	II	III	IV	V	VI	VII
Islamic Loan	-1.601***	-1.869***	-1.654***	-2.015**	-1.554*		-1.374***
	(0.358)	(0.384)	(0.381)	(0.865)	(0.928)		(0.326)
-- Borrowers with conventional and Islamic loans						0.196	
						(0.580)	
-- Borrowers with only conventional loans						1.184***	
						(0.426)	
-- Borrowers that switch to Islamic loans (from conventional)							-0.877*
							(0.464)
-- Borrowers that switch to conventional loans (from Islamic)							-0.350
							(0.956)
Borrower Characteristics							
ln(Size)		0.0147	0.0345			0.0431	0.0429
		(0.0288)	(0.0291)			(0.0302)	(0.0304)
Loan Characteristics							
Maturity		-0.00446	-0.00799*	0.00500*	0.0071***	-0.00807*	-0.00804*
		(0.00390)	(0.00429)	(0.00256)	(0.00276)	(0.00429)	(0.00429)
Collateral		-0.479***	-0.559***	-0.204*	-0.238*	-0.551***	-0.552***
		(0.137)	(0.136)	(0.123)	(0.127)	(0.137)	(0.137)
Cash		2.485***	2.357***	1.800***	1.786***	2.350***	2.358***
		(0.148)	(0.160)	(0.169)	(0.178)	(0.159)	(0.159)
Export		-0.0254	-0.0608	-0.239***	-0.173**	-0.0558	-0.0611
		(0.255)	(0.238)	(0.0757)	(0.0790)	(0.236)	(0.237)
Agricultural		0.238	0.0639	0.700	0.523	0.0591	0.0642
		(0.193)	(0.199)	(0.443)	(0.444)	(0.199)	(0.199)
Intercept	-4.734***	-6.657***	-6.907***			-8.162***	-7.004***
	(0.130)	(0.614)	(1.224)			(1.286)	(1.232)
Borrower Region dummies (7)	No	Yes	Yes	No	No	Yes	Yes
Borrower Industry Dummies (67)	No	Yes	Yes	No	No	Yes	Yes
Year*Month Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes
Borrower Fixed Effects	No	No	No	Yes	No	No	No
Bank Fixed Effects	No	No	Yes	Yes	No	Yes	Yes
Borrower*Bank Fixed Effects	No	No	No	No	Yes	No	No
Log Pseudolikelihood	-17,336	-15,824	-14,695	-6,863	-7031	-14,679	-14,674
α (Duration Dependence)	1.009	1.026	by bank	-	-	by bank	by bank
Chi^2(k) [LR in VI-X, Wald in other]	20	6,334	7,390	1,280	1019	7,768	7,819
Number of regressors minus one (k)	1	81	123	46	36	124	125
Number of Loan-Months	378,649	372,415	372,415	378,649	378,649	372,415	372,415
Number of Loans	109,157	107,944	107,944	109,157	109,157	107,944	107,944
Number of Borrowers	15,653	15,355	15,355	15,653	15,653	15,355	15,355

***, **, * indicate significance at 1%, 5% and 10% level, two-tailed.

Table 8: Religion as a Motivator to Perform on Loans

The table reports the maximum likelihood estimation results of duration models. All estimations except in Model I employ parametric duration models with a Weibull distribution that includes a parameter of duration dependence. Model I reports the results of a Cox-proportional hazard model and includes quarter dummies and borrower fixed effects. Estimations in Models II to V include only those loans that are granted in the four provinces and the federal capital (i.e., regions where Pakistani political parties can operate and key statistics are recorded) and exclude loans in other regions administered by Pakistan. The sample period runs from 2006:04 to 2008:12. The dependent variable is the hazard rate. For each variable in the specification the table reports the estimated coefficient, statistical significance level and standard error (below in parentheses). In all estimations below involving parametric models, standard errors are clustered by borrower.

Models	I	II	III	IV	V
		Share = Religious Political Parties		*Share* = Post-Natal Private Care	
Islamic Loan	-0.569***	-0.463	-0.859	-2.133**	-1.667
	(0.191)	(0.450)	(0.715)	(0.925)	(1.185)
Islamic Loan * Ramadan	-0.696*				
	(0.363)				
Islamic Loan * *Share*		0.0399**	0.0429	13.13**	9.050
		(0.0169)	(0.0269)	(6.533)	(9.136)
Islamic Loan * Big City		0.0108	0.206	0.923	-0.331
		(0.511)	(0.907)	(1.004)	(1.360)
Islamic Loan * *Share* * Big City		-0.0474**	-0.170***	-10.830	-10.300
		(0.0202)	(0.0567)	(6.666)	(9.384)
Added Variables					
Ramadan	-0.0481				
	(0.0600)				
Share		0.00588	0.00687	0.324	-0.767
		(0.00462)	(0.00525)	(0.837)	(0.870)
Share * Big City		0.000510	0.00193	-0.268	1.350
		(0.00676)	(0.00756)	(1.021)	(1.100)
Loan Characteristics					
Maturity	0.0125***	0.00396*	-0.00912**	0.00397*	-0.00828**
	(0.00133)	(0.00238)	(0.00418)	(0.00239)	(0.00417)
Collateral	0.331***	-0.022	-0.593***	-0.0253	0.577***
	(0.0990)	(0.134)	(0.134)	(0.133)	(0.133)
Cash	-1.617***	2.256***	2.482***	2.240***	2.454***
	(0.107)	(0.113)	(0.163)	(0.113)	(0.162)
Export	-0.192***	-0.0536	-0.127	-0.0558	0.113
	(0.0620)	(0.204)	(0.239)	(0.205)	(0.237)
Agricultural	0.217	-0.173	0.247	-0.177	0.218
	(0.368)	(0.262)	(0.202)	(0.265)	(0.202)
Borrower Characteristics					
ln(Size)		0.0267	0.0462	0.0285	0.0455
		(0.0465)	(0.0626)	(0.0469)	(0.0636)
Big City		0.395***	0.486***	0.470**	0.367*
		(0.126)	(0.143)	(0.183)	(0.198)
Bank Characteristics					
Government	0.353***	0.239*		0.229*	
	(0.115)	(0.124)		(0.128)	
Specialized	-0.505	-0.0259		-0.0512	
	(1.161)	(0.318)		(0.314)	
Foreign	-0.515	-0.855**		-0.847**	
	(0.360)	(0.337)		(0.337)	
Large	0.659***	0.823***		0.803***	
	(0.0967)	(0.158)		(0.152)	
Intercept		-7.145***	-5.799***	-7.141***	-6.010***
		(1.308)	(1.535)	(1.308)	(1.561)
Region dummies (7)	No	No	No	No	No
Industry Dummies (67)	No	Yes	Yes	Yes	Yes
Year*Month Fixed Effects	d(Quarter)	Yes	Yes	Yes	Yes
Borrower Fixed Effects	Yes	No	No	No	No
Bank Fixed Effects	No	No	Yes	No	Yes
Log Pseudolikelihood	-10,013	-21,928	-14,477	-21932	-14,554
α (Duration Dependence)	-	0.971	1.021	0.970	1.045
Chi^2(k) [LR in VI, VII, IX & XIII, Wald in others]	625.8	4,179***	6,268***	4,166.30***	6,529.89***
Number of regressors minus one (k)	15	116	122	116	122
Number of Loan-Months	603,677	578,809	369,816	579,144	370,063
Number of Loans	152,730	148,316	107,215	148,397	107,282
Number of Borrowers	22,723	21,574	15,144	21,586	15,153

***, **, * indicate significance at 1%, 5% and 10% level, two-tailed.

APPENDIX -- NOT FOR PUBLICATION

Appendix A: Types of Islamic Products

This Appendix aims to provide a brief summary of the main issues in Islamic finance and the dominant types of Islamic products that are employed to finance small businesses. For more detail see Kettell [2010] for example.

Under Islamic economic philosophy, granting a loan is essentially a charitable activity and hence should occur without any compensation. The borrower may (and is encouraged to) voluntarily pay back more than the principal amount to show her/his gratitude towards lender, however, it is prohibited to make an agreement regarding any such additional payment.

If someone wants to earn profits from transferring money, then one must make an investment and share both in the risk and the return of the venture. The ideal modes of Islamic finance are thus *Musharakah* (partnership, where all partners invest both money and some or contribute their expertise) and *Mudarabah* (partnership with some partners investing only money and others only their skills/labor). Islamic banks, however, have devised a variety of other products that mimic the conventional banking products. Many of these products are based on sale contracts rather than loan contracts while others are based on rental contracts. Salient features of most widely used Islamic financial products are given below.

The first column lists the name of the Islamic banking product. The second column mentions the conventional (banking) product(s) that are similar to that particular Islamic product. The third column describes the way the product operates, the fourth column defines the default event and the last column describes the penalties in case of default.

Islamic Product	Conventional Equivalent	Operation	Default	Penalty in the Event of Default
Murabahah	Term loan (w/ balloon payment) installment loan (w/ bullet payments)	1. *Murabahah* is a kind of sale in which seller discloses cost to the buyer. 2. Bank and customer enter into a *Murabahah* agreement 3. The bank appoints the customer as its agent to purchase the asset and gives her/him money for that or the bank itself purchases the asset 4. Under a separate contract, the bank sells that asset to the customer at a marked-up price	Default occurs when the customer misses a payment. The facility is classified as non-performing when a payment is overdue by 90 days or more.	1. The bank cannot change the sales price once it is fixed. 2. To contain moral hazard on part of the customer regarding delayed payment or non-payment of any amount when it is due, the customer undertakes that s/he will give x% per annum of the overdue amount for the period of default to a charity fund managed by the bank.

		5. The customer pays the price in installments over a period of time or in lump sum at an agreed on date. Notes: Bank can appoint the customer as an agent to purchase the underlying asset on its behalf, but bank must retain the risk and return as the owner of the asset. Bank must own the asset before it could sell it. *Murabahah* cannot be used to finance commodities/assets already owned by the customer. Unlike a normal sale, the customer knows the cost and profit of the bank.		3. Bank can approach a court to seek redressal, court may award solatium to the bank to cover the 'real losses' suffered like the cost of litigation. Real losses do not include time value of money.
Diminishing Musharakah	Hire-purchase, mortgage financing	1. Customer approaches the bank with a request to finance a fixed asset (say building). 2. Bank agrees to a joint ownership with the customer and agrees to finance say 80% of the value of the building, worth $10M. 3. Bank pays $8M to seller, customer pays $2M to seller. 4. The bank divides its ownership in say 20 parts and the customer undertakes to	Default occurs when the customer misses a payment. The facility is classified as non-performing when a payment is overdue by 90 days or more. Breach of promise also occurs if the customer does not	1. Bank cannot change the rent or sale price of its share in asset once it is fixed. 2. To contain moral hazard on part of customer regarding delayed payment or non-payment of any amount when it is due, the customer undertakes that s/he will give x% per annum of the overdue amount for the period of default to a charity fund

		purchase those parts at agreed dates. 5. The customer uses the building and pays rent to the bank for its 80% ownership in the building. 6. At agreed dates, the customer purchases the bank's shares in the building, the ownership in the building gradually transfers to the customers. 7. The bank's share in rent of the building decreases proportionally. Notes: The contract of joint ownership and the promise to purchase the shares in asset from bank cannot be made conditional on each other. The promise to purchase bank's share is essentially a unilateral promise by the customer.	keep her/ his promise to purchase bank's share in asset.	managed by the bank. 3. Bank can approach a court to seek redressal, court may award solatium to the bank to cover 'real losses' suffered by it like the cost of litigation. Real losses do not include time value of money.
Ijarah	Operating lease	1. It involves the transfer of usufruct but not ownership of the asset at an agreed rent. 2. Customer (lessee) approaches the bank (lessor) for lease of a specific asset and makes a promise to lease that asset. 3. The bank purchases the asset, or it may	Default occurs when the lessee misses a payment. The facility is classified as non-performing when a payment is overdue by	1. Bank cannot change the rent once it is fixed. 2. To contain moral hazard on part of customer regarding delayed payment or non-payment of any amount when it is due, the customer

		appoint customer to purchase the asset as its agent. 4. After acquisition, the bank rents the asset to the customer for a specific rent; rent may vary for different periods. 5. The customer pays the rent on agreed dates. Notes: Anything, which cannot be used without consuming, cannot be leased out, for example money, wheat etc. Bank retains the risks and rewards of the owner. Customer is responsible for the costs and benefits as the user of the asset The lease agreement can be terminated with the mutual consent of lessee and lessor or it can be terminated by lessor if the lessee contravenes any terms of lease.	90 days or more.	undertakes that s/he will give x% per annum of the overdue amount for the period of default to a charity fund managed by the bank. 3. Bank can approach a court to seek redressal, court may award solatium to the bank to cover 'real losses' suffered by it like the cost of litigation. Real losses do not include time value of money.
Ijarah wa' Iqtina	Financial lease	1. It involves transferring of usufruct of the asset, and at the end of lease period ownership of the asset also transfers to customer. 2. Customer (lessee) approaches the bank	Default occurs when the lessee misses a payment. The facility is classified as non-	1. Bank cannot change the rent or sale price of the asset once it is fixed. 2. To contain moral hazard on part of customer regarding

		(lessor) for the lease of a specific asset and makes a promise to lease that asset. 3. The bank purchases the asset, or it may appoint customer to purchase the asset as its agent. 4. The bank makes a separate promise to give the asset to the lessee at the end of lease period as a gift or to sell the asset for a specific price. The promise must be unilateral i.e. not binding on lessee and it cannot be conditional on the lease contract. 5. After acquisition, bank rents the asset to the customer for a specific rent; rent may vary for different periods. 6. The customer pays the rent on agreed dates. 7. At the end of the *Ijarah* period, the bank sells the asset to the customer or gives it away to customer as gift. Note: The contract of *Ijarah* cannot be conditional on signing the promise of sale or gift. The promise must be made separately.	performing when a payment is overdue by 90 days or more.	delayed payment or non-payment of any amount when it is due, the customer undertakes that s/he will give x% per annum of the overdue amount for the period of default to a charity fund managed by the bank. 3. Bank can approach a court to seek redressal, court may award solatium to the bank to cover 'real losses' suffered by it like the cost of litigation. Real losses do not include time value of money.
Istisna	In some aspects comparable to	1. *Istisna'* is a sales transaction where a commodity is traded before it comes into existence. It is an order to a manufacturer	Default occurs if customer fails to deliver specified	1. It is permissible for the bank and customer to agree that in the event of delay in delivery

	working capital finance	to manufacture a specific commodity for the buyer. 2. The price can be paid in advance, in installments or at the time of delivery. 3. The bank and customer enter into an *Istisna* contract, bank orders the customer to manufacture specific goods. 4. Bank can pay some or entire sum of the order in advance or in installments. 5. Customer manufactures the products and delivers them to the bank. The delivery can be constructive. 6. Bank appoints the customer (or anyone else) as its agent to sell the manufactured goods for cash or credit and receives the proceeds. 7. The agent is entitled to agency fees for services. Note: The customer can utilize the amount paid by bank for any purpose.	goods in time. Default also occurs if the agent fails to perform her duties.	of goods the price will be reduced by a specific amount per day. 2. It is also permissible to change the price later because of force majeure.
Salam		1. In *Salam*, the seller undertakes to supply specific goods to the buyer at a future date in exchange of a price fully paid in advance.	Default occurs, if the customer fails to perform her obligations under the	

		2. Bank enters in a *Salam* contract with customer and pays the price for goods to be delivered at a later date. 3. With the same delivery date bank enters into a parallel *Salam* with another customer to sell the goods that it expects to receive under the first *Salam* contract. 4. Alternatively bank can obtain a promise from another potential buyer of the goods that the bank expects to receive under *Salam*. The bank can then sell the products for cash when it receives them. 5. The price under two *Salam* contracts or the first *Salam* and purchase promise can be different and that difference is profit of the bank. Notes: Engineering a buyback agreement using parallel *Salam* is not permissible, i.e., the seller under first *Salam* cannot be buyer under the second *Salam* contract The two *Salam* contract are distinct from each other and cannot be made conditional on one another. Bank can ask for security or guarantee to	contract. Any misrepresentation by the customer is also construed as an event of default.	

		ensure performance on part of its customer		
Musharakah	Joint venture	1. *Musharakah* is a relationship between two parties or more, who contribute capital to a business, and divide the net profit and loss. All providers of capital are entitled to participate in management, but not necessarily required to do so. The profit is distributed among the partners in pre-agreed ratios, while the loss is borne by each partner strictly in proportion to respective capital contributions. 2. Bank and customer enter into a *Musharaka* agreement by investing a certain sum of capital in the business for a specified period of time. 3. Bank and customer also define the share of each party in expected profits. The customer also gives an (annual) projection of profit. 4. The customer periodically (monthly/ quarterly) pays the profit to the bank based on the profit projections and bank's share in profit. 5. These profit payments are provisional and are subject to upward or downward adjustments based on the realized profits/losses.	Default occurs if the customer fails to make profit or capital payments when they are due. The facility is classified as non-performing when a payment is overdue by 90 days or more.	1. If the business suffers losses, then bank assumes the losses in proportion to its investment. 2. To contain moral hazard on part of customer regarding delayed payment or non-payment of any amount when it is due, the customer undertakes that s/he will give x% per annum of the overdue amount for the period of default to a charity fund managed by the bank. 3. Bank can approach a court to seek redressal, court may award solatium to the bank to cover 'real losses' suffered by it like the cost of litigation. Real losses do not include time value of money.

		6. At the end of *Musharaka* contract, customer pays back the capital of the bank net of profits/losses. Notes: Return can be fixed as a percentage of profit but not as a percentage of investment. Share of an active partner in profit can be more than her/his contribution to capital. A sleeping partner cannot share in profit more than her/his share is capital. Loss is always shared proportional to the invested capital.		
Mudaraba	Similar to hedge / mutual funds	1. *Mudaraba* is a kind of partnership between two parties, where one party (or parties-financiers) provides finances and the other (entrepreneur) provides expertise, labor and management. Profits made are shared between the financier and the entrepreneur according to a predetermined ratio. In the event of loss, the financier absorbs all losses, while the entrepreneur loses her/his provision of labor 2. Bank and customer enter into a *Mudaraba* agreement, whereby the bank invests *all* the required capital and the customer commits his skills/management.	Default occurs if the customer fails to make payments to the bank when they become due under the agreement or when customer fails to render her/his duties as agent of the bank to manage the affairs of the business. The facility is classified as non-performing when a payment is overdue by 90 days or more.	1. If the customer (agent) acts negligently to run the affairs of the business and business suffers loss because of negligence then bank can deny payment of compensation(for management and labor) to the customer. 2. The bank can also take over the business and terminate the right of the customer to look after it if the customer contravenes any terms of *Mudaraba* agreement.

		3. Bank and customer also define their shares in expected profits. 4. The customer periodically (monthly/ quarterly) pays the profit to the bank as agreed between the two. 7. At the end of *Mudaraba* contract, the *Mudaraba* can be dissolved or extended. In case of dissolution, the customer pays back the principal net of any accrued profits or losses. Notes: Return can be fixed as a percentage of profit but not as a percentage of investment. Losses are always absorbed by the financier(s)/bank.		3. The customer is liable for the loss if it is proven that s/he has breached her/his obligations.
Qard-e-Hasna	Benevolent Loan	1. The borrower approaches the bank for financing. 2. The bank agrees to give loan to customer for a certain period, to be paid back in installments or in one go. 3. Bank can charge service fee, and documentation charges. 4. Bank cannot claim any other interest or profits for time value of money.	Default occurs when the customer fails to pay an amount when it is due. The facility is classified as non-performing when a payment is overdue by 90 days or more.	1. Bank cannot any additional amount in the event of default by the borrower. 2. To contain moral hazard on part of customer regarding delayed payment or non-payment of any amount when it is due, the customer undertakes that s/he will give x% per annum of the overdue amount for the period of default to a charity fund

				managed by the bank. 3. Bank can approach a court to seek redressal, court may award solatium to the bank to cover ‘real losses’ suffered by it like the cost of litigation. Real losses do not include time value of money.

Appendix B: Banks

The appendix reports the banks by type (and which therefore may appear in more than one category).

Banks
Islamic Banks
Albaraka Islamic Bank B.S.C. (E.C.)
Meezan Bank Ltd.
Dubai Islamic Bank Pakistan Ltd.
BankIslami Pakistan Limited
Emirates Global Islamic Bank
Dawood Islamic Bank Ltd.
Government Banks
The Bank of Khyber
The Bank of Punjab
First Women Bank Limited
National Bank of Pakistan
Specialized Banks
IDPB (industrial development)
Punjab Provincial Cooperative Bank Ltd.
SME Bank
ZTBL (agricultural development)
Foreign Banks
Albaraka Islamic Bank B.S.C. (E.C.)
Barclays Bank Plc
Citi Bank N.A.
Deutsche Bank A.G.
Hong Kong & Shanghai Banking Corporation
Oman International Bank S.A.O.G.
The Bank of Tokyo-Mitsubishi Ltd.
Large Banks
Bank Alfalah Limited
Habib Bank Limited
MCB Bannk Limited
National Bank of Pakistan
United Bank Limited
Banks with Both Islamic and Conventional Loans
Askari Commercial Bank Limited
Bank Alfalah Limited
Bank Al-Habib Limited
Bank of Khyber
Habib Bank Limited
Habib-Metropolital Bank Limited
MCB Bannk Limited
National Bank of Pakistan
Royal Bank of Scotland (Formerly ABN Amro Bank NV)
Soneri Bank Limited
Standard Chartered Bank Limited
United Bank Limited
All Other Banks (Smaller Private Domestic Banks Offering only Conventional Loans)
Allied Bank Limited
Arif Habib Rupali Bank Limited
Atlas Bank Limited
Crescent Commercial Bank Limited
Faysal Bank Limited
JS Bank Limited
KASB Bank Limited
Mybank Limited
NIB Bank Ltd
Saudi Pak Commercial Bank Limited
Soneri Bank Limited

Appendix C: Regions and Industries

The appendix reports the names of the regions and industries.

Regions
Province of Punjab
Province of Sindh
North-Western Frontier Province (renamed as Khyber Pakhtoonkhwa in 2010)
Province of Baluchistan
Federal Capital Area
(Pakistan Administered) Azad Kashmir
Federally Administered Tribal Area
Federally Administered Northern Area (Gilgit Baltistan as of 29 August 2009)
Industries (Sectors)
Agriculture, hunting and forestry - Others
Commerce and Trade- Retail trade
Commerce and Trade- Sale, maintenance and repair of motor vehicles and motor cycles
Commerce and Trade- Wholesales and commission trade
Construction- Buildings
Construction- Infrastructure
Education
Electricity, gas and water supply
Fishing, farming, aquaculture and related service activities
Foreign constituents
Health and social work
Hotels, restaurants and clubs
Insurance
Manufacturing- Basic metals
Manufacturing- Chemicals and chemical products
Manufacturing- Electrical machinery and apparatus
Manufacturing- Fabricated metal products
Manufacturing- Furniture and fixture
Manufacturing- Handicrafts
Manufacturing- Jewellery and related articles
Manufacturing- Machinery and equipments
Manufacturing- Medical, precision and optical instruments, watches and clocks
Manufacturing- Motor vehicles, trailers and semi - trailers
Manufacturing- Office, accounting and computing machinery
Manufacturing- Other sectors
Manufacturing- Other non - metallic mineral products
Manufacturing- Other transport equipment
Manufacturing- Petroleum products
Manufacturing- Radio, television and communication equipments and apparatus
Manufacturing- Rubber and plastic products
Manufacturing- Sport goods
Manufacturing- Food products
Manufacturing- Papers, paper boards and products
Manufacturing- Printing, publishing and allied industries
Manufacturing- Tanning and dressing of leather
Manufacturing- Textiles- Weaving
Manufacturing- Textiles- Spinning
Manufacturing- Textiles- Finishing
Manufacturing- Textiles- Made-up
Manufacturing- Textiles- Knitwear
Manufacturing- Textiles- Carpets and rugs
Manufacturing- Textiles- Wearing apparel, ready made garments and dressing
Manufacturing- Textiles- Other
Manufacturing- Tobacco
Manufacturing- Wood products
Mining and quarrying
Other community, social and personal service activities
Other service sectors
Real estate, renting and business activities
Ship breaking
Transport, storage and communications
Trust funds and non-profit organizations
Trading
Petroleum
Beverages
Cement
Telecommunication
Surgical and medical instruments
Footware
Sugar
Oil and gas expolaration
Power generation
Refinaries
Fertilizers
Agriculture- Rice
Agriculture- Raw cotton
Agriculture- Wheat
Miscellaneous Industries

Appendix D: Penalties at the Conventional and Islamic Branches of Various Mixed Banks

The table reports the penalties by loan type at the conventional and Islamic branches of various mixed banks as reported on their websites in March 2011. All amounts are in PKR.

Bank	*Branch*	Car Loan	Home Loan	Credit Card
Alhabib	*Conventional*	500/installment & check return charges of 500*	400/installment & check return charges of 500	
	Islamic	N/a	N/a	
Askari	*Conventional*	3% of amount due & check return charges of 500*	750/installment & check return charges of 500	
	Islamic	No	No	
Bank Alfalah	*Conventional*	Min. per installment: 100/day or 1,000/month	Per installment (for loans up to 1 million): 500/month [for average loan around 8% on unpaid amount]	
	Islamic	No	Regular rent on unpaid amount	
Bank of Khyber	*Conventional*	As per sanction letter & check return charges of 500*	as per sanction letter & check return charges of 500*	
	Islamic	No	No	
Habib Bank	*Conventional*	600/month	600/month	
	Islamic	No	No	
UBL	*Conventional*	1,000/month unless contract stipulates differently	1,000 unless contract stipulates differently	
	Islamic	Max. 20%/year of the amount due [for a Toyota Corolla, 5 year financing, 0% equity around 550/month]	N/a	
Royal Bank of Scotland (merged into Faysal Bank as of 01-Jan-2011; its schedule applies)	*Conventional*	600/installment, collection charges of 465/visit & check return charges as per schedule (0 in the reference schedule of charges)	higher of 1,000 or 10% of amount due, collection charges 475/visit & check return charges as per schedule (0 in the reference schedule of charges)	
	Islamic	Same as above	Same as above	
Soneri	*Conventional*	500/month for all products		
	Islamic	Per agreement		
Standard Chartered	*Conventional*	Up to 1,000	Up to 1,000	higher of up to 1,500 or 10% of amount due
	Islamic	Up to 1,000	Up to 1,000 & 2% pro month on amount due	No

Max.= Maximum. Min.= Minimum. No = not mentioned in the schedule of charges; The bank cannot charge anything unless a clause in the individual loan contract mentions a penalty. N/a= We could not track the penalty schedule, or it is not available. *= The bank receives undated checks from the borrower with the amount of an installment and when the customer misses an installment payment submits the check.

Appendix E: Religiosity and Loan Default: An Illustration

Let x be the degree of religiosity of a business owner that borrows from a bank. When $x = 0$ the borrower is secular, when $x = 1$ the borrower is a devout Muslim.

Both the probability the borrower takes a conventional loan and the probability the borrower defaults on a loan likely decrease in the degree of religiosity. The motivation for these two assumptions is straightforward. Islamic finance finds its existence and inspiration in the principles of Islamic law so a more devout Muslim is more likely to take an Islamic loan than a conventional loan. In addition, Islamic principles forbid "eating" other people's money in an unlawful way, hence a more devout Muslim is less likely to default on a loan.

Given these two assumptions, Islamic loans will less likely default than conventional loans. As an illustration assume for example that x is the probability that a borrower obtains an Islamic loan and $1 - x$ the probability that a borrower takes a conventional loan, and that the probability of default on a loan equals $p(1 + p - x)$, which is a decreasing function of the religiosity of the person, with p some value for which $0 < p < 1$ and $0 < p(1 + p) < 1$.

Borrowers of equal religiosity x that are granted either an Islamic or a conventional loan are equally likely to default on these loans. Yet, if borrowers are uniformly distributed (in x on [0,1]) and each take one loan, then the probability of default across all granted Islamic loans equals $\int_0^1 xp(1 + p - x)dx = \frac{p}{2}(\frac{1}{3} + p)$, while the probability of default on all granted conventional loans equals $\int_0^1 (1 - x)p(1 + p - x)dx = \frac{p}{2}\left(\frac{2}{3} + p\right)$. Hence the ratio of the default probability across all Islamic versus conventional loans equals that we would observe equals: $\frac{\frac{1}{3}+p}{\frac{2}{3}+p} < 1$. For $p = \frac{1}{2}$ this ratio equals $\frac{5}{7}$ for example.

Borrowers may also take two loans. With probability x^2 both loans are Islamic and with probability $(1 - x)^2$ both loans are conventional. With probability $2x(1 - x)$ one loan is Islamic and the other loan is conventional, a probability which is at its maximum for $x = \frac{1}{2}$, that is for borrowers of an intermediate religiosity.

If a borrower takes one Islamic and one conventional loan the probability the borrower defaults on the Islamic loan likely decreases in his religiosity while a secular borrower is likely to be indifferent. This assumption is motivated by our prior that a borrower who has both types of loans and is a more devout Muslim will feel a more acute conflict with his religious beliefs when defaulting on an Islamic loan than when defaulting on a conventional loan. For example the probability a person defaults on the Islamic loan rather than on the

conventional loan when the borrower has two different loans may equal $\frac{1-x}{2}$. The borrower then defaults on the conventional loan with probability $\frac{1+x}{2}$.

For borrowers with one Islamic and one conventional loan, the default ratio of the Islamic over the conventional loan, i.e., $\frac{1-x}{1+x}$, decreases in their religiosity x. In addition, if borrowers are again uniformly distributed (in x on [0,1]) and each take two loans, then the probability of default across <u>all</u> granted Islamic loans for those borrowers that mix equals $\int_0^1 2x(1-x)\left(\frac{1}{2}\right)(1-x)\,(p(1+p-x)dx$, while probability of default on <u>all</u> conventional loans for those borrowers that mix equals $\int_0^1 2x(1-x)\left(\frac{1}{2}\right)(1+x)\,(p(1+p-x)dx$. The ratio of these two probabilities equals $\frac{1}{3}$, which is smaller than the equivalent ratio across one-loan borrowers in our example.

In sum, if increasing religiosity <u>decreases the probability the borrower</u>: (a) takes a conventional loan rather than an Islamic loan, (b) defaults on a loan, and (c) defaults on the Islamic rather than on the conventional loan (if both an Islamic and conventional loan are taken), then:

(1) *Islamic loans are on average less likely to default than conventional loans*.

(2) *Intermediate religiosity is more likely to result in a conventional and Islamic loan being taken*.

(3) *The ratio of the Islamic over conventional loan default probabilities for two-loan borrowers is smaller than for one-loan borrowers*.

Notice that implication (1) pertains to all observed loans (that are studied in models without borrower fixed effects), while implication (3) is for those loans that are granted to borrowers that take multiple loans (comprising those that are retained in the borrower and bank*borrower fixed effects models).