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# Default Resolution and Access to Fresh Credit in an Emerging Market

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## Default Resolution and Access to Fresh Credit in an Emerging Market

### Abstract

We examine loan defaults by firms and identify the factors that influence both the default resolution process and firms' access to fresh credit after firms exit default. Using a dataset of all commercial loans made in Pakistan from 2006 to 2013, we find an important role for collateral. Collateral expedites both the default resolution process and access to fresh credit after exiting default. Higher interest rates increase the default duration. Relationships with multiple lenders as well as those with multiple branches of one lender are associated with obtaining fresh credit at the post default stage.

*JEL classification:* G21; G15; G33

*Key Words:* Emerging markets; Default resolution; Access to credit; Duration analysis

### 1. Introduction

Failure to repay loans is at the core of banking crises (Reinhart and Rogoff, 2009). The net costs of resolving banking crises have been estimated at about 13.3 percent of GDP, with these costs much higher in emerging economies (Laeven and Valencia, 2008). An efficient default resolution mechanism is in the interest of every economic agent, be it banks, businesses or the economy as a whole. Tedious, time consuming and unsuccessful default negotiations are costly to both banks (in the form of loan losses) and firms (through higher risk of insolvency and reputational loss), as well as to the economy as a whole (Hart and

Moore (1998) observe that post default lack of trust between lender and borrower causes the liquidation of many viable businesses). Since bank credit is a dominant source of funds for businesses in emerging economies (Fan *et al.*, 2012), access to fresh loans after default resolution is critical for the very survival of firms. Both default resolution and access to fresh credit after exiting default thus have strong linkages with financial stability and economic growth.

Despite the importance of default resolution and access to fresh credit for defaulting firms, these subjects have received only limited attention in the literature. While reorganizations under formal insolvencies regimes like Chapter 11 have been examined in detail, there have been few studies on corporate default resolution through private channels.<sup>1</sup> Two studies though have examined formal versus informal resolutions: Blazy *et al.* (2014) find that larger loans with long term maturities are restructured through private negotiations; whereas Hotchkiss *et al.* (2014) observe that firms backed by private equity also prefer informal channels for loan renegotiations. A few other studies have examined the role of particular variables of interest on default resolution: Bester (1994), in a theoretical paper, argues that collateral helps renegotiations; however, Karagozoglou *et al.* (2008) find that collateral increases the probability of liquidation in case of default; and Chan *et al.* (2014) examine mortgage loans and find that loans of borrowers with low credit scores are more likely to be restructured.

The topic of access to fresh credit after default resolution is reported in the literature even less than default resolution. To the best of our knowledge, Bonfim *et al.* (2012) present the only study on this topic. They find that most of the borrowers in Portugal are able to maintain access to credit even after default; however, few of them are able to get fresh loans. The large firms having multiple credit relationships are in a better position to access credit

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<sup>1</sup> Chapter 11 is a component of the US bankruptcy code that governs reorganization of a firm.

markets after clearing default. Further, access to credit becomes difficult if default is with the main bank of the borrower or if the duration of default is long. Bonfim *et al.* (2012) study, however, does not examine the role of collateral and interest rates in default resolution nor does it consider these variables while evaluating access to fresh credit: these variables are not available in the dataset. Our study, in contrast, is the first to examine the role of collateral and interest rate in default resolution and access to fresh credit.

We use a unique dataset of *all* loans in Pakistan, from April 2006 to December 2013.<sup>2</sup> Our dataset has been sourced from the Credit Information Bureau (CIB) of the State Bank of Pakistan (SBP).<sup>3</sup> All financial institutions in Pakistan are legally obligated to report complete information about their borrowers to CIB on a monthly basis and thus the database covers *every* firm which has availed itself of *any* financing facility from *any* financial institution in Pakistan.<sup>4</sup> The limited research on bank-borrower post default relationships and subsequent access to credit after default resolution could be due to the nature of the required data. The number of defaults is generally a very small percentage of total credit transactions. As a result, even if one is able to gain access to the complete records of one or even a few banks, the small number of observations makes a meaningful analysis difficult. We overcome the limitations of data availability by examining *all* the credit transactions in an economy.

Our contribution to the literature is three fold. First, to the best of our knowledge, this is the first study that examines the impact of collateral and interest rate on default resolution

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<sup>2</sup> Pakistan is the 6<sup>th</sup> largest country in terms of population with around 180 million people. It stands at 35<sup>th</sup> position in terms of area and at 45<sup>th</sup> position in terms of GDP at around US\$ 233 billion (IMF World Economic Outlook – April 2015). The Karachi Stock Exchange is the largest stock exchange in Pakistan, ranked at 50<sup>th</sup> position in terms of market capitalization (WDI report by World Bank available at <http://databank.worldbank.org/data/download/WDI-2013-ebook.pdf> accessed on November 29, 2014)

<sup>3</sup> The State Bank of Pakistan is the central bank of the country entrusted with dual responsibilities of conducting monetary policy as well as banking supervision in Pakistan.

<sup>4</sup> Financial institutions under the regulatory domain of the SBP are obliged to provide credit information under Section 25A of the Banking Companies Ordinance, 1962. Further, the Securities and Exchange Commission of Pakistan (SECP) has also advised financial institutions falling under its regulatory ambit to submit credit information to CIB. Thus all financial institutions are comprehensively covered.

and access to fresh credit after clearing default. More importantly, in addition to examining the collateral *per se*, our dataset allows us to consider the role of different types of collateral in default resolution and access to fresh credit. Secondly, this study examines default resolution and access to credit from the perspective of a developing country. The design and enforcement of creditor rights in a country can have a material impact on economic relationships (la Porta *et al.*, 1998). As we explain in Section 6.1, the judicial system in Pakistan is inefficient and susceptible to pressure. Thirdly, we are able to examine the role of relationships in default resolution and access to fresh credit. Our dataset allows us to test the proposition of Bolton and Scharfstein (1996) that credit relationships with more banks are associated with inefficient reorganization because of coordination problems.

Our results suggest that defaulters in Pakistan behave differently to those in Portugal as studied by Bonfim *et al.* (2012). Indeed, in contrast to Bonfim *et al.* (2012), who observe that default duration is shorter for large firms, we find that larger borrowers take more time for default resolution. This is consistent with institutional differences in both countries.<sup>5</sup> The Pakistani dataset allows us to precisely determine when a borrower obtains fresh credit after clearing default. We consider a firm having accessed fresh credit after clearing default only when it obtains a new loan.<sup>6</sup> We find that borrowers in Pakistan need more time (10 months for first 25% firms) to access fresh loans after default resolution than the borrower in Portugal (6 months for first 25% firms).

The Pakistani dataset also provides information on collateral and interest rates (factors which could not be considered by Bonfim *et al.*). We find that the collateral is helpful in both

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<sup>5</sup> As we explain in Section 6.1, large borrowers can exploit the weak creditor rights regime and Pakistan's inefficient judicial system.

<sup>6</sup> This definition is stricter than Bonfim *et al.* (2012) who define access as availability of any sort of financing facility after clearing default "broad access" or an increase in the total credit outstanding "strict access". Total credit outstanding may simply increase because of accrual of interest and may not actually reflect the borrower's ability to access fresh credit.

expediting the default resolution process and in establishing access to fresh credit after exiting default. Regarding the effect of types of collateral, we observe that mortgages of both the residential and commercial property are helpful in resolving default. Higher interest rates increase the duration of default, suggesting that the higher credit pricing makes it difficult for a borrower in distress to service the loan and come out of default quickly. Interest rates do not play any significant role in accessing fresh credit after default resolution. Contrary to the notion that banks can lend to higher risk customers by charging greater risk premium, financial institutions in Pakistan perhaps decline the customers considered bad credit risk by them as observed by Stiglitz and Wejss (1983).

Default with more than one financial institution makes default resolution difficult perhaps owing to coordination problems amongst lenders (Brunner and Krahen, 2008). We however, also observe a similar effect when a borrower in default has a credit relationship with a higher number of branches of the lender, or is availing multiple financing products from it. This shows that coordination can be a problem not only between lenders but also between branches of one financial institution. Quite understandably, however, the adverse impact of dealing with multiple branches is much milder as compared to dealing with many financial institutions (the hazard ratio of 'bank relationships in default' is 0.395 as against 0.828 for 'number of branches'). Higher numbers of credit relationships both with financial institutions and their branches, however, are quite useful when it comes to obtaining new loans after resolving default. The findings of this paper shed light on two important facets of the bank-firm relationship and identify factors that facilitate or hamper the path to default resolution and access to fresh credit after the default episode is over. These findings can help both banks and firms in charting their course of action during this tumultuous period of their journey. The results might also be used by policy makers, especially in emerging economies, to design appropriate frameworks for default resolution and rehabilitation of sick businesses.

## 2. Relevant Literature

Most of the studies on bank loan defaults have predominantly sought to identify determinants of default and estimate the probability of default (PD), loss given default (LGD) and exposure at default (EAD).<sup>7</sup> The primary aim of such studies is to assist banks in mitigating their credit risk or support them in adopting foundation and advanced internal rating based approaches for determining their credit risk under Basel Capital Accord II and III.<sup>8</sup>

Another stream of literature has dealt with businesses in distress especially insolvencies under Chapter 11.<sup>9</sup> There are, however, only a few studies that have looked into loan default resolution through private bilateral negotiations between banks and borrowers. Comparing formal versus informal distress resolution, Blazy *et al.* (2014) find that larger loans and long term maturities are associated with direct negotiations with lenders while Hotchkiss *et al.* (2014) observe that firms backed by private equity prefer informal channel and achieve resolution quickly as compared to other firms.

Examining the impact of defaults on firms in a theoretical model, Stiglitz and Wejss (1983), observe that banks will deny credit to defaulters rather than penalizing them through higher interest rates. Hart and Moore (1998) provide a theoretical argument that lack of credibility between lenders and borrowers after a default results in an inefficient and premature liquidation of an otherwise viable project, exposing both the bank and the

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<sup>7</sup> PD – Probability of default is the likelihood that the borrower will not meet their debt obligations as they become due. EAD – Exposure at default is the borrower's total indebtedness at the time of default and LGD – loss given default is the net loss borne by the bank after netting off any recoveries made out of collateral.

<sup>8</sup> As a sample of such studies, please see Bastos (2010), Qi and Zhao (2011), Bellotti and Crook(2012) and Loterman *et al.* (2012).

<sup>9</sup> Chapter 11 is a component of US bankruptcy code that governs reorganization of a firm.



entrepreneur to losses. Brown *et al.* (2006) suggest that prospects of loan restructuring encourage borrowers to commit strategic default even when they are in a position to repay the loan.

Examining the role of write-offs in renegotiations, Gorton and Kahn (2000) observe that debt forgiveness reduces a borrower's incentive to take on more risk and thus is in the interest of the lenders. Franks and Sussman (2005) find that while banks extend the repayment period to help the borrowers in difficult situations, they do not offer any write off to reduce the burden on such borrowers. Examining distressed mortgage loans, Chan *et al.* (2014) find that borrowers with low credit scores at the time of origination of loans are better placed to get their loans restructured. The examination of the role of collateral in distress resolution has yielded mixed findings. Bester (1994) finds that collateral facilitates debt renegotiation and modification of the terms of the credit. However, Karagozoglu *et al.* (2008) find that collateral increases the threat of liquidation whereas high leverage leads to reorganization.

Examining the violations of debt contract by firms in an empirical study, Sufi (2009) find that such firms have lower access to credit. Roberts and Sufi (2009a) reveal that, in addition to a substantial negative impact on the future credit raising capacity of the borrower, violation of any provision of a debt contract also leads to higher interest rates. Roberts and Sufi (2009b) find that the majority (over 90%) of long term loans are renegotiated during their life because of macroeconomic changes and variations in borrowers' profiles. Default and financial distress were rarely the cause for renegotiation.

One aspect of loan defaults that has received limited academic attention is the access to fresh credit after resolving default. Analysing loans granted to countries after sovereign default, Sol (2009) observe that additional information acquired by lenders during the default

helps them to extend fresh loans to such countries.<sup>10</sup> Bonfim *et al.* (2012) present the only study that examines corporate default resolution as well as access to fresh credit after the default is over. Bonfim *et al.* (2012) use an economy wide dataset of loans from Portugal and find that 50% of the firms are able to resolve their default within about one year. Default duration increases with time and resolution may take many years if the firm stays in default beyond one year. Larger borrowers are able to achieve default resolution quickly and higher overdue amounts at the start of default result in a longer duration of default. On the question of access to credit after clearing default, the study finds that most of the firms are able to maintain their access to bank loans, although only 25% of them are able to obtain fresh credit. Higher overdue amounts and a longer stay in default make access to fresh credit more difficult. Larger borrowers are able to regain access to the credit markets quickly.

Some of our findings match with those of Bonfim *et al.* (2012) while others differ. Access to fresh credit after clearing default appears to be more difficult in Pakistan. Further, we find that large borrowers in fact take more time for default resolution. Our results regarding the adverse impact of higher overdue amounts and smaller size of loans on access to fresh credit are consistent with their findings.

### 3. The Data

The dataset for this study has been sourced from the Credit Information Bureau (CIB) of the State Bank of Pakistan (SBP). The State Bank of Pakistan is the central bank of Pakistan and is entrusted with the dual responsibility of conducting monetary policy as well as supervising banking sector in Pakistan. This study uses the CIB dataset for firms from April 2006 to December 2013. April 2006 has been selected as the starting point since there have been relatively few and minor changes in the reporting formats since this date and thus

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<sup>10</sup> The study examines default by Governments and not by firms.

the definitions and codes are consistent over the period April 2006 – December 2013. In addition, the CIB started collecting information about collateral and interest rates in April 2006: these being key variables for our study.

As of December 2013, the CIB database contained information concerning 34,470 active firms and about 3.9 million individual borrowers. An active status means that the borrower owes some money to a bank. If a borrower has fully repaid all its loans, it is no longer active, although its information is still retained in the system. Using the unique identifiers for each borrower and financial institution, we aggregate the loans extended by a particular financial institution to a particular borrower. Our primary unit of analysis is thus bank-borrower-month and our final dataset contains about 3.6 million observations. Since we have a panel dataset where observations are repeated each month, we measure our variables at the end of each month. For example, for variable ‘number of banks’, we count the number of bank relationships each borrower has, at the end of each month. Note that the CIB does not collect accounting data and we are unable to augment our analysis with potentially important additional information relating to the firm, for example those related to the firm’s financial statement(s). This is similar to Bonfim *et al.* (2012), the closest published study to the current paper, who also do not incorporate financial data. Our estimations, however, do exploit the panel nature of the data by employing a random effects specification, explicitly controlling for any such unobserved firm-specific heterogeneity.

[Insert Table 1 and Table 2 about here]

Table 1 lists the research variables and their definitions while Table 2 presents summary statistics. We do not scale variables in this paper but rather we use variables capturing the size of the loan in our set of explanatory variables. Pearson (1896), Kronmal (1993), Barth and Kallapur (1996), Kim (1999), Zhu (2012), Bonaimé *et al.* (2014) and Dang

et al. (2014) highlight the risk of spurious correlations associated with scaling. The size of the loan has been found to influence the type of renegotiation in cases of default (Blazy *et al.*, 2014). In addition to the outstanding amount of the loan we also use the loan limit sanctioned for each firm and the number of loans made as our independent variables. The mean and standard deviation of all the three variables depict substantial dispersion while percentiles indicate the data is dominated by smaller borrowers. Seventy five percent of firms borrow less than PKR 19.15 million (equivalent to about US\$ 183,000).<sup>11</sup> Against this backdrop, a mean value of PKR 65 million (equivalent to US\$ 617,000) also signals the presence of a small number of large borrowers.

Collateral impacts the probability of default as well as the result of renegotiation in cases of default (Berger *et al.*, 2012; Bester, 1994). There are 30 different types of collateral captured by the dataset. Given the lower number of observations for many categories and overlapping definitions, we have decided to broadly divide collateral into five categories, combining the types that have common characteristics from the perspective of quality of collateral.

Deposits under lien, certificate of deposits, precious metals and ornaments, listed debt securities and listed equities are categorized as *liquid collateral*. *Liquid collateral* can be readily converted into cash and is available to settle the bank's claim against the borrower without the need to go to a court of law. *Residential mortgages* include residential lands and buildings offered as security and likewise *commercial mortgages* include the mortgage of commercial land and buildings. *Pledged stocks* are raw material, work in process and finished goods offered as collateral, with the distinguishing feature that these stocks are under the control of the bank and are released to the borrower with the permission of the bank.

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<sup>11</sup> SBP PKR-US\$ exchange rate on 31<sup>st</sup> December 2013 obtained from SBP website <http://www.sbp.org.pk/ecodata/rates/m2m/M2M-History.asp> has been used for conversion of Pakistan Rupees into US Dollars. The same exchange rate has been used for conversion throughout the paper.

Commercial mortgages are the second largest category at 8.8%, followed by residential mortgages, with its share at 3.2%. The most valuable and useful category, that is liquid collateral, constitutes only 2.3% of total collateral. The last category termed “*other collateral*” contains all the remaining 19 types of collateral, such as unrated debt securities, unlisted equities, mortgage of plant and machinery, guarantees, hypothecation, charge over assets, lien on documents, etc., which are relatively difficult to value, repossess and sell off in case of default. However, this category is also the dominant type of collateral, constituting about 83.9% of the total collateral.

Multiple lending relationships of a firm are associated with better credit quality (Bolton and Scharfstein, 1996) although coordination problems among banks may reduce the probability of resolution in cases of default (Brunner and Krahen, 2008). Further, the chances of resolution decrease if the main bank handles the negotiation in cases involving multiple lenders (Blazy *et al.*, 2014). In addition to the number of bank relationships and the main bank, we also use the number of branches of a financial institution with which a firm conducts credit transactions as well as the number of different types of products it uses to raise financing. The dummy variable ‘Main bank’ identifies the credit transaction in our dataset being carried out with the bank from which borrower is availing maximum credit limits. We have preferred to use sanctioned limits for determining the main bank of a borrower since loan limits are sanctioned for a fixed term and generally remain unchanged over a period of time, while the principle outstanding varies substantially. Summary statistics in Table 2 show that more than 50 percent of the observations in our dataset relate to borrowers dealing with only one bank, whereas the number of observations related to borrowers dealing with a single branch of a bank is even higher, at 90 percent. This indicates that, even when borrowers avail themselves of loans from more than one bank, they

still prefer to deal with only one branch of a particular bank, perhaps because of familiarity with the branch officials or ease of access.

The length and severity of default makes it difficult for firms both to resolve default as well as access fresh credit after clearing default (Bonfim *et al.*, 2012). We use five ‘default variables’ to capture the post default position of a borrower. The mean value of PKR 0.02 million for write off against the mean of PKR 7.63 million for overdue amounts shows that only a small number of overdue accounts actually result in a loss for the banks. A relatively high mean for the amount in litigation at PKR 12.9 million shows that banks generally take relatively larger defaulters to court. This phenomenon could be the result of a rational calculation on the part of the bank given the legal expenditure which makes legal proceedings against small borrowers unfeasible.

Pakistan also has Islamic commercial banks and the dataset contains information about loans extended by them.<sup>12</sup> The share of Islamic banks in the total credit of the economy, while growing, was still around 5% in year 2013. Although Islamic commercial banks extend loans in accordance with the principles of Islamic jurisprudence (Shariah), it has been found that risks and rewards for the customers of Islamic banks are similar to that of conventional banks (see for example, Khan (2010) and Chong and Liu (2009)). The Baele *et al.* (2014) study, however, reported a lower default rate for Islamic banks as compared to that for conventional banks in Pakistan. In order to control this aspect, we have added a dummy variable ‘Islamic bank’ in our estimations.

#### 4. Characteristics of Default

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<sup>12</sup> There were six Islamic banks in Pakistan as of 31<sup>st</sup> December 2013

We consider a loan in default when it has been reported by the bank in any one of four categories – other assets especially mentioned, substandard, doubtful or loss.<sup>13</sup> The State Bank of Pakistan has issued detailed regulations for the classification of loans and all banks are legally bound to follow these guidelines, ensuring uniformity of practices among financial institutions in Pakistan.<sup>14</sup> The original dataset obtained from CIB includes both fund based (various types of loans and investments like running finance, term loans, leases, Term Finance Certificates, Sukooks<sup>15</sup>, and so on) and non-fund based facilities (such as letters of credit, guarantees, etc.) extended to borrowers by the financial institutions. Since the default on a non-fund based facility may elicit a different type of response as compared to a loan default, this study only uses fund based facilities, that is, loans, for analysis.

The dataset contains month wise information of all loans from April 2006 to December 2013. The position of total loans, as well as corresponding NPLs, is given in Table 3.

[Insert Table 3 about here]

The NPL to loan ratio of the entire banking system descended to its lowest level of 6.9% in December 2006 and then it gradually ascended to its peak at 15.7% in December 2011, after which it gradually levelled off to 13% in December 2013. Borrowings by firms also closely followed this trajectory, with NPLs peaking at 15.5% in December 2011 and then declining gradually. In terms of absolute numbers, the NPLs of the banking system attained their maximum level of PKR 615 billion in December 2012, after which they declined to PKR 585 billion in December 2013. The period under our examination, therefore, includes a variety of scenarios and should provide useful insight into the behaviour of banks and

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<sup>13</sup> We use the term loans in default or classified loans or NPLs (Non-performing loans) interchangeably.

<sup>14</sup> For detail information, please see Prudential Regulations available at the SBP website <http://www.sbp.org.pk/publications/prudential/index.htm> accessed on September 30, 2014.

<sup>15</sup> Sukook or Sukuk (سكوك) is an Islamic finance alternative for fixed income debt securities.

borrowers during a period of heightened concerns about the quality of loan portfolios. The period covered in the study also coincides with the onset of the Global Financial Crisis in 2007-08, which had a substantial adverse effect on the economy of Pakistan (Jamali and Waseemuddin, 2011; Latif *et al.*, 2011).

In order to understand the dynamics of default, we provide in Table 4 some basic statistics and comparative information for loans in the regular category and the loans in default.

[Insert Table 4 about here]

The average values in Table 4 calculated on the basis of mean and median narrate different stories. To start with, while the mean value of a loan almost doubled from PKR 22.27 million on 30<sup>th</sup> April 2006 to PKR 45.63 million at the end of 2013, the median value showed a negligible increase. This indicates that borrowing by larger borrowers increased while lending to small borrowers remained more or less at the same level during this period. The mean values of loans in default ranged from PKR 8.35 million to PKR 25.14 million as against a range of PKR 24.69 million to PKR 52.50 million for regular loans, thus suggesting that firms which succumb to default are small borrowers. However, the median values of loans in default (from PKR 1.16 million to PKR 2.89 million) are higher than those of regular loans (from PKR 1.19 million to PKR 0.39 million). These differences are unconditional and we will present a model of conditional default probabilities below which will help resolve the seemingly inconsistent picture that emerges from inspection of the summary statistics in Table 4.

The collateral to loan ratio ranged from 3.6 to 2.11 during the period under examination. Based on our discussions with regulators, we interpret this high level of collateral ratio an outcome of an inefficient judicial system (discussed in Section 6.1).



During lengthy legal proceedings, the value of collateral may decline due to a number of reasons, for example, obsolescence, depreciation, theft and so on. In order to compensate for this likely decline, financial institutions require higher levels of collateral from their borrowers.

We also observe that most of the default resolutions in Pakistan are achieved through private negotiations rather than judicial proceedings. Out of 17,040 cases of default resolutions in our dataset, only 940 cases (5.5%) were under litigation prior to resolution. However, we cannot state with certainty that even in these 940 cases, resolution was achieved through a court decision. Sometimes, lenders and borrowers reach out of court settlement while the legal proceedings are underway. Given the overwhelming majority of private resolutions in our dataset, we assume that our analysis and findings mainly pertain to private default resolutions.

## **5. Estimation Methodology**

We utilize survival analysis technique for modelling data since our dependent variable(s) of interest are duration of default and time to access fresh credit after clearing default. It is also considered an appropriate choice for modelling longitudinal data, especially with censoring problems (Mills, 2011). In contrast to logistic regression that uses a binary output, survival analysis models use time to event of interest, which is more informative since it takes into account both the time to the event and probability of occurring of the event. A logistic regression model, in our case for example, would have treated a default that occurred after one month exactly the same as a default that occurred after one year. The proportional hazard model has been found to outperform logistic regression when occurrence of the event is not rare and the time to the event is long (Green and Symons, 1983).

The data are an unbalanced panel but the nature of the data introduces left and right censoring. Left censored observations are loans which had already experienced the event that we are trying to model, before the start of the observation period, i.e., April 2006. Right censoring occurs because we do not observe the subjects after a certain date. Following common practice in literature, we drop the left censored observations while right censoring is not considered a major problem in survival analysis and most of the econometric tools including the semi parametric Cox proportional hazards model we employ can take care of this issue (Guo, 2010). The Cox proportional hazards model (Equation 1) is estimated for the duration of the default and access to fresh credit after default:

$$h(t/x) = h_0(t) \exp(x, \beta). \quad (1)$$

In the equation shown above,  $h_0$  is the unspecified baseline hazard function,  $x$  is the vector of covariates and  $\beta$  is coefficient vector. One major advantage of using the Cox proportional hazard model is that it does not require any prior assumption about the shape of the baseline hazard.

Our first endogenous variable, duration of default, is the time that a borrower has been in default and is measured in number of months. It is the period when a borrower is reported in default by a financial institution till the time it is reported as regular. For example, if a borrower was reported in default for January 2008 and then reported as regular for August 2008, duration of default for this borrower would be 7 months. The second endogenous variable, time to access fresh credit after clearing default, measures the number of months it takes to obtain a new loan after a borrower has exited default. In the previous example, if the borrower having exited default in August 2008, obtains a new loan in June 2009, time to access fresh credit would be 10 months.

Our original dataset contains information for *each* loan obtained by a borrower. If a borrower has three loans from a bank, our dataset would have three observations for that borrower. However, a loan in itself is a transitory phenomenon since, in the normal course of the business, it is repaid and then a new loan is generated. As we are interested in observing the dynamics of a bank and borrower relationship, we collapse loan level data to the bank-borrower level by aggregating all the loans obtained from one bank by a particular borrower. Our primary unit of analysis is thus borrower-bank-month and the collapsed dataset contains about 3.6 million observations.

We proceed in the following manner for our analyses. Initially, we restrict our dataset to only the first default. All delinquents, by construction, must be in default a first time. Excluding subsequent defaults allows us to concentrate on this significant event for firms and also forestalls any confounding effects due to recidivism. This analysis is thus confined to the duration of the first default and access to fresh credit after clearing the first default only. However, we later relax this restriction and include all subsequent defaults as well. This larger dataset allows us to consider if our decision to exclude subsequent defaults has a material effect on the inferences we draw. In these two analyses, we use nominal data. We present the results of these analyses in Panel A of Tables 5 and 6. We also re-estimate the samples after deflating monetary variables using the GDP deflator *and* converting nominal interest rates into real interest rates by use of the consumer price index.<sup>16</sup> We present these results in Panel B of Tables 5 and 6. Overall, our main findings are unaffected by these robustness checks.

We estimate several variants of the model, expanding the set of explanatory variables to develop a fuller picture of the influences on the dependent variable. We begin by

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<sup>16</sup> The consumer price index and the GDP deflator have been obtained from the website of the State Bank of Pakistan <http://www.sbp.org.pk/ecodata> on 30<sup>th</sup> September 2014.

estimating the Cox model with total collateral offered by a borrower to a bank to assess the impact of collateral *per se*. We then re-estimate the model using five different categories of collateral: – liquid collateral, residential mortgages, commercial mortgages, pledged stock and other collateral – in place of total collateral. This allows us to assess the efficacy and role played by different types of collateral in default resolution and access to fresh credit after clearing default. We then augment these models with the interest rate pertaining to the loan. Data on interest rates are available only for about 43% of observations but the data does not appear to be systematically missing (hence, a Heckman-like correction is not warranted). Both the performing and non-performing loans have more or less the same level of non-reporting of interest rates. There is neither any incentive or benefit nor any deterrence or threat to the bank related to reporting of interest rates: in Pakistan, banks are free to charge any interest rate considered appropriate by them.

## 6. Estimation Results

Our discussion of estimation results starts with the presentation of the Kaplan-Meier (KM) estimate, which is non-parametric tool and yields an unconditional probability of survival at time  $t$ . For failure events defined as ‘exit from default’ and ‘access to fresh credit after clearing default’, KM estimate provides us an assessment of duration of default and time it takes for firms to access fresh credit after exiting default.<sup>17</sup>

We then follow up this discussion with the results of Cox Proportional Hazard Model, which are presented in Tables 5 and 6. As explained in Section 5, we run the estimations using both the nominal as well as real values of the variables. The Panel A of these tables present results for estimations with nominal values of the variables whereas Panel B lists results when we use real values of the variables. The first set of estimations (first four

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<sup>17</sup> Failure event is the event of interest that we intend to examine and is the term commonly used in survival analysis.

columns) in each panel contains results where analysis has been confined to the first default only. For example, for ‘exit from default’, we take into account only the first default of a firm and its resolution, ignoring subsequent defaults and any resolutions thereof. Likewise, for ‘access to fresh credit’, we use information about exit from first default and access to fresh credit after this default, ignoring subsequent defaults, exits and access to fresh loans after these events. This constraint is then removed in second set of estimations (last four columns), which uses first as well as all the subsequent defaults, exits from defaults and accesses to credit after all exits.

As explained in Section 5, we use numerous (16) different specifications of the model to estimate our variables of interest. The significance, sign and size of hazard ratios of almost all the variables, as shown in Tables 5 and 6, remain the same across all these specification, reflecting the robustness of our results.<sup>18</sup>

### *6.1. Exit from Default*

The first aspect that we examine is when companies come out of default after committing default. A borrower may exit default by paying off the overdue amounts or through rescheduling or restructuring of its loan.<sup>19</sup> We consider a borrower having exited default once it is reported as regular after being in default by the lending institution. Figure 1 provides the Kaplan-Meier survival estimate for exit from default.

[Insert Figure 1 about here]

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<sup>18</sup> The reported standard errors in the paper have been calculated using conventional estimates for the variance-covariance matrix of the coefficients. However, the results with a range of standard errors (robust, clustered, bootstrapped, and so on) remain essentially unchanged (results available on request).

<sup>19</sup> Rescheduling refers to an extension in the repayment dates where restructuring is much more comprehensive and in addition to an extension in the maturity date of loans may include haircuts, waivers, reduction in interest rates, and so on.

As we can see from Figure 1, the probability of exiting default drops with time. In the first five months, about 25% of defaults are cleared. However, it takes another 25 months to clear the next 25% of the defaults. Default duration thereafter increases with time. Our findings are close to those of Bonfim *et al.* (2012), who observe that 25% of the defaults are resolved in one or two quarters and 50% of the defaults are cleared within the first five quarters. They also observe that the defaults which are not cleared in one year take many years to resolve.

[Insert Table 5 about here]

Table 5 summarizes the results of estimations for duration of default. This set of estimations assesses the impact of exogenous variables on time ( $t$ ) for which a firm remains in default.

We first look at the variables representing the size of the borrowings. The firms having borrowed larger amounts take more time to exit from default. This is consistent with the notion that the resolution of large loans is more complicated and requires more time. However, the higher propensity of the firms borrowing larger sums of money to remain in default longer may also be construed as evidence of misuse of system inefficiencies by such borrowers. There have been consistent observations and findings regarding judicial system manipulations in Pakistan by persons with influence and power.<sup>20</sup> A weak judicial system deters the lenders from taking defaulting firms to courts and forces them to resolve defaults through private negotiations (Claessens *et al.*, 2003). The inability of the lenders to

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<sup>20</sup> For example, the Ex-Governor of the State Bank of Pakistan, Dr Ishrat Husain, lamented the inefficiencies of the judicial system regarding loan recoveries in his essay “Judicial reforms and economic growth” published in the Express Tribune (Pakistan) on 17<sup>th</sup> March 2012. A working paper titled “Approaches to Legal and Judicial Reform in Pakistan” dated January 2011 by the Development Policy and Research Centre (DPRC) of Lahore University of Management Sciences and Law (LUMS) explains the misuse of the judicial system by powerful people (available at <http://dprc.lums.edu.pk> accessed on 25<sup>th</sup> February 2015).

efficiently foreclose collateral or liquidate defaulting firms would naturally strengthen the bargaining position of the borrower in a default resolution process.

Higher sanctioned limits, however, expedite the resolution of default. The sanctioned credit limits have been found to be associated with firms having higher cash flows (Sufi, 2009). In addition, the financial institutions in Pakistan generally reserve the right to cancel or revoke, at their own discretion, even a sanctioned limit.<sup>21</sup> This discretion helps them to contain their exposure in case of a default. The banks, however, generally keep the sanctioned limits intact if, in their judgement, the default is temporary or if they want the defaulting borrowers to utilize cushion in their limits to clear their default. In both scenarios, higher sanctioned limits help the borrowers to come out of default.

The optimal number of credit relationships is an important question for each firm. The higher number of creditors, being associated with inefficient reorganization in case of default, works as a deterrent against strategic default but also results in higher probability of liquidation in case of genuine default (Bolton and Scharfstein, 1996).<sup>22</sup> We estimate the impact of both the number of credit relationships as well as number of credit relationships in default on duration of default. Our estimation results show that having a higher number of credit relationships helps the firms in exiting default quickly. However, default with a higher number of credit relationships impedes the resolution process, most probably because of coordination problems. In fact, one additional bank relationship in default more than doubles the duration of default: this result holds across all models in Table 5. The credit relationship with multiple financial institution, we presume augment a borrower's ability to either payoff its overdue amounts to a bank by using financing from other banks or to use its credit relationships as a source of leverage in negotiation after default.

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<sup>21</sup> This assessment is based on our discussion with heads of credit of some of the large banks in Pakistan.

<sup>22</sup> A genuine default is because of cash flow problems of the firm where the firm is unable to honour its obligations. A strategic default, on the other hand, is committed to obtain better terms or seek partial write offs.

In addition to credit relationships, we also examined the role of number of branches and the number of financing products in the default resolution process. The variable ‘number of branches’ captures the number of branches of a bank with which a firm conducts credit transactions and represents breadth of a bank-borrower relationship. The variable ‘number of products’ represents the number of financing services utilized by a firm from a lender. Both the variables are significant and have hazard ratios of less than one across all specifications indicating their negative role in default resolution. This shows that coordination is not only an issue between different lenders in case of default, it is also a problem if a borrower is availing credit facilities from multiple branches of the same financial institution or utilizing various types of financing products. Having higher numbers of products utilized for financing makes the resolution of defaults complicated and thus such borrowers take more time in exiting default.

The variable ‘main bank’ identifies the credit transactions carried out with main bank if the borrower has credit relationships with more than one financial institution. The variable is significant with a hazard ratio of more than 1, reflecting an expeditious default resolution if the loan in default is from the main bank. Our results support the findings of Elsas and Krahen (1998) that main banks are helpful for the borrowers in distress.

Collateral has a hazard ratio of more than one, which means that the firms offering higher collateral exit default quickly, *ceteris paribus*. There are mixed findings about the role of collateral in debt renegotiation. Bester (1994) reported that collateral facilitates debt restructuring while Neus and Stadler (2013) observe a diminishing role of collateral after the loan default. Our findings support the view that collateral facilitates default resolution. It implies that despite the issues related with foreclosure of collateral in Pakistan, discussed at the start of this section, banks still do rely on it to some extent. There is a possibility that,



while it is difficult to foreclose on collateral because of the inefficient judicial system, collateral may still give some bargaining power to the banks in case of default.

While total collateral is significant across all models in Table 5, further consideration of the role of *types* rather than *total* collateral provides a more nuanced view. In our analyses of exit from default, not all types of collateral are statistically significant. Mortgages (both residential and commercial) and ‘other collateral’ tend to be statistically significant, with hazard ratios of 1.019, 1.015 and 1.033 respectively. Liquid collateral and pledged stock are not statistically significant: these types of collateral do not play any role during the default resolution process. Liquid collateral may become immaterial when firms are in default because it may have already been used or earmarked by the lender against its claim on the defaulting borrower and thus remains no more available at post default stage. The insignificance of pledged stock, however, is another matter. Pledged stock cannot be sold off by the bank without the help of the legal apparatus of the country. However, pledged stocks are moveable items and in many cases perishable as well. Being moveable and on the premises of the borrower, there is a high risk of pilferage once the borrower has defaulted. As a result, just like liquid collateral, pledged stock loses its importance at post default stage.

The hazard ratio of less than 1 for overdue amounts suggest that severity of default increases the duration of default as also observed by Bonfim *et al.* (2012). This is also intuitive since the borrowers will need more time to arrange for the repayment of the higher overdue amounts and banks will also take more time in processing the requests for rescheduling or restructuring of the large overdue amounts.

The existence of litigation between a lender and a borrower also makes the default resolution difficult. In fact, the higher the amount in litigation, the more time it takes for the borrower to exit default as suggested by a hazard ration of less than 1 for the variable

‘amount in litigation’. Write-off is the only variable related to default that expedites renegotiation process. A decision to write-off is generally taken by a bank as a result of some sort of negotiated settlement. The results show that when the banks are ready to accept a write-off, resolution of the problem loans can be achieved quickly.

The interest rate, both nominal and real, is significant and increases the duration of default but only when we restrict the analysis to first default only. The higher interest rate adversely affects the debt servicing capacity of a borrower who is already in distress and as a result exit from default becomes more difficult. Thus a reduction in the interest rate may be an appropriate and effective strategy to pull such borrowers out of default. The interest rate, however, becomes insignificant when we take into account first, as well as, subsequent defaults. It means after the first episode of default and its resolution, interest rates no longer remain relevant for subsequent defaults. The repetition of default means that either the borrower is in serious trouble or is in default by choice. As a result, a reduction in the interest rate is not an effective strategy to help or deal with second and subsequent defaults.

The hazard ratios for ‘Islamic banks’, ranging from 1.257 to 2.069 as shown in Table 5, demonstrate that Islamic banks are much better than their conventional counterparts in resolving default. This could be attributed to borrowers’ preference towards Islamic banks for regularization of their loan as Baele *et al.* (2014) found that likelihood of default by the same borrower on an Islamic finance loan is less than on a conventional loan. The efficient default resolution, however, may also be a result of better information that an Islamic bank acquires about its customers by virtue of peculiar characteristics of Islamic financing products that require a closer interaction between lender and borrower.<sup>23</sup>

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<sup>23</sup> The bulk of financing by Islamic banks in Pakistan is done through Murabaha, which is basically a sale and purchase transaction between lender and borrower. The nature of transaction enables the Islamic banks to get much more information about their borrowers (like for example, their products, suppliers, inventory, etc.) than their conventional peers.

## 6.2. Re-access to fresh credit

Access to credit is a lifeline for subsistence as well as necessary precondition for the growth of business. It is, therefore, important to assess whether the borrowers who default are able to access fresh credit after exiting default and when are they able to do so. Further, it is important how the different variables affect the ability of such borrowers to access fresh credit. We define access as having obtained a new loan after exiting default. It is important to note that, as earlier pointed out in Section 1, our definition of access to fresh credit is quite strict and we only acknowledge access when the firm obtains a new loan.

[Insert Figure 2 about here]

Figure 2 shows the Kaplan Meier survival function for access to fresh credit after exiting default. In this case, the failure event (generic term used in the survival analysis) is access to fresh credit after exiting default. The graph shows that the majority of the firms are able to access fresh credit after default, although the probability declines with time. The first 25% of the firms gain access to fresh credit within ten months of the exit from default, whereas 50% of the firms get access to fresh credit in about 30 months.

As described in Section 2, Bonfim *et al.* (2012) is the only study that has examined access to fresh credit after default. Our findings here are different from those of Bonfim *et al.* (2012) who observe that 25% of the firms increase their bank debt within two quarters of exiting default. They also observe that firms, which are not able to re-access credit within one year of exiting default, have less than 1% chance of getting credit afterwards. The differences, however, may be the result of different definitions of access to credit. Bonfim *et al.* (2012) use increase in total credit as evidence of obtaining a fresh loan whereas this study,

having the benefit of a loan level dataset, identifies access to fresh credit only when a new loan has been obtained by the firm.

The results of estimations of time for access to fresh credit as a dependent variable are presented in Table 6.

[Insert Table 6 about here]

From Table 6, we see that firms with larger outstanding principle, higher sanctioned limits and greater number of loans are able to access fresh loans earlier after clearing default.<sup>24</sup> Bonfim *et al.* (2012) also observe a positive relationship between larger outstanding amounts and access to fresh credit after clearing default. Our results suggest that sanctioned loan limits and number of loans have the same effect on access to fresh credit as that of the outstanding loan amount.

In the previous Section, we discussed that multiple credit relationships help the borrower in exiting default. We now observe that this variable is also helpful in obtaining fresh loans after default resolution. In fact, firms conducting credit transactions with greater number of branches and using multiple financing products are also at an advantageous position in accessing fresh credit as implied by the hazard ratios of more than one for both these variables in Table 6. These results suggest that generally larger firms are able to access the loan market faster than smaller firms, after resolving default. Our assessment is based on the notion that generally large firms would obtain bigger loans, would have relationships with more banks and branches, and would use greater number of financing products as compared to small firms.

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<sup>24</sup> Variable 'number of loans' has a hazard ratio of 1.001 (which is very close to one, indicating the low impact of the variable on dependent variable) and is not significant when we confine the dataset to access to fresh credit after first default only, that is, we ignore subsequent defaults and re-access after such defaults. However, the variable becomes significant when re-access to fresh credit after subsequent defaults is also taken into account and its hazard ratio also improves to 1.004.

The variable 'main bank' is significant across all models in Table 6, with hazard ratios ranging from 1.167 to 1.319. This variable identifies the credit transaction of a firm with its main bank in the dataset. The results show that the firms clearing default with their main bank are able to access credit markets faster. Our results in the previous section show an efficient default resolution if the loan has been obtained from the main bank of the borrowers. These findings suggest that relationship with main bank is welfare enhancing both in terms of efficient default resolution and access to credit markets after clearing default.

The value of collateral also plays a positive role as suggested by its hazard ratios of more than one in Table 6 across all specification. Thus higher the collateral a borrower has, the quicker it will be able to access the fresh credit. While there is a plausible economic justification for this phenomenon (banks would be more willing to lend if borrower can offer suitable collateral), this relationship may also be the manifestation of influence of the large firms. Generally large firms would have access to higher levels of collateral. However, given the issues related with foreclosure of collateral because of an inefficient judicial system, financial institutions are generally not expected to assign substantial weightage to collateral especially when they are lending to a firm with bad credit history. A positive relationship between collateral and access to fresh credit after default, therefore, may actually be driven by the influence wielded by large firms in Pakistan.

Bonfim *et al.* (2012) observe that overdue amounts increase the time to access fresh credit. We also find that larger overdue amounts make access to fresh credit difficult even after the resolution of default. The larger overdue amounts may be a reflection of deterioration in the financial condition of the firm. In such a case, lenders would generally be unwilling to take fresh stake in the company because of higher credit risk. The greater forced

sale value of collateral and amount in litigation also stretches the timeframe to obtain fresh loans, presumably because of the same reasons discussed in Section 6.1 in detail.

The 'write off', which facilitates the borrowers in exiting default quickly, has an adverse impact on access to credit as shown by its hazard ratios of less than one across all specification in Table 6. It means that even when the banks support the borrowers in exiting default through write offs, such write offs create a hindrance for borrowers in re-accessing fresh credit. This creates a major dilemma. The absence of fresh credit, post default, may not only constrain the growth prospects of a company but may endanger its very existence, thus compromising the very objective for which write off was offered by the bank.

The borrowers of the Islamic banks are able to access fresh credit faster as compared to borrowers of conventional financial institutions. This may be attributable to a more accommodative stance that Islamic banks can take because of their access to higher information about the borrower as Sol (2009) find that more information about the borrowers during default plays an important role in lenders' decision to extend fresh loans to defaulters.<sup>25</sup>

The interest rate is insignificant across all model specifications in Table 6, suggesting that it does not play any role in access to fresh credit after default resolution. A borrower with a poor credit history will be considered a higher risk by the lenders. One may suggest that lenders could compensate for this risk through charging higher interest rates to such borrowers. In such a scenario, interest rate should be significant with a hazard ratio of more than 1. However, our results support the argument of Stiglitz and Wejss (1983) who suggest that lenders would not extend fresh credit to defaulters even at the higher interest rates to avoid adverse selection.

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<sup>25</sup> We have earlier explained, in Section 6.1 and foot note 27, that peculiar characteristics of Islamic financing products entail acquisition of richer information by Islamic banks about their borrowers.

### 6.3. Joint dynamics of default resolution and access to fresh credit after exiting default

Table 7 summarizes the estimation results (reported in Tables 5 and 6) of default resolution and access to credit taking into account the whole credit history of the borrowers for comparison purposes.

[Insert Table 7 about here]

We find that the firms with smaller loan size are able to resolve default quickly. Despite this, such firms take more time in accessing fresh credit after clearing default. Further, the access becomes more challenging if these firms do not have sanctioned loan limits or the limits are small. Assuming a strong correlation between the firm size and size of its borrowing and sanctioned loan limit, our interpretation of the results suggests that defaults are especially costly for smaller firms in terms of their access to credit markets. Given the fact that small businesses play a pivotal role in economic development and generation of employment, policy makers may need to extend some handholding to small businesses at the post default stage.

Firms with higher overdue amounts face difficulties both in exiting default and in accessing fresh credit after default resolution. The overdue amount would generally increase with time in default as firms increasingly do not make payments on due dates. Litigation is also a time consuming process and delays both the default resolution as well as access to fresh credit. It is, therefore, in the interest of both the lender and the borrower to resolve defaults quickly without involving courts.

Surprisingly, write offs expedite the default resolution process, however, borrowers with a write off history face problems in getting fresh credit after exiting default. Firms

accepting write offs should, therefore, be cautious that this temporary relief may compromise their fund raising ability in future.

## 7. Conclusion

In this paper, we use a unique and exhaustive dataset of loans from Pakistan to examine the factors that facilitate or hamper loan default resolution and access to fresh credit by firms after exiting default. The findings of the study have important implications for banks, firms, policy makers and especially bank supervisors.

We offer the first study that examines the role of collateral and credit pricing on default resolution and access to fresh credit. We find that collateral facilitates the borrowers in both exiting default and accessing fresh credit after default resolution. Firms with access to real assets that can be offered as collateral are, therefore, at advantageous position. The firms paying higher interest rates find it difficult to exit from default. This suggests that banks should carefully weigh the pros and cons of charging high penalty interest rates to their borrowers in default since it can actually delay the resolution and hurt both banks and their borrowers.

We also examine the impact of relationships on default resolution and access to fresh credit. Having multiple credit relationships is helpful in resolving default and in accessing the credit markets for fresh loans after clearing default. However, in the event of default involving more than one credit relationship, both resolution and access to credit in the future becomes problematic. We believe that this could be because of coordination issues between lenders. Since the delays in default resolution and access to credit markets can result in suboptimal utilization of productive resources, these findings highlight the need for a suitable mechanism to facilitate coordination between lenders at the post default stage. Such a



mechanism would be useful, not only in resolving defaults involving multiple lenders, but also in arranging the necessary funding to keep such borrowers afloat.

Our findings also suggest that effective coordination is also an issue even when a firm borrows from multiple branches of the same financial institution. It may be necessary for a firm, especially if it is geographically dispersed, to build credit relationships with many branches. However, utilising facilities from a higher number of bank branches, and use of multiple financing products, make the default resolution process complicated and time consuming. A centralized default resolution mechanism at the banks could iron out these complications and accelerate the process, benefitting both the banks and their borrowers. Both of these variables (number of both branches and financing products) are, however, helpful to firms at the post default stage of accessing fresh credit since accessibility to a higher number of bank branches and multiple financing products increase the number of options that a borrower can tap into to arrange fresh loans.

Our results suggest that Islamic banks are able to resolve loan defaults quickly as compared to conventional financial institutions. Further, firms dealing with Islamic banks are also able to access fresh credit more easily. This shows that the relationships with Islamic banks are welfare enhancing for firms. Owing to a lack of information, we cannot say at this stage with certainty whether these findings are the results of characteristics of the borrowers of Islamic banks or the business model of such financial institutions that requires closer interaction between lender and borrower as explained in previous sections.

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## Appendix

### Background: Pakistan and Portugal

Pakistan is the 6<sup>th</sup> largest country in terms of population with about 180 million people. It stands at 35<sup>th</sup> position in terms of area and at 45<sup>th</sup> position in terms of GDP at around US\$233 billion for the year 2014.<sup>26</sup> The Karachi Stock Exchange (KSE), the largest stock exchange in Pakistan, ranked at 50<sup>th</sup> position in terms of market capitalization (2012). However, Pakistan lags far behind in terms of other development indicators. Its *per capita* income for year 2014 at US\$1,410 places it in the category of lower middle income countries. It stands at 110<sup>th</sup> position for ease of doing business and at 167<sup>th</sup> position in terms of enforcing a contract.<sup>27</sup> Corruption is a major issue in Pakistan as reflected in its ranking of 127<sup>th</sup> position in terms of corruption perception index by Transparency International.<sup>28</sup>

The total assets of the financial sector in Pakistan are around 57% of its GDP.<sup>29</sup> Financial sector consists of banks, development financial institutions (DFIs), microfinance banks, investment banks, leasing companies, housing finance companies, modarabas (an Islamic form of mutual funds) and insurance companies. Another important player in the financial sector is Central Directorate of National Savings (CDNS) which mobilizes savings on behalf of Government of Pakistan through distributing various types of Government securities to individuals as well as firms. In terms of number of various types of financial institutions, the financial sector in Pakistan seems quite diversified: there are 38 banks, 47 insurance companies, 8 DFIs, 7 investment banks, 9 leasing companies and 26 modarabas. However, in reality, the financial sector is dominated by banks since they constitute 73% of the financial sector in terms of assets.

Comprehensive banking reforms in 1990s and early 2000s transformed the banking system from a predominantly Government owned sector (more than 80% in terms of assets) to a privately owned and controlled banking system (more than 78% of the banking assets are now under the private sector control). There are two regulators of the financial sector. The State Bank of Pakistan (SBP) regulates banks, DFIs and microfinance banks whereas Securities and Exchange Commission of Pakistan (SECP) regulates insurance companies, investment banks, leasing companies, *etc.*

While the size of the economy of Portugal is quite close to that of Pakistan at around US\$ 225 Billion, Portugal is a high income country with *per capita* income at US\$21,320 for

<sup>26</sup> IMF world economic outlook database accessed on 19<sup>th</sup> November 2015, available at <https://www.imf.org/external/pubs/ft/weo/2015/01/weodata/weorept.aspx>

<sup>27</sup> Ease of business doing report by World Bank accessed on 19<sup>th</sup> November 2015, available at <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB15-Chapters/DB15-Report-Overview.pdf>

<sup>28</sup> Corruption perceptions index by Transparency International is available at <http://www.transparency.org/cpi2013/results>.

<sup>29</sup> The Financial Stability Review, June 2012 available at State Bank of Pakistan website [www.sbp.org.pk](http://www.sbp.org.pk).

the year 2014; much higher than about US\$1,410 for Pakistan.<sup>30</sup> In terms of financial development, Portugal's credit to GDP ratio at 1.90 is almost triple to that of Pakistan (0.49).

Portugal's institutional framework is far better than that of Pakistan. Portugal is ranked 33<sup>rd</sup> on corruption perception index as compared to the 127<sup>th</sup> position held by Pakistan. Enforcing a contract in Portugal takes 547 days as compared to 976 days in Pakistan.

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<sup>30</sup> World development indicators (WDIs) database of World Bank, accessed on 19<sup>th</sup> November 2015, available at <http://databank.worldbank.org/data>.

**Table 1:**  
**Variables and their Descriptions**

No.	Name of the variable	Description
<b><u>Dependent Variables</u></b>		
1	Time to exit from default	The variable measure duration of default. In other words, the time it takes for a borrower to come out of default. It is measured in number of months, starting from the month a borrower is reported in default by a financial institution till the time it is reported as regular.
2	Time to access to fresh credit after exiting default	The time it takes, in months, for a borrower to obtain a new loan from a financial institution, after the default is cleared.
<b><u>Size of the Borrowings</u></b>		
3	Principle	The outstanding amount of the loan owed by a borrower to a financial institution
4	Limit	The loan limit sanctioned by the financial institution to a borrower. This is the maximum amount that can be withdrawn by a borrower under a loan contract.
5	Number of loans	Number of loans availed of by the borrower from a particular financial institution
<b><u>Collateral</u></b>		
6	Total collateral	Total value of collateral held by the financial institution as security against loans of a particular borrower
7	Liquid collateral	The best quality collateral that can be converted into cash without loss of substantial time and erosion in the value of security. It includes deposits under lien, precious metals, Government securities and shares of listed companies
8	Residential mortgage	The value of residential land and building mortgaged to the financial institution as security against loans
9	Commercial mortgage	The value of commercial land and property mortgaged to the financial institution as security against loans
10	Pledged stock	The value of stock (raw material, work in process, finished goods, merchandise, etc.) under the control of the financial institution, held as security against loans
11	Other collateral	All other types of collateral excluding the above categories
12	Types of collateral	Number of types of collateral offered by a borrower to a financial institution
<b><u>Credit Relationships</u></b>		
13	Number of banks	Number of financial institutions with which a borrower has lending relationships at the end of a particular month
14	Number of branches	Number of branches of a particular financial institution with which a borrower has a credit relationship at the end of a particular month
15	Mainbank (dummy)	A dummy variable that identifies the main bank (the financial institution that has granted maximum



		aggregate loan limits to the borrower) if the borrower has lending relationship with more than one financial institutions
16	Number of products	Number of types of financing products (like term loans, running finance, TFC, bonds, etc.) availed of by a borrower from a financial institution
	<b><u>Other variables</u></b>	
17	Rating (dummy)	A dummy variable with a value of 1 if the borrower is rated either externally or internally by its lender
18	Maturity of loan	It is tenure of the loan and is measured as the number of months when a loan becomes due.
19	Islamic bank (dummy)	A dummy variable with the value of 1 if the bank extending the loan is an Islamic bank
	<b><u>Default variables</u></b>	
20	Total overdues	Total overdue amounts include principle, interest or any other amount owed to the bank and not paid by the due date
21	Write offs	Write offs include any amounts written off by the bank out of its claim on the borrower
22	Number of bank relationships in default	Number of financial institutions with which a borrower is in default at the end of the reporting month
23	FSV of collateral	Value of the collateral, assessed by an independent expert under the guidelines issued by SBP, which can be fetched in a forced sale
24	Amount in litigation	The amount claimed by the bank in recovery proceedings against a borrower in a court of law
	<b><u>Credit Pricing</u></b>	
25	Interest rate	The rate charged on the loan by a financial institution

Notes: This table presents definitions of the variables used in analyses. The variables have been grouped into five categories: size of the borrowings, collateral, accessibility to credit, other variables and default variables. The first four categories are used in the analysis where the failure event is default and the fifth category is added when analysing post default scenarios of default resolution and access to credit after clearing default.

**Table 2:**  
**Descriptive Statistics for Independent Variables Excluding Dummies**

(Amounts are in Pakistan Rupees Millions)

Variables	Mean	Std. Dev.	Percentiles				
			p_10	p_25	p_50	p_75	p_90
<b>Dependent Variables</b>							
Time to exit from default (Number of months)	32.62	29.09	2	7	25	52	83
Time to access fresh credit (Number of months)	22.50	18.04	4	8	17	33	49
<b>Size of the Borrowings</b>							
Principle	65.00	485.00	0.03	0.32	2.61	19.15	100.07
Limit	98.80	703.00	0.18	0.90	5.03	33.56	167.50
Number of loans	2.27	4.42	1.00	1.00	1.00	2.00	4.00
<b>Collateral</b>							
Total collateral	168.00	1170.00	0.00	1.00	7.15	49.24	250.00
Liquid collateral	3.92	109.00	0.00	0.00	0.00	0.00	0.00
Residential mortgage	5.36	97.90	0.00	0.00	0.00	0.00	1.54
Commercial mortgage	14.70	301.00	0.00	0.00	0.00	0.00	6.00
Pledge	2.32	48.90	0.00	0.00	0.00	0.00	0.00
Other collateral	141.00	1100.00	0.00	0.00	2.03	25.00	190.40
Types of collateral	1.10	0.75	0.00	1.00	1.00	1.00	2.00
<b>Credit Relationships</b>							
Number of bank relationships	3.01	4.22	1.00	1.00	1.00	3.00	7.00
Number of branches	1.05	0.27	1.00	1.00	1.00	1.00	1.00
Number of products	1.54	1.10	1.00	1.00	1.00	2.00	3.00
<b>Other Variables</b>							
Maturity of loan	30.62	29.31	5	9	22	46	68

**Default Variables**

Overdue amounts	7.63	76.00	0.00	0.00	0.00	0.00	3.70
Write off amounts	0.02	2.73	0.00	0.00	0.00	0.00	0.00
Number of bank relationships in default	0.63	1.80	0.00	0.00	0.00	1.00	1.00
Forced sale value of collateral	12.90	232.00	0.00	0.00	0.00	0.00	1.00
Amount in litigation	8.14	1520.00	0.00	0.00	0.00	0.00	0.00

**Credit Pricing**

Interest rate	14.66	3.94	10.00	12.47	14.83	16.95	19.00
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Note: This table presents descriptive statistics for variables (excluding dummies) used in the analysis

**Table 3:****Position of the Total Loans and Non-Performing Loans during April 2006 - December 2013**

(Amounts are in Pakistan Rupees Billions)

Date	Borrowings by firms					Banking System Total Loans		
	Number of borrowers	Number of loans	Aggregate Principle Outstanding	Classified Principle	%age of total principle classified	Aggregate principle outstanding	Classified Principle	%age of total principle classified
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
30/04/2006	17,249	45,352	1,010.07	56.01	5.55%	2,174.02	176.71	8.13%
31/12/2006	22,441	60,072	1,477.62	100.80	6.82%	2,565.39	176.77	6.89%
31/12/2007	28,792	78,532	1,888.07	138.22	7.32%	2,875.69	218.00	7.58%
31/12/2008	29,063	81,552	2,328.41	229.79	9.87%	3,422.55	359.24	10.50%
31/12/2009	27,718	76,551	2,735.42	329.94	12.06%	3,551.33	446.01	12.56%
31/12/2010	26,944	75,361	2,990.89	375.36	12.55%	3,729.00	555.97	14.91%
31/12/2011	29,317	74,905	2,948.11	457.75	15.53%	3,759.24	591.58	15.74%
31/12/2012	28,591	73,446	3,295.29	462.96	14.05%	4,243.53	614.93	14.49%
31/12/2013	28,386	77,082	3,517.26	486.60	13.83%	4,505.49	585.12	12.99%

Notes: This table presents a comparative position of loans extended to firms and loans of the whole banking system. The banking system total loans include loans extended to firms as well as to individuals. Only the principle portion of the loans outstanding at a particular date has been shown here. The classified principle is the principle outstanding in respect of a loan reported as impaired by the bank in any category of classification (other assets especially mentioned, substandard, doubtful or loss).

**Table 4**  
**The Position of Regular vs. Defaulted Loans**

(Amounts are in Pakistan Rupees Billions)

Date	Number of firms	Loans per firm	Total Loans			Loans in Regular Category			Loans in Default			%age loans in default		Collateral to Loan Amount ratio
			Number	Mean Amount	Median Amount	Number	Mean Amount	Median Amount	Number	Mean Amount	Median Amount	Number	Amount	
30/04/2006	17,249	2.63	45,352	22.27	4.60	38,643	24.69	1.19	6,709	8.35	1.16	14.79%	5.55%	3.22
31/12/2006	22,441	2.68	60,072	24.60	5.00	49,690	27.71	0.98	10,382	9.71	1.22	17.28%	6.81%	3.24
31/12/2007	28,792	2.73	78,532	24.04	4.50	64,620	27.08	0.77	13,912	9.94	1.20	17.72%	7.31%	3.60
31/12/2008	29,063	2.81	81,552	28.55	4.33	65,378	32.10	0.56	16,174	14.21	1.50	19.83%	9.86%	2.44
31/12/2009	27,718	2.76	76,551	35.73	4.56	58,576	41.07	0.56	17,975	18.36	2.18	23.48%	12.04%	2.25
31/12/2010	26,944	2.80	75,361	39.69	4.90	57,699	45.33	0.51	17,662	21.25	2.86	23.44%	12.55%	2.11
31/12/2011	29,317	2.56	74,905	39.36	4.52	56,146	44.36	0.38	18,759	24.40	2.72	25.04%	15.52%	3.46
31/12/2012	28,591	2.57	73,446	44.87	4.90	54,423	52.04	0.38	19,023	24.34	2.82	25.90%	14.03%	2.61
31/12/2013	28,386	2.72	77,082	45.63	5.45	57,729	52.50	0.39	19,353	25.14	2.89	25.11%	13.82%	2.76

Notes: This table presents the comparative position of regular loans and loans in default on certain dates. The loans in default are the loans reported as classified by financial institution in any category of classification, namely other assets especially mentioned, substandard, doubtful or loss. The terms 'loans in default', 'defaulted loans' and 'classified loans' have been used interchangeably in this article.

**Table 5: Panel A**  
**Estimation Results with Exit from Default as Failure Event**

Variables	First Default				Multiple Defaults			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Size of the Borrowing</b>								
Ln (Principle)	0.965*** (0.002)	0.968*** (0.002)	0.970*** (0.002)	0.971*** (0.002)	0.976*** (0.001)	0.980*** (0.002)	0.979*** (0.002)	0.980*** (0.002)
Ln (Limit)	1.062*** (0.003)	1.076*** (0.003)	1.098*** (0.004)	1.106*** (0.004)	1.077*** (0.002)	1.092*** (0.003)	1.117*** (0.003)	1.123*** (0.004)
Number of loans	0.997 (0.002)	0.998 (0.002)	0.999 (0.002)	0.998 (0.002)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
<b>Collateral</b>								
Ln (Total collateral)	1.064*** (0.003)	-	1.030*** (0.003)	-	1.064*** (0.002)	-	1.024*** (0.003)	-
Ln (Liquid collateral)	-	0.992 (0.005)	-	0.981*** (0.006)	-	0.996 (0.004)	-	0.993 (0.005)
Ln (Residential mortgage)	-	1.019*** (0.002)	-	1.003 (0.003)	-	1.021*** (0.002)	-	1.003 (0.002)
Ln (Commercial mortgage)	-	1.015*** (0.002)	-	0.996 (0.003)	-	1.017*** (0.002)	-	0.996 (0.002)
Ln (Pledged stock)	-	1.006 (0.005)	-	0.994 (0.006)	-	1.001 (0.004)	-	0.985*** (0.005)
Ln (Other collateral)	-	1.033*** (0.002)	-	1.021*** (0.003)	-	1.036*** (0.002)	-	1.017*** (0.002)
Types of collateral	1.022 (0.017)	1.033 (0.024)	0.943*** (0.020)	0.994 (0.030)	0.983 (0.013)	0.974 (0.017)	0.895*** (0.015)	0.930*** (0.020)
<b>Credit relationships</b>								
Number of banks	1.075*** (0.002)	1.079*** (0.002)	1.058*** (0.003)	1.056*** (0.003)	1.077*** (0.002)	1.081*** (0.002)	1.060*** (0.002)	1.059*** (0.002)
Number of branches	0.828*** (0.031)	0.834*** (0.031)	0.832*** (0.036)	0.838*** (0.036)	0.856*** (0.025)	0.875*** (0.025)	0.844*** (0.027)	0.851*** (0.027)
Main bank (dummy)	1.231*** (0.036)	1.260*** (0.037)	1.194*** (0.043)	1.184*** (0.042)	1.176*** (0.028)	1.206*** (0.029)	1.143*** (0.032)	1.135*** (0.032)
Number of products	0.958*** (0.012)	0.941*** (0.011)	1.005 (0.015)	0.993 (0.015)	0.936*** (0.009)	0.924*** (0.009)	0.995 (0.011)	0.988 (0.011)

<b>Default variables</b>								
Ln (Total overdues)	0.832*** (0.002)	0.830*** (0.002)	0.824*** (0.002)	0.823*** (0.002)	0.813*** (0.001)	0.812*** (0.001)	0.799*** (0.002)	0.797*** (0.002)
Ln (Write offs)	1.056*** (0.004)	1.056*** (0.004)	1.055*** (0.005)	1.056*** (0.005)	1.041*** (0.003)	1.040*** (0.003)	1.030*** (0.004)	1.031*** (0.004)
Number of bank relationships in default	0.395*** (0.007)	0.391*** (0.007)	0.410*** (0.008)	0.411*** (0.008)	0.458*** (0.006)	0.453*** (0.006)	0.479*** (0.007)	0.478*** (0.007)
Ln (FSV of collateral)	0.963*** (0.002)	0.967*** (0.002)	0.978*** (0.002)	0.984*** (0.002)	0.962*** (0.002)	0.967*** (0.002)	0.983*** (0.002)	0.987*** (0.002)
Ln (Amount in litigation)	0.985*** (0.003)	0.985*** (0.003)	0.996 (0.004)	0.999 (0.004)	0.973*** (0.003)	0.972*** (0.003)	0.985*** (0.003)	0.987*** (0.003)
<b>Other variables</b>								
Rating (dummy)	1.132*** (0.030)	1.114*** (0.029)	1.099*** (0.034)	1.106*** (0.034)	1.253*** (0.027)	1.236*** (0.027)	1.273*** (0.032)	1.284*** (0.032)
Maturity of loan	1.002*** (0.000)	1.001*** (0.000)	1.001*** (0.000)	1.000 (0.000)	1.002*** (0.000)	1.001*** (0.000)	1.001*** (0.000)	1.001** (0.000)
Islamic bank (dummy)	1.658*** (0.108)	1.764*** (0.115)	1.257*** (0.161)	1.379*** (0.177)	1.935*** (0.100)	2.066*** (0.107)	1.489*** (0.151)	1.579*** (0.161)
<b>Credit Pricing</b>								
Interest rate	-	-	0.990*** (0.003)	0.990*** (0.003)	-	-	1.002 (0.002)	1.002 (0.002)
Year dummy	Included	Included	Included	Included	Included	Included	Included	Included
No. of observations	776,997	776,997	439,764	439,764	931,677	931,677	550,188	550,188
Log Likelihood	-9,8108	-98,311	-62,128	-62,099	-143,672	-143,933	-94,678	-94,647
Likelihood ratio chi-square (df)	29,988 (24)	29583 (28)	20,321 (25)	20,377 (29)	46,922 (24)	46,399 (28)	34417 (25)	34,480 (29)

Notes: This table presents the results of the Cox Proportional Hazard Model with exit from default defined as a 'failure event'. Panel A contains estimation results with nominal values of independent variables. In the first four models, the dataset is confined to first default (and exit) only and subsequent defaults are ignored. In the next four models, all the defaults as well as exits are taken into account. The first model contains the total value of collateral which is substituted with five different types of collateral in second model. The third model adds interest rate as another independent variable in the first model and the fourth model substitutes total collateral with types of collateral. This sequence is repeated in the next four models with multiple defaults. Standard errors are shown in parenthesis.

\*\* significant at 5% level

\*\*\* significant at 1% level

**Table 5: Panel B**  
**Estimation Results with Exit from Default as Failure Event**

Variables	First Default _ Deflated				Multiple Defaults _ Deflated			
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
<b>Size of the Borrowing</b>								
Ln (Principle)	0.958*** (0.002)	0.964*** (0.003)	0.959*** (0.003)	0.961*** (0.003)	0.973*** (0.002)	0.979*** (0.002)	0.972*** (0.003)	0.973*** (0.003)
Ln (Limit)	1.077*** (0.003)	1.097*** (0.004)	1.124*** (0.005)	1.136*** (0.005)	1.095*** (0.003)	1.117*** (0.003)	1.148*** (0.005)	1.157*** (0.004)
Number of loans	0.997 (0.002)	0.998 (0.002)	0.998 (0.002)	0.998 (0.002)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.998 (0.001)
<b>Collateral</b>								
Ln (Total collateral)	1.066*** (0.003)	-	1.033*** (0.003)	-	1.065*** (0.002)	-	1.026*** (0.003)	-
Ln (Liquid collateral)	-	0.993 (0.005)	-	0.983*** (0.006)	-	0.997 (0.004)	-	0.995 (0.005)
Ln (Residential mortgage)	-	1.019*** (0.002)	-	1.005 (0.003)	-	1.021*** (0.002)	-	1.005 (0.002)
Ln (Commercial mortgage)	-	1.016*** (0.002)	-	0.998 (0.003)	-	1.017*** (0.002)	-	0.998 (0.002)
Ln (Pledged stock)	-	1.006 (0.005)	-	0.996 (0.006)	-	1.001 (0.004)	-	0.987*** (0.005)
Ln (Other collateral)	-	1.033*** (0.002)	-	1.022*** (0.003)	-	1.035*** (0.002)	-	1.018*** (0.002)
Types of collateral	1.021 (0.017)	1.031 (0.024)	0.945*** (0.020)	0.986 (0.030)	0.982 (0.013)	0.970 (0.017)	0.898*** (0.015)	0.925*** (0.020)
<b>Credit Relationships</b>								
Number of banks	1.075*** (0.002)	1.078*** (0.002)	1.058*** (0.003)	1.056*** (0.003)	1.077*** (0.002)	1.080*** (0.002)	1.059*** (0.002)	1.058*** (0.002)
Number of branches	0.820*** (0.031)	0.825*** (0.031)	0.825*** (0.035)	0.832*** (0.036)	0.854*** (0.025)	0.862*** (0.025)	0.834*** (0.027)	0.840*** (0.027)
Main bank (dummy)	1.248*** (0.037)	1.263*** (0.037)	1.197*** (0.043)	1.184*** (0.043)	1.187*** (0.028)	1.202*** (0.029)	1.141*** (0.032)	1.130*** (0.032)
Number of products	0.957*** (0.012)	0.935*** (0.011)	1.000 (0.015)	0.986 (0.015)	0.935*** (0.009)	0.920*** (0.009)	0.990 (0.011)	0.982 (0.011)



<b>Default variables</b>								
Ln (Total overdues)	0.759*** (0.003)	0.756*** (0.003)	0.750*** (0.003)	0.747*** (0.003)	0.734*** (0.002)	0.731*** (0.002)	0.714*** (0.002)	0.712*** (0.002)
Ln (Write offs)	1.096*** (0.006)	1.096*** (0.006)	1.089*** (0.008)	1.090*** (0.007)	1.072*** (0.005)	1.071*** (0.005)	1.052*** (0.006)	1.053*** (0.006)
Number of bank relationships in default	0.383*** (0.007)	0.379*** (0.007)	0.390*** (0.008)	0.390*** (0.008)	0.445*** (0.006)	0.441*** (0.006)	0.458*** (0.007)	0.457*** (0.007)
Ln (FSV of collateral)	0.950*** (0.003)	0.958*** (0.003)	0.972*** (0.003)	0.981*** (0.004)	0.952*** (0.002)	0.959*** (0.002)	0.979*** (0.003)	0.986*** (0.003)
Ln (Amount in litigation)	0.982*** (0.005)	0.981*** (0.005)	1.000 (0.006)	1.004 (0.006)	0.966*** (0.004)	0.962*** (0.003)	0.985*** (0.005)	0.987*** (0.005)
<b>Other variables</b>								
Rating (dummy)	1.137*** (0.030)	1.113*** (0.029)	1.101*** (0.034)	1.104*** (0.034)	1.257*** (0.027)	1.235*** (0.027)	1.274*** (0.032)	1.279*** (0.032)
Maturity of loan	1.001*** (0.000)	1.001*** (0.000)	1.001*** (0.000)	1.001 (0.000)	1.001*** (0.000)	1.001*** (0.000)	1.001*** (0.000)	1.001 (0.000)
Islamic bank (dummy)	1.676*** (0.109)	1.780*** (0.116)	1.273*** (0.163)	1.392*** (0.179)	1.944*** (0.100)	2.069*** (0.107)	1.512*** (0.153)	1.601*** (0.163)
<b>Credit pricing</b>								
Interest rate	-	-	0.991*** (0.003)	0.991** (0.003)	-	-	1.003 (0.003)	1.004 (0.003)
Year dummy	Included	Included	Included	Included	Included	Included	Included	Included
No. of observations	776,997	776,997	439,764	439,764	931,677	931,677	550,188	550,188
Log likelihood	-98,406	-98,613	-62,377	-62,358	-144,237	-144,496	-95228	-95208
Likelihood ratio chi-square (df)	29,394 (24)	28,979 (28)	19,822 (25)	19,860 (29)	45,790 (24)	45,273 (28)	33,317 (25)	33,359

Notes: This table presents the results of the Cox Proportional Hazard Model with exit from default defined as 'failure event'. Panel B contains estimation results with deflated values of

independent variables. In the first four models (9 to 12), the dataset is confined to first default (and exit) only and subsequent defaults are ignored. In the next four models (13 to 16), all the defaults as well as exits are taken into account. Model 9 contains the total value of collateral which is substituted with five different types of collateral in the model at column 10. Model 11 adds 'interest rate' as another independent variable in model 9 and the model at column 12 substitutes total collateral with types of collateral. This sequence is repeated in the next four models (13 to 16) with multiple defaults. Standard errors are shown in parenthesis.

\*\* significant at 5% level

\*\*\* significant at 1% level

Table 6: Panel A

## Estimation Results with Failure Event as Access to Fresh Credit after Exiting Default

Variables	First Default				Multiple Default			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Size of the Borrowing</b>								
Ln (Principle)	1.041*** (0.004)	1.041*** (0.004)	1.055*** (0.006)	1.057*** (0.006)	1.035*** (0.004)	1.036*** (0.004)	1.046*** (0.005)	1.047*** (0.005)
Ln (Limit)	1.027*** (0.007)	1.025*** (0.006)	1.022** (0.010)	1.024** (0.010)	1.020*** (0.006)	1.020*** (0.006)	1.021** (0.009)	1.023*** (0.009)
Number of loans	1.001 (0.001)	1.000 (0.001)	1.001 (0.002)	1.001 (0.002)	1.004*** (0.001)	1.004*** (0.001)	1.004*** (0.001)	1.004*** (0.001)
<b>Collateral</b>								
Ln (Total collateral)	1.019*** (0.005)		1.016*** (0.006)		1.014*** (0.005)		1.010 (0.005)	
Ln (Liquid collateral)		1.006 (0.006)		0.998 (0.008)		1.009 (0.005)		1.006 (0.006)
Ln (Residential mortgage)		1.004 (0.004)		0.996 (0.005)		1.001 (0.003)		0.997 (0.004)
Ln (Commercial mortgage)		1.011*** (0.003)		1.005 (0.004)		1.005 (0.003)		1.003 (0.004)
Ln (Pledged stock)		0.997 (0.006)		0.987 (0.007)		0.996 (0.005)		0.994 (0.006)
Ln (Other collateral)		1.027*** (0.004)		1.012*** (0.005)		1.015*** (0.003)		1.006 (0.004)
Types of collateral	0.929*** (0.019)	0.892*** (0.025)	0.942** (0.025)	0.954 (0.035)	1.005 (0.016)	0.988 (0.022)	1.016 (0.019)	1.018 (0.025)
<b>Credit Relationships</b>								
Number of banks	1.090*** (0.003)	1.089*** (0.003)	1.093*** (0.004)	1.093*** (0.004)	1.048*** (0.003)	1.047*** (0.003)	1.050*** (0.003)	1.050*** (0.003)
Number of branches	1.225*** (0.047)	1.222*** (0.046)	1.228*** (0.050)	1.227*** (0.050)	1.055** (0.024)	1.050** (0.025)	1.052** (0.025)	1.048** (0.026)
Main bank (dummy)	1.319*** (0.055)	1.300*** (0.055)	1.270*** (0.066)	1.263*** (0.066)	1.217*** (0.044)	1.213*** (0.044)	1.185*** (0.052)	1.184*** (0.052)
Number of products	1.174*** (0.016)	1.171*** (0.016)	1.140*** (0.019)	1.138*** (0.019)	1.084*** (0.012)	1.081*** (0.012)	1.064*** (0.014)	1.063*** (0.014)

<b>Default variables</b>								
Ln (Total overdues)	0.946*** (0.004)	0.946*** (0.004)	0.939*** (0.005)	0.939*** (0.005)	0.950*** (0.003)	0.950*** (0.004)	0.944*** (0.005)	0.944*** (0.005)
Ln (Write offs)	0.946*** (0.012)	0.944*** (0.012)	0.949*** (0.015)	0.949*** (0.015)	0.951*** (0.012)	0.951*** (0.012)	0.951*** (0.014)	0.950*** (0.014)
Number of bank relationships in default	0.940*** (0.006)	0.937*** (0.006)	0.939*** (0.008)	0.938*** (0.008)	0.999 (0.005)	0.998 (0.005)	1.004 (0.007)	1.004 (0.007)
Ln (FSV of collateral)	0.980*** (0.004)	0.983*** (0.004)	0.976*** (0.004)	0.979*** (0.005)	0.985*** (0.003)	0.987*** (0.003)	0.983*** (0.004)	0.985*** (0.004)
Ln (Amount in litigation)	0.962*** (0.009)	0.963*** (0.009)	0.959*** (0.011)	0.960*** (0.011)	0.971*** (0.009)	0.972*** (0.009)	0.967*** (0.010)	0.967*** (0.010)
<b>Other variables</b>								
Rating (dummy)	1.058 (0.044)	1.054 (0.044)	0.935 (0.046)	0.941 (0.046)	0.966 (0.036)	0.964 (0.036)	0.853*** (0.037)	0.857*** (0.037)
Maturity of loan	1.000 (0.001)	1.000 (0.001)	0.998*** (0.001)	0.998*** (0.001)	1.000 (0.000)	1.000 (0.000)	0.999 (0.001)	0.999 (0.001)
Islamic bank (dummy)	1.619*** (0.144)	1.589*** (0.141)	1.466*** (0.264)	1.482*** (0.267)	1.261*** (0.100)	1.248*** (0.099)	1.037 (0.166)	1.037 (0.166)
<b>Credit pricing</b>								
Interest rate	-	-	0.998 (0.006)	0.998 (0.006)	-	-	1.000 (0.005)	1.001 (0.005)
Year dummy	Included	Included	Included	Included	Included	Included	Included	Included
No. of observations	88,454	88,454	59,821	59,821	166,453	166,453	114,524	114,524
Log likelihood	-33,780	-33,750	-22,062	-22,055	-46,000	-45,986	-30,657	-30,654
Likelihood ratio chi-square (df)	3,240 (24)	3,300 (28)	2,235 (25)	2,249 (29)	2,342 (24)	2,370 (28)	1,691 (25)	1,696 (29)

Notes: This table presents the results of the Cox Proportional Hazard Model with access to credit after clearing default defined as ‘failure event’. Panel A contains estimation results with nominal values of independent variables. In the first four models, the dataset is confined to first default (exit and subsequent access to credit) only and subsequent defaults are ignored. In the next four models, all the defaults (as well as exits and access to credit) are taken into account. The first model contains the total value of collateral which is substituted with five different types of collateral in the second model. The model at column 3 adds ‘interest rate’ as another independent variable in model 1 and the model at column 4 substitutes total collateral with types of collateral. This sequence is repeated in the next four models (5 to 8) with multiple defaults. Standard errors are shown in parenthesis.

\*\* significant at 5% level

\*\*\* significant at 1% level

**Table 6: Panel B**  
**Estimation Results with Failure Event as Access to Fresh Credit after Exiting Default**

Variables	First Default _ Deflated				Multiple Defaults _ Deflated			
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
<b>Size of the Borrowing</b>								
Ln (Principle)	1.056*** (0.006)	1.056*** (0.006)	1.075*** (0.008)	1.077*** (0.008)	1.049*** (0.005)	1.049*** (0.005)	1.062*** (0.007)	1.063*** (0.007)
Ln (Limit)	1.036*** (0.008)	1.031*** (0.008)	1.027** (0.012)	1.027** (0.012)	1.026*** (0.007)	1.024*** (0.007)	1.025** (0.011)	1.026*** (0.010)
Number of loans	1.001 (0.001)	1.001 (0.001)	1.001 (0.002)	1.001 (0.002)	1.004*** (0.001)	1.004*** (0.001)	1.004*** (0.001)	1.004*** (0.001)
<b>Collateral</b>								
Ln (Total collateral)	1.014*** (0.005)		1.012 (0.006)		1.010** (0.005)		1.006 (0.005)	
Ln (Liquid collateral)		1.005 (0.006)		0.997 (0.008)		1.009 (0.005)		1.006 (0.006)
Ln (Residential mortgage)		1.003 (0.004)		0.995 (0.005)		1.000 (0.003)		0.996 (0.004)
Ln (Commercial mortgage)		1.010*** (0.003)		1.003 (0.004)		1.004 (0.003)		1.002 (0.004)
Ln (Pledged stock)		0.996 (0.006)		0.986 (0.007)		0.996 (0.005)		0.993 (0.006)
Ln (Other collateral)		1.025*** (0.004)		1.010** (0.005)		1.014*** (0.003)		1.005 (0.004)
Types of collateral	0.930*** (0.019)	0.896*** (0.025)	0.944** (0.025)	0.959 (0.035)	1.006 (0.016)	0.993 (0.022)	1.017 (0.019)	1.021 (0.025)
<b>Credit Relationships</b>								
Number of banks	1.087*** (0.003)	1.086*** (0.003)	1.091*** (0.004)	1.090*** (0.004)	1.047*** (0.003)	1.045*** (0.003)	1.049*** (0.003)	1.048*** (0.004)
Number of branches	1.219*** (0.046)	1.216*** (0.046)	1.223*** (0.049)	1.222*** (0.050)	1.052** (0.024)	1.048** (0.025)	1.049** (0.025)	1.046 (0.025)
Main bank (dummy)	1.292*** (0.054)	1.274*** (0.054)	1.247*** (0.065)	1.239*** (0.065)	1.200*** (0.044)	1.195*** (0.043)	1.169*** (0.052)	1.167*** (0.052)
Number of products	1.165*** (0.016)	1.162*** (0.016)	1.129*** (0.019)	1.127*** (0.019)	1.078*** (0.012)	1.074*** (0.012)	1.056*** (0.014)	1.056*** (0.014)

<b>Default variables</b>								
Ln (Total overdues)	0.921*** (0.006)	0.922*** (0.006)	0.910*** (0.008)	0.910*** (0.008)	0.928*** (0.006)	0.928*** (0.006)	0.917*** (0.007)	0.917*** (0.007)
Ln (Write offs)	0.916*** (0.018)	0.914*** (0.018)	0.918*** (0.022)	0.918*** (0.022)	0.925*** (0.017)	0.924*** (0.017)	0.921*** (0.021)	0.921*** (0.021)
Number of bank relationships in default	0.940*** (0.006)	0.937*** (0.006)	0.940*** (0.008)	0.938*** (0.008)	0.999 (0.005)	0.998 (0.005)	1.005 (0.007)	1.005 (0.007)
Ln (FSV of collateral)	0.974*** (0.005)	0.979*** (0.005)	0.968*** (0.006)	0.973*** (0.006)	0.981*** (0.004)	0.983*** (0.004)	0.978*** (0.005)	0.980*** (0.0005)
Ln (Amount in litigation)	0.946*** (0.013)	0.948*** (0.013)	0.943*** (0.015)	0.943*** (0.015)	0.959*** (0.012)	0.961*** (0.012)	0.953*** (0.015)	0.953*** (0.015)
<b>Other variables</b>								
Rating (dummy)	1.057 (0.044)	1.053 (0.044)	0.937 (0.046)	0.942 (0.047)	0.963 (0.036)	0.961 (0.036)	0.855*** (0.037)	0.859*** (0.037)
Maturity of loan	1.000 (0.001)	1.000 (0.001)	0.998*** (0.001)	0.998*** (0.001)	1.000 (0.000)	1.000 (0.000)	0.999 (0.001)	0.999 (0.001)
Islamic bank (dummy)	1.617*** (0.143)	1.582*** (0.140)	1.465** (0.264)	1.474** (0.265)	1.258*** (0.100)	1.243*** (0.098)	1.036 (0.166)	1.034 (0.166)
<b>Credit pricing</b>								
Interest rate	-	-	0.999 (0.006)	0.999 (0.006)	-	-	1.003 (0.005)	1.003 (0.005)
Year dummy	Included	Included	Included	Included	Included	Included	Included	Included
No. of observations	88,454	88,454	59,821	59,821	166,453	166,453	114,524	114,524
Log likelihood	-33,780	-33,751	-22,066	-22,058	-46,000	-45,986	-30,658	-30,655
Likelihood ratio chi-square (df)	3,239 (24)	3,299 (28)	2,228 (25)	2,243 (29)	2,343 (24)	2,371 (28)	1,689 (25)	1,695 (29)

Notes: This table presents the results of the Cox Proportional Hazard Model with access to credit after clearing default defined as 'failure event'. Panel A contains estimation results with nominal values of independent variables. In the first four models (at columns 9 to 12), the dataset is confined to first default (exit and subsequent access to credit) only and subsequent defaults are ignored. In the next four models (at columns 13 to 16), all the defaults (as well as exits and access to credit) are taken into account. The first model at column 9 contains the total value of collateral which is substituted with five different types of collateral in the next model at column 10. The model at column 11 adds 'interest rate' as another independent variable in model 9 and the next model at column 12 substitutes total collateral with types of collateral. This sequence is repeated in the next four models (13 to 16) with multiple defaults. Standard errors are shown in parenthesis.

\*\* significant at 5% level

\*\*\* significant at 1% level

Table 7:

## Summary of the Results

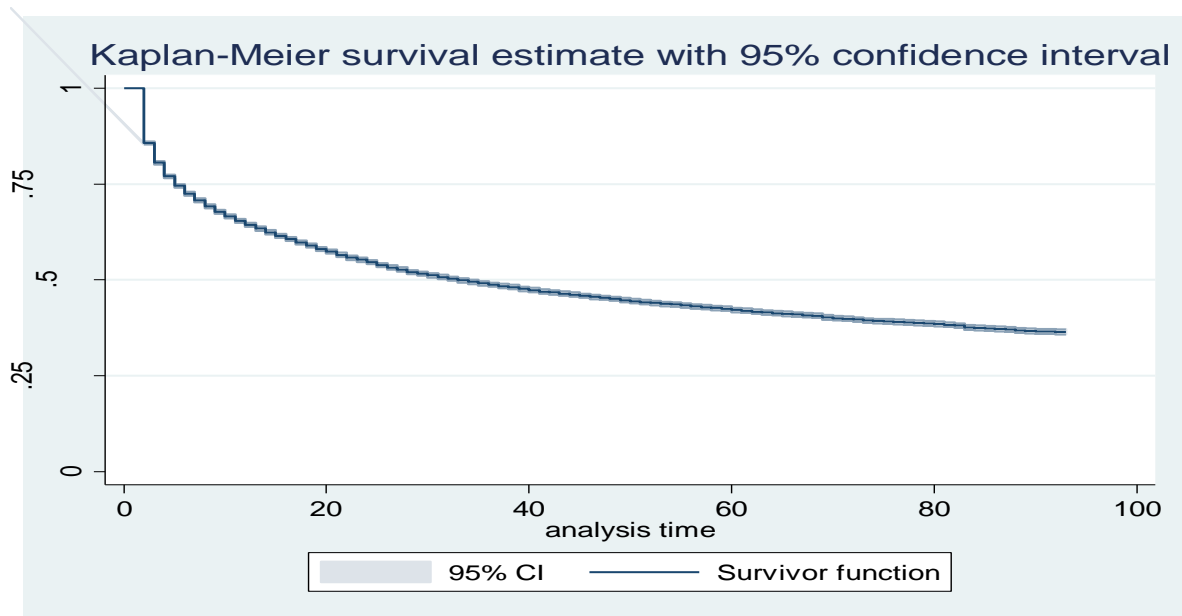
Failure Event	Exit from Default		Access to Credit after Exiting Default	
	Table 6, panel A, column 5	Table 6, panel A, column 7	Table 7, panel A, column 5	Table 7, panel A, column 7
<b>Size of the Borrower</b>				
Ln (Principle)	-	-	+	+
Ln (Limit)	+	+	+	+
Number of loans	n/s	n/s	+	+
<b>Collateral</b>				
Ln (Total collateral)	+	+	+	n/s
Types of collateral	n/s	-	n/s	n/s
<b>Credit Relationships</b>				
Number of banks	+	+	+	+
Number of branches	-	-	+	+
Main bank (dummy)	+	+	+	+
Number of products	-	n/s	+	+
<b>Other Variables</b>				
Rating (dummy)	+	+	n/s	-
Maturity of loan	+	+	n/s	n/s
Islamic bank (dummy)	+	+	+	+
<b>Default Variables</b>				
Ln (Total overdues)	-	-	-	-
Ln (Write offs)	+	+	-	-
Number of bank relationships in default	-	-	n/s	n/s
Ln (FSV of collateral)	-	-	-	-

Ln (Amount in litigation)	-	-	-	-
<b>Credit Pricing</b>				
Interest rate	n/a	n/s	n/a	n/s
<b>Year dummy</b>	<b>Included</b>	<b>Included</b>	<b>Included</b>	<b>Included</b>

Notes: This table presents a comparison of the estimation results with the three failure events examined in the paper i.e., default, exit from default and access to credit after clearing default. The table shows the estimation results of equation 5, which take into account all defaults (that is first default as well as subsequent defaults) and equation 7 which adds 'interest rate' as another independent variable in equation 5. The sign (+) denotes a positive and significant association at 1% and 5% level and (-) denotes a negative and significant association at 1% and 5% level. The word (n/s) denotes insignificant association whereas (n/a) denotes the variables not included in the equation.

Figure 1

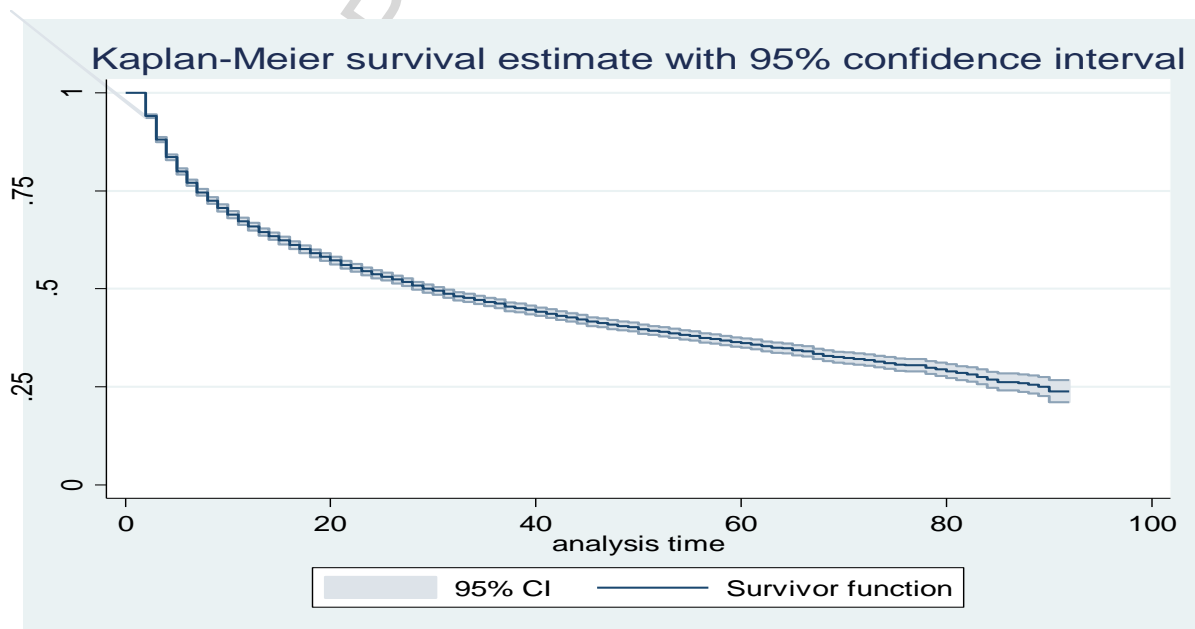
## Exit from Default



Note: Analysis time reflects number of months since default. The survival estimate yields the probability of surviving till time  $t$ . In the current scenario, the survival estimate is the probability of remaining in default till time  $t$ .

Figure 2

## Access to Fresh Credit after Exiting Default



Note: Analysis time is the number of months after clearing default. The survival estimate yields the probability of subjects remaining in the same state till time  $t$ . In the current scenario, it is used to assess the probability of accessing fresh credit till time  $t$ . The access to fresh credit has been defined as obtaining a new loan after exiting default.



ACCEPTED MANUSCRIPT

# Default Resolution and Access to Fresh Credit in an Emerging Market

## Highlights

- We study default resolution and access to fresh credit in an emerging market.
- Collateral expedites default resolution and access to fresh credit.
- This is the first study to document the role of collateral in default resolution.
- We use a unique dataset of *all* commercial loans made in Pakistan from 2006 to 2013.